# MIDDLE SCHOOL MATHEMATICS TEACHERS' SENSE OF SELF-EFFICACY FOR TEACHING MATHEMATICS TO FIFTH GRADE STUDENTS

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Approval of the Graduate School of Social Sciences

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## ABSTRACT

MIDDLE SCHOOL MATHEMATICS TEACHERS' SENSE OF SELF-EFFICACY FOR TEACHING MATHEMATICS TO FIFTH GRADE STUDENTS

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The purpose of the study was to investigate the issue of whether middle school mathematics teachers' sense of self-efficacy for teaching differs in terms of type of teaching licence, gender and year of teaching experience. The current thesis also aimed at examining the relationship between middle school mathematics teachers' sense of self-efficacy for teaching mathematics to fifth grades and teaching independent from grade levels.

The data were collected from 208 mathematics teachers from 50 public middle schools in the central area of Ankara, in the spring semester of 2014-2015. In order to determine teachers' self-efficacy the instruments called Mathematics Teachers' Sense of Efficacy Scale and Turkish version of Teachers' Sense of Efficacy Scale were used. The results were evaluated in terms of three dimensions: *efficacy for student engagement, efficacy for instructional strategies and efficacy for classroom management* via one-way MANOVA and pearson correlation analysis.

The results indicated that there was not a significant difference in mathematics teachers' scores of self-efficacy with respect to type of teaching licence and gender whereas there was a significant difference in mathematics teachers'

scores of self-efficacy for teaching independent from grade levels with respect to years of teaching experience. Teachers with an experience of 16-20 years scored better for dimensions of efficacy for student engagement and instructional strategies. Moreover, teachers with a background of 0-5 years had fewer score in efficacy for instructional strategies. In addition, teachers who have been teaching for 6-10 years scored less in efficacy for student engagement. Moreover, the result of the correlation analysis indicated there was a strong and positive correlation between teachers' self-efficacy scores for teaching mathematics to fifth grades and teaching independent from grade levels.

Keywords: Self-efficacy, Teachers' Sense of Self-Efficacy, Middle School Mathematics Teachers

# ÖZ


ORTAOKUL MATEMATİK ÖĞRETMENLERİNİN 5.SINIFLARA ÖĞRETİM YAPABİLMEYE YÖNELİK ÖZ-YETERLİK ALGILARI

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Bu çalışmanın amacı ortaokul matematik öğretmenlerinin matematik öğretimine yönelik öz-yeterlik algılarını mezun olunan fakülte, cinsiyet ve mesleki deneyim süresi değişkenlerine bağlı olarak incelemektir. Çalışmanın diğer amacı, ortaokul matematik öğretmenlerinin 5. sınıflara matematik öğretimine yönelik öz-yeterlik algıları ile genel olarak öğretmeye yönelik öz-yeterlik algıları arasındaki ilişkiyi incelemektir.

Bu çalışma için gereken veriler 2014-2015 yılı bahar döneminde Ankara ili merkezinde 50 devlet ortaokulunda çalışan 208 ortaokul matematik öğretmeninden toplanmıştır. Ortaokul matematik öğretmenlerinin öz-yeterlik algılarını belirlemek için *Matematik Öğretmenlerinin Öz-yeterlik Algıları Ölçeği* ve *Öğretmen Öz-Yeterlik Algıları Ölçeğinin Türkçe Versiyonu* isimli ölçekler kullanılmıştır. Çalışmanın sonuçları, öğrenci katılımına yönelik yeterlik, öğretim stratejilerine yönelik yeterlik ve sınıf yönetimine yönelik yeterlik boyutları açısından değerlendirilmiştir. Ayrıca, verilerin analizi tek yönlü çok değişkenli varyans analizi ve korelasyon analizi ile gerçekleştirilmiştir.

Çalışmanın sonunda elde edilen bulgular, ortaokul matematik öğretmenlerinin öz-yeterlik algılarının mezun olunan fakülte ve cinsiyet değişkenlerine göre farklılık göstermediğini göstermiştir. Ancak öğretmenlerin genel olarak öğretime yönelik öz-yeterlik algıları mesleki deneyime göre farklılık göstermektedir. Bu farklılık özellikle öğretmenlerin genel olarak matematik öğretimine yönelik öz-yeterlik algılarının öğrenci katılımına yönelik yeterlik ve öğretim stratejilerine yönelik yeterlik değişkenleri açısından görülmüştür. 16-20 yıl aralığında meslek deneyimine sahip öğretmenlerin öğrenci katılımına ve öğretim stratejilerine yönelik değişkenler açısından puanları diğer öğretmenlere göre yüksek çıkmıştır. Ayrıca, öğretim stratejilerine yönelik yeterlik puanlarının en düşük olduğu grubun 0-5 yıl aralığında meslek deneyimine sahip öğretmenler olduğu görülmüştür. Öğrenci katılımına yönelik yeterlik puanlarının en düşük olduğu grubun 6-10 yıl aralığında meslek deneyimine sahip öğretmenler olduğu ortaya çıkmıştır. Ayrıca, korelasyon analizi ortaokul matematik öğretmenlerinin 5.sınıflara matematik öğretmeye yönelik öz-yeterlik algıları ile genel öğretime yönelik algıları arasında güçlü ve pozitif bir ilişki olduğunu göstermiştir.

Anahtar Kelimeler: Öz-yeterlik, Öğretmen Öz-yeterlik Algısı, Ortaokul Matematik Öğretmenleri

To My Better Half

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| | |
|---|---|
| CFA | Confirmatory Factor Analysis |
| CM | Classroom Management |
| H0 | Null hypothesis |
| IS | Instructional Strategies |
| IV | Independent Variable |
| M | Mean |
| MANOVA | Multivariate Analysis of Variance |
| MoNE | Ministry of National Education |
| MSES | Mathematics Self-Efficacy Scale |
| MTEBI | Mathematics Teaching Efficacy Beliefs Instrument |
| MTSES | Mathematics' Teachers Sense of Efficacy |
| N | Number of the Participants |
| NCTM | National Council of Teachers of Mathematics |
| p | Significance Value |
| SD | Standard Deviation |
| SE | Student Engagement |
| SETMI | Self Efficacy for Teaching Mathematics Instrument |
| SPSS | Statistical Package for Social Sciences |
| TEOGS | Transition Examinations from Primary to Secondary Education |
| TSEB | Teacher Self-Efficacy Belief |
| TTSES | Turkish Version of Teachers' Sense of Efficacy |

# CHAPTER 1

## INTRODUCTION

Self-efficacy is a term defined by Albert Bandura (1997), developer of social cognitive theory, as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments". Self-efficacy is not a perceivable or observable skill. It is an internal belief related to the answer of the question of "what can I do?" (Snyder & Lopez, 2002). From the social cognitive theory perspective, self-efficacy beliefs have effect on people's choices, efforts, persistence when handling difficulties and emotions (Pajares, 1997).

Consistent with the general definition of self-efficacy, teacher self-efficacy is defined as "judgement of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated." (Tschannen-Moran & Woolfolk, 2001, p.783). The findings of the studies about self-efficacy revealed that the sense of teachers' self-efficacy affects the instructional classroom activities and the teachers having high sense of self-efficacy are more ambitious and devoted about teaching (Bıkmaz, 2004).

Moreover, teachers are seen as the most important component through success in mathematics education (Battista, 1994). On the other hand, performing of influential instructional practices in mathematics teaching has been connected to teacher efficacy (Enon, 1995). Teacher efficacy is a notable predictor of mathematics instructional strategies resulting in a situation that mathematics teachers who have high sense of efficacy are more effectuous than teachers having a lower sense of efficacy (Swars, 2005).

A school reform bill popularly known as 4+4+4 is approved by The Grand National Assembly of Turkey in the year of 2012. The law extended the compulsory education from continuous 8 years to 12 years consisting 3 parts (4 years of primary school, 4 years of middle school and 4 years of high school instead of 5 years of

primary school and 3 years of middle school). This reform law brought about many critics related to its feasibility. One of the critics is about the integration of the fifth graders into secondary school which meant that fifth grade students are taught by subject teachers instead of class teachers anymore. This situation was unusual for both students and teachers. The reform was adopted regardless of teachers' thoughts and motivation as real practitioners. Therefore, it was questioned that whether subject teachers are ready to teach fifth grade students and whether there was a need of in-service training for them. In the literature, there are some studies about this issue however they are mostly based on the qualitative studies which are not attributed to any theoretical framework. For this reason, in this research study, the issue of middle school mathematics teachers' sense of self-efficacy on teaching fifth grade students in new education system is examined. In order to carry out this examination the instruments of *"Turkish version of the Teachers' Sense of Efficacy Scale (TTSES)"* developed by Capa, Cakiroglu & Sarikaya, 2005 and *"Mathematics Teachers' Sense of Efficacy Scale (MTSES)"* developed by the researcher were used. The results of the TTSES were evaluated in terms of three dimensions namely: *student engagement, instructional strategies* and *classroom management.*

### 1.1. Purpose of the Study

The purpose of the study was to examine the issue of whether middle school mathematics teachers' sense of self-efficacy differs in terms of type of teaching licence, gender and year of teaching experience. This study also aimed at investigating the relationship between middle school mathematics teachers' sense of self-efficacy for teaching independent from grade levels and teaching mathematics to fifth grades. In order to achieve these purposes, following research questions were addressed for the present study.

### 1.2. Research Questions

In this section of this chapter research questions, sub-research questions and hypotheses for the study were presented.

Research Question 1: Does the middle school mathematics teachers' sense of self-efficacy for teaching fifth grades and teaching independent from grade levels differ in terms of type of teaching licence, gender and year of teaching experience?

Sub-question 1: Is there a significant difference among fifth grade middle school mathematics teachers of graduate of education faculty and other faculties in

terms of their self-efficacy scores of MTSES and TTSES for each sub-dimension; *efficacy for student engagement, efficacy for instructional strategies, efficacy for classroom management*?

$H_0$: There is no significant difference among fifth grade middle school mathematics teachers graduate of education faculty and other faculties in terms of their scores of MTSES and TTSES for each sub-dimension; *efficacy for student engagement, efficacy for instructional strategies, efficacy for classroom management*.

Sub-question 2: Is there a significant difference between female and male fifth grade mathematics teachers in terms of their scores of MTSES and TTSES for each sub-dimension; *efficacy for student engagement, efficacy for instructional strategies, efficacy for classroom management?*

$H_0$: There is no significant difference between female and male fifth grade mathematics teachers in terms of their scores of MTSES and TTSES for each sub-dimension; *efficacy for student engagement, efficacy for instructional strategies, efficacy for classroom management.*

Sub-question 3: Is there a significant difference among fifth grade mathematics teachers with a teaching experience of 0-5, 6-10, 11-15, 16-20 years and more in terms of their scores of MTSES and TTSES for each sub-dimension; *efficacy for student engagement, efficacy for instructional strategies, efficacy for classroom management?*

$H_0$: There is no significant difference among fifth grade mathematics teachers with experience of 0-5, 6-10, 11-15, 16-20 years and more in terms of their scores of MTSES and TTSES for each sub-dimension; *efficacy for student engagement, efficacy for instructional strategies, efficacy for classroom management.*

Research Question 2: Is there a relationship between MTSES and TTSES scores of the middle school mathematics teachers?

$H_0$: There is no relationship between MTSES and TTSES scores of the middle school mathematics teachers.

**1.3. Significance of the Study**

The necessity of mathematics education in any kind of educational institution is an undebatable issue accepted all over the world and it is concluded that the statue

of mathematics learning in a nations' educational understanding is equivalent to the statue of teaching the nation's own language (Çoban, 2002).

As mentioned in the previous section of this chapter, the issue of subject teachers' teaching fifth grade students, brought with the reform of 4+4+4 schooling applied first time in 2012-2013 academic year, was unfamiliar for both middle school teachers and fifth grade students.

When the draft law was come out, it was criticized in terms of many aspects. The age of 60-72 months for starting school was one of critics. It was found to be inappropriate for a child to start first grade at this age because his/her cognitive level is not sufficient to make basic numeric evaluation and arithmetic operations. The draft law did not focus on early childhood education although scientific findings showed that a student educated in early childhood period is more adaptable to school and more accomplished in school than a student who is not educated in this period (Hacettepe, 2012). Another critique is about the transition of a student from primary school to middle school after fourth grade. Since a fourth grade student is in the middle of concrete operations period, the transition at this age to middle school which requires the ability of abstract operations was found scientifically inappropriate for him/her (Boğaziçi, 2012). Furthermore, the issue of intermittent feature of 12 years education providing students with opportunity for open high school is the other critique which might prevent compulsory high school education's aim of covering the whole population at this age (Boğaziçi, 2012).

All of the mentioned critics are important but there are more questions to be addressed:

- Did people from all sides participate in the process of new education reform?
- Were discussions on advantages and possible disadvantages about the reform sufficient?
- Were classroom teachers ready to teach first grade students of 60-72 months or was there a need of in-service training for classroom teachers?
- Were subject teachers ready to teach fifth grade students or was there a need of in-service training for subject teachers?

"Providing quality education means that we should invest in higher standards for all children, improved curricula, tests to measure student achievement, safe schools, and increased use of technology Without good teachers to implement them,

no educational reforms will succeed at helping all students learn to their full potential" (Riley, 1998). The most crucial enterprise is to make is in well-qualified, caring, and dedicated teachers (Stronge, Ward & Grant, 2011).

One of the teacher beliefs affecting behaviors is their sense of self-efficacy. The detection and development of teachers' sense of self-efficacy which has influence on individual motivation and performance is essential for enhancing the quality of education and instruction. In education, teacher efficacy has been a very important variable over the past 25 years (Cakiroglu, 2008). The studies carried out about teachers' sense of self-efficacy provide important insights to raise academic achievements, especially in courses with significantly low student achievements (Dee & Hoy, 2008). It is very crucial to develop practices to increase the number of qualified and successful teachers with high levels of sense of self-efficacy (Ozder, 2011) since there are positive correlations between teachers' sense of self-efficacy in terms of their capabilities and self-confidences and students' academic success and motivations (Graham, Harris, Fink & McArthur, 2001). Moreover, teachers' sense of self-efficacy is increased by their' satisfaction with their performances (Özerkan, 2007). In addition to these, even if they are made for better, changes are uncomfortable and stressful, hence, change is difficult. The development of teacher efficacy seems to continue in a curvilinear manner for teachers who are in the middle of a change process. While attempting to implement new strategies, teachers' efficacy beliefs may firstly be decreased but then come up to a higher level when the new practices are effective (Ross, 1994; Stein & Wang, 1988). Teacher's personal efficacy initially has been affected negatively by the implementation of change. According to the Guskey (1986, 1989), change is difficult and gradual process for teachers therefore, after training in a new method to be able to overcome the initial slump in their confidence, teachers need encouragement, support and feedback. In addition to these, there are many factors affecting students' learning of mathematics; however, the most important factor in mathematics learning is teachers' self-efficacy (NCTM, 2000; Romberg & Carpenter, 1986). It is because of the fact that the issue of how to teach mathematics is as important as what to teach in mathematics (NCTM, 1989).

In national education system of Turkey, significant changes have occured in recent years. The issue of the integration of $5^{th}$ grades into the structure of middle

schools after the year of 2012 was challenging for both fifth grade students and middle school mathematics teachers. Regarding with this change, professionals brought about several controversial issues to handle. One of them was about how middle school mathematics teachers would evaluate this issue as main practitioners. For this reason, the focus of present research is the determination of middle school mathematics teachers' sense of self-efficacy for teaching mathematics to fifth grades. In the light of the situation which is detected with this survey research, middle school mathematics teachers will have the opportunity to evaluate themselves in terms of their lessons to fifth grade students, it will be possible to determine the general sense of self- efficacy and sense of self-efficacy for teaching mathematics to fifth grade students and whether there is a need for in-service training for teachers. Moreover, this study, related to mathematics teaching, will lighten studies for teaching other disciplines to fifth grade students. At this point, the sense of middle school mathematics teachers' efficacy for teaching mathematics to fifth grades and teaching independent from grade levels will be investigated.

### 1.4. Definition of Important Terms

Key terms of the present study were explained in this part of this chapter. In addition to the self-efficacy, teachers' sense of self-efficacy, teachers' year of teaching experience, type of teaching licence, middle school mathematics teachers, dimensions of TTSES, namely efficacy for student engagement, efficacy for instructional strategies and efficacy for classroom management were explained as important terms to be defined in alphabetic order.

*Efficacy for classroom management* dimension of TTSES is related to the level of teachers' efficacy on keeping order in the class which is a process of ensuring that classroom sessions run smoothly by handling disruptive behaviors of unmotivated students. "How much can you do to calm a student who is disruptive or noisy?" and "How well can you keep a few problem students form ruining an entire lesson?".

*Efficacy for instructional strategies* dimension of TTSES is about the level of teachers' efficacy on performing teaching strategies during class session. Sample items involved in this dimension are "How well can you implement alternative strategies in your classroom?" and "To what extent can you craft good questions to your students?".

*Efficacy for student engagement* dimension of TTSES is concerning the level of teachers' efficacy on making students involved in learning activities during class session. Sample items of this dimension are "How much can you do to motivate students who show low interest in school work?" and "How much can you assist families in helping their children do well in school?".

*Middle school mathematics teacher* is defined as "a person who works in an institution of education in order to teach mathematics to $5^{th}$, $6^{th}$, $7^{th}$ and $8^{th}$ grade students. The participants of present study are middle school mathematics teachers of $5^{th}$ graders.

*Self- efficacy* is defined as "a person's belief on his competence to fulfill a task" (Bandura, 1997).

*Teachers' sense of self-efficacy* is defined as beliefs of teachers in their abilities to organize and perform required actions to get desired results in specific situations successfully (Tschannen-Moran, Woolfolk-Hoy, & Hoy, 1998).

*Teachers' year of experience* is defined as number of years that teachers spend on being a teacher. In the present study teachers' year of experience is categorized under 5 groups, namely 0-5, 6-10, 11-15, 16-20 years and more.

*Type of teaching licence* is defined as teachers' graduation from faculty of education or other faculties (e.g teaching certificate).

# CHAPTER 2

# LITERATURE REVIEW

In this chapter of present study, theoretical framework was handled with the pioneering studies on self-efficacy, teachers' sense of efficacy and mathematics teachers' sense of efficacy on teaching fifth grade students. In the first part of this chapter, the concept of self-efficacy is mentioned under the framework of social cognitive theory. The concept is also handled in terms of four sources of self-efficacy. The following part is related to teachers' sense of efficacy. Teachers' sense of efficacy is detailed in four sections concerning characteristics of teachers depending on the level of self-efficacy, instruments used for measuring self-efficacy, studies on teacher's self- efficacy and studies on teachers' self-efficacy on teaching mathematics, respectively. Next part is related to studies on new education system in Turkey. Lastly, the summary of literature review is given in the final part of this chapter.

## 2.1 Self-Efficacy

The term self-efficacy is defined "a cognitive process in which people construct beliefs about their capacity to perform at a given level of attainment". These beliefs affect the level of their effort, persistence and resilience while coping with challenges in the face of obstacles (Bandura, 1997). According to Bandura (1986), sense of efficacy is mainly constructed due to an individual's preceding experiences. Self-efficacy originates from social cognitive theory, which is best described by a triadic model representing the relationships between one's behaviors, the environment, and personal factors (Bandura, 1997; Pajares, 2002). *Efficacy expectations* and *outcome expectations* are the two main constructs of Bandura's (1977) social cognitive theory. Efficacy expectancy is the individual's belief to conduct actions which are necessary to perform a given task, on the other hand, outcome expectancy is the individual's prediction of the probable results of

executing that task at the expected degree of capability. The efficacy question is "Do I have the ability to organize and execute the actions necessary to accomplish a specific task at a desired level?" whereas outcome question is "If I accomplish the task at that level, what are the likely consequences?" (Bandura, 1986). Present use of the term self-efficacy originates in the construct of efficacy expectations. Self-efficacy does not have a universal measure (Bandura, 2006). According to Skinner (1996) one of the few conceptualizations of human control describing a difference between capability (I can execute actions) and contingency (the actions will attain certain outcome) is self-efficacy theory. Although there are many notions of self, such as self-concept, self-worth and self-esteem, self-efficacy is different from them because of the fact that it is particular to specific task. More specifically, self-esteem is usually considered to be a personality feature which reflects a person's characteristics affective evaluation of self. Conversely, self-efficacy is an evaluation of task capability which is not intrinsically judgmental (Gist & Mitchell, 1992, p.185). Evaluations of self-efficacy are task-specific and diversify in strength and magnitude (Bong & Skaalvik, 2003). Self- efficacy has an effect not only on the result of an event but also on the results expected depending on one's evaluations of how much they can achieve (Bandura, 1986). It is stated that self-efficacy means that the degree of perceived ability alters depending on the task or situation (Tschannen-Moran, Woolfolk Hoy & Hoy, 1998). The focus of social cognitive theory as a theoretical base of self-efficacy is on the development and use of human agency (Bandura, 2006). Social cognitive theory emphasizes on the interaction of individual factors such as thoughts, behaviors and environmental circumstances. An individual's aims and action is affected by self-efficacy and self-efficacy is affected by situations within the environment (Schunk & Meece, 2006). Thought patterns and emotions providing actions in which individuals make efforts in pursuing objectives, persisting in the face of handicaps and controlling events that influence their lives are affected by self-efficacy beliefs (Bandura, 1986, 1993, 1996, 1997).

The level of self-efficacy has influence on choice of actions, degree of exertion spent on activities and the time amount an individual perseveres when facing obstacles (Bandura, 2006). While expecting the uselessness of efforts to change their life situation, people with self-doubts produce little modification even in environments which provide many potential opportunities. In contrast, people with a

particular belief in their efficacy, through ingenuity and determination, deduce many ways to exercise some control, even in environments which contains restricted opportunities. These people demonstrated a highly resilient self-efficacy, even in the face of numerous troubles; set themselves demanding targets and show high performance in analytic thinking; therefore, they achieve a high level of performance. At the same time, people with a low sense of efficacy avoid from challenging tasks, take low responsibility for pursuing the goals. In addition when faced of difficulties, they slacken their effort and give up quickly. They protect a self-diagnostic emphasis instead of concentrating on how to accomplish task successfully (Bandura, 1993).

Since perceived self-efficacy has an effect on performance both directly and through its powerful influences on fixing targets and thinking analytically, personal achievements were enhanced depending on the strength of sense of efficacy. People with high efficacy see hard tasks as challenges to be get overed rather than as troubles to be avoided. Such an efficacious approach promotes interest and extent engagement in activities. They set themselves demanding targets and take responsibility for them. They have an idea that failure is because of the inadequate effort or absence of required knowledge and skills. When they face with a failure or setback, they raise and maintain their efforts and rapidly recover their sense of efficacy. They cope with threatening situations in the assurance of being able to control over them. Such an efficacious perspective results in personal achievements, reduces stress and decreases defenselessness to depression (Bandura, 1993). However, people who have a low degree of self-efficacy have an idea that their failure is because of low ability (Alden, 1986; Collins, 1982; McAuley, Duncan, & McElroy, 1989; Silver, Mitchell, & Gist, 1989).

### 2.1.1 Four Sources of Self-Efficacy

Degree of sense of efficacy has an effect on people's feelings, thoughts, behaviors and motivation. Self-efficacy beliefs generate these varied influences through four major processes named as enactive mastery experiences, vicarious learning, social persuasion, and physiological-affective processes (Bandura, 1986, 1997). Of these, mastery experiences which are measured by the past academic achievement of students are likely the most powerful influential source in fostering efficacy by providing direct feedback about capabilities. When an individual

evaluates his or her results as successful, this improves self-efficacy; on the other hand, outcomes which are judged as failures affect the degree of self-efficacy negatively. Particularly, the perception of successful performance not only increases individual's present efficacy beliefs but also contributes to the expectation of proficient performance in the future. On the other hand, the perception of unsuccessful performance both decreases self-efficacy beliefs and leads to the expectations of failure in the future (Bandura, 1993). The degree of sense of efficacy are increased when achievements is succeeded on challenging duties with little help or when achievement is succeeded early in learning with few setbacks, but not all successful experiences foster efficacy. To illustrate, in the success which is achieved in the situation of too much external help, late in learning of setbacks, a simple and negligible task, one's efficacy is not promoted (Bandura, 1986, 1997). All four sources identified by Bandura, affect sense of teacher efficacy but it is powerfully affected by mastery experiences because only in a situation of actual teaching one can examine the capabilities on the task and experience the result of those capabilities (Tschannen-Moran, Hoy & Hoy, 1998).

Experiences which are obtained by observing another person's performance on a particular subject are vicarious experiences. Social cognitive theory focuses on vicarious experiences can enhance learning and efficacy. Vicarious learning is particularly useful for people who are less confident about their competencies or past experience with a specific task (Schunk, 1987). In vicarious experiences the skill is modeled by someone else. This way of improving efficacy encourages individuals to get new actions without experiencing the test and error process (Pajares, 2002). The observer's self-efficacy is affected depending on the degree of the identification of this model. If the observer becomes one with the model closely, the effect on efficacy will be higher. Similarly, when a model's performance is well, there is an improvement in the efficacy of the observer. In contrast, when the performance of the model is poor, the observer's efficacy expectations weaken (Bandura, 1997). Vicarious experience, which relies on inferences from social comparison, is less dependable source of information about one's capabilities than direct evidence of personal accomplishments. Therefore, the efficacy expectations encouraged by just modeling are probably weaker and more vulnerable to change (Bandura, 1977).

Social persuasion which means being approved by someone who is professional in the area might also increase the level of self-efficacy. Verbal persuasion is popular because it is easily available (Bandura, 1977). Actually a supervisor or a colleague give a specific performance feedback in social persuasion. Despite of the fact that social persuasion is restricted to power in itself to create consistent raises in self-efficacy, it has contribution on successful performances to improve self-efficacy by initiating a task and attempting new strategies (Bandura, 1982). Social persuasion sometimes confront occasional handicaps otherwise which may result in self-doubt interrupting persistence. The strength of persuasion changes depending on persuader's credibility, trustworthiness and proficiency. Persuasive communication works best when the professional who express the efficacy information are seen as trustworthy and capable (Bandura, 1986).

Self-efficacy beliefs can be strengthened or weakened by the emotional state experienced during social interactions and attributions, (Henson, 2001). When an achievement is ascribed to ability or effort, self-efficacy is enhanced; however, if it is ascribed to luck or the intervention of others self-efficacy is not promoted. Physiological reactions like heartbeats and exhaustion can be associated with past failure and "trigger" people in ways affecting their view of efficacy in particular situations (Bandura, 1993; Pintrich & Schunk, 1996).

The fact that one has a capability on something does not always mean it is self-convincing. Self-efficacy contributes to academic development in terms of three different levels which are students' efficacy beliefs in organizing their own learning and having a command of academic activities, individual teachers' efficacy beliefs in motivating and fostering their students' learning and staffs' collective sense of efficacy that significant academic progress can be achieved in their schools (Bandura, 1993).

Considering contribution of self-efficacy in cognitive level, it was stated that when the perceived self-efficacy get strong, people set higher goals for themselves and their commitment is firmer (Bandura, 1991). It was also said that it is difficult to accomplish much while struggling with lack of self-confidence. The types of people's prudential scenarios they built are affected by their sense of efficacy. More specifically, those with high degree of sense of efficacy outline achievement scenarios resulting in positive guides and encouragements for performance; on the

other hand, those who is doubtful for their efficacy visualize unsuccessful scenarios and keep on thinking on several things that can come off badly (Bandura, 1993).

When self-efficacy is viewed as a motivational contributor it can be said that level of motivation is influenced by sense of self-efficacy in several ways: Determination of the targets that individuals assign for themselves, the degree of effort they expend, the duration for severing when faced with challenges, and their resilience to failures. People who have lack of self-confidence about their competencies decelerate their efforts or surrender easily, when faced with barriers and lack of success. Those having a strong belief in their competencies exert greater effort when they fail to overcome struggle. Powerful perseverance usually pays off in performance accomplishments (Bandura, 1993).

As well as their level of motivation, sense of people in their capabilities has an impact on affective domain such as the degree of stress and depression they have in intimidating or troubling situations. This is the emotional mediator of self-efficacy belief. Perceived efficacy plays a principal role in the stimulation of anxiety by controlling over stressors. Individuals believing that they are able to manage to control on threats do not bring to mind upsetting thoughts; however, those believing that they are not able to manage threats have high level of anxiety. They continue to think about on their struggling inadequacies and see many perspectives of their environment as suspicious. They exaggerate the seriousness of potential threats and feel anxious about things that scarcely happen. They become uncomfortable and their level of performance is weakened as a result of such an inefficacious approach (Bandura, 1993).

**2.2 Teachers' Self-Efficacy**

In education, self-efficacy has been defined as teachers' belief in their ability to organize and carry out courses of action required to bring about targeted results (Tschannen-Moran, Hoy, & Hoy, 1998). Particularly, the concept of "teacher self-efficacy belief" (TSEB) is "the extent to which the teacher believes he or she has the capacity to affect student performance" (Berman, McLaughlin, Bass, Pauly, & Zellman, 1977, p.137) or the beliefs of teachers about their competencies to influence the learning outcomes of students especially with low motivation and low ability to learn (Bandura, 1977; Tschannen-Moran, et al., 1998). Research suggests that

teacher's sense of efficacy has a strong role in schooling (Tschannen-Moran, Hoy, & Hoy, 1998).

The teacher efficacy was first emerged by the RAND researchers' studies on whether control of reinforcement depends on teachers themselves or in the environment, with the work of Rotter (1966). Teaching behaviors were assumed to be reinforced by student motivation and performance. As a result, high efficacious teachers believed that they were able to control and strongly affect student motivation and achievement. Studies of teacher efficacy have found that there are two separate dimensions or factors: general teaching self-efficacy and personal teaching self-efficacy. General teaching self-efficacy is related to teacher's expectation to be able to help students learn given other assumptions of the extent to which students can learn what the teacher has to teach (Bandura, 1997). Teachers' sense of efficacy is a powerful construct for student achievement (Ashton & Webb; Moore & Esselman, 1992), student motivation (Midgley et al., 1989), and student's sense of efficacy (Anderson et al., 1988). It also influences the teachers' behavior in the classroom by having an impact on teachers' efforts, goals and level of aspiration. Individuals with a powerful sense of teaching self-efficacy positively affect student performance, prefer struggling activities, try harder when faced with handicaps like student inability or a student's living environment and carry out better planning and organization (Allinder, 1994). They have a tendency on believing that if proper conditions for learning satisfied all students can learn (Tschannen-Moran & Hoy, 2001). In addition to these, personal teaching self-efficacy means to teacher's personal judgements of their own teaching competencies. According to Gibson & Dembo (1984), teachers' own understanding of their teaching ability affect their classroom management selections, instructional strategies such as use of time and questioning techniques. Individuals having low level of personal teaching self-efficacy permit unmotivated students to ignore classroom rules and stay off-task during instruction. They also cannot motivate these students while they foster other students in the class. Having doubt about their personal competence, the level of teaching effectiveness decreases (Ashton & Webb, 1986). Teachers' sense of efficacy is in relation with student outcomes such as achievement (Ashton & Webb, 1986; Moore & Esselman, 1992; Ross, 1992), motivation (Midgley, Feldlaufer, & Eccles, 1989), and students' own sense of efficacy (Anderson, Greene, & Loewen,

1988). Moreover, teachers' behaviors in the class are also influenced by senses of their efficacy. Teachers' efficacy has an effect on the effort they perform in teaching, the targets they determine, and their level of motivation. It is stated that the degrees of teachers' endeavours, goals and desires differ according to level of self-efficacy beliefs (Tschannen-Moran & Hoy, 2001). Tschannen-Moran and Hoy (2001) defined a teacher's efficacy belief as "a judgement of his/her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated".

Higher teacher self-efficacy is related to shared decision making, positive school cultures, students' achievement, motivation, and self-efficacy (Tschannen-Moran, Hoy, & Hoy, 1998). If people believe that control is possible, they tend to control the situations influencing their lives. Highly efficacious educators view obstacles as struggles to cope with instead of difficult tasks to be avoided (Bandura, 1997). Teachers with high self-efficacy also encourage and challenge themselves and guide their actions by visualizing achievement (Bandura, 1977; Paglis & Green, 2002).

Student achievement is undoubtedly ensured by efforts of teachers, students herself/himself and family of students altogether. Studies showed that self-efficacious parents share responsibility for the education of their children. When they have high level of sense of efficacy to guide their children, they are more likely to help their children's learning and perform active involvement in school activities (Hoover-Dempsey, Bassler, & Brissie, in press). In contrast, parents who are doubtful of their efficacy to help learning process, resign education of their children completely to teachers (Bandura, 1993). On the other hand, teachers with high self-efficacy heighten parent's ability to help their children learn. Both generated academic progress and parental support of school activities, alternately, increase teachers' sense of instructional efficacy. The contribution of perceived efficacy to parents in order to participate in educational activities is considerably important due to the central focus of familial effect on children's academic success (Bandura, 1993).

Teaching performance achieved with certain amount of endeavor and persistence becomes the past and source of future efficacy beliefs because greater efficacy generates further effort and persistence which in turn generate greater

efficacy (Tschannen-Moran, Hoy & Hoy, 1998). According to Ross (1998), teachers develop a relatively set of inner beliefs on their abilities with experience. However, new struggles such as working in a new setting, teaching a new grade or adopting a new curriculum might evoke a reevaluation of efficacy. Therefore, helping teachers improve strengthened efficacy beliefs early in the career provide lasting benefits (Tschannen-Moran, Hoy & Hoy, 1998). Moreover, the level of teacher efficacy is not equal for all teaching situations because teacher efficacy depends on context. The degree of teachers' efficacy may be less or much under different circumstances. They feel strongly efficacious while teaching specific subjects to particular students in certain settings. For instance, a secondary chemistry teacher with high level of efficacy might feel unconfident teaching middle school science, or very efficacious rural sixth grade teacher might be restless in the thought of teaching sixth graders in the city. The level of teachers' efficacy might change even from one class to another (Ross et al., 1996; Raudenbush, et al., 1992). Hence, while making an efficacy judgement, teaching task and context are to be considered.

### 2.2.1 Instruments Developed for Measuring Teacher Self-Efficacy

History of measuring teacher self-efficacy is more than 30 years. The first use of the term "teacher efficacy" was in two reports of RAND Corporation evaluations of projects financed by the Elementary and Secondary Education Act (Berman, McLaughlin, Bass, Pauly, & Zellmann, 1977). The RAND studies used Rotter's social learning theory as a theoretical framework (Henson, 2001). According to Woolfolk & Hoy (1990), Rotter's social learning theory refers to *internal-external locus of control of reinforcement* as a component of efficacy. However, development of so many varied measurement tools for teacher self-efficacy resulted in confusion about the nature of self-efficacy. In response to this, Bandura (1997) developed his own Teacher Self-Efficacy Scale and argued that locus of control and self-efficacy were not empirically related and locus of control was a weak predictor of behavior. By this way, Rotter's social learning theory as a basis for teacher self-efficacy was denounced. Most of the instruments that have been developed to measure teacher self-efficacy with regard to mathematics fall into the categories of general self-efficacy, self-efficacy for teaching mathematics, or mathematics self-efficacy (McGee & Wang, 2014). Teachers' mathematics self-efficacy has been measured by a scale named "Mathematics Self-Efficacy Scale" (MSES) developed by Betz and

Hackett (1983). Moreover self-efficacy for teaching mathematics has been evaluated by another scale named "Mathematics Teaching Efficacy Beliefs Instrument" (MTEBI) created by Enochs, Smith, and Huinker (2000). In order to provide more content- and context-specific measurement of a teacher's self-efficacy beliefs, Mcgee (2012) created a new instrument called "Self-Efficacy for Teaching Mathematics Instrument" (SETMI) based on the support of Bandura's social cognitive theory. Among the instruments developed to measure self-efficacy, Teacher's Sense of Efficacy Scale (TSES) created by Tschannen-Moran & Woolfolk Hoy (2001) remained the most widely used measure of general teacher self-efficacy (Swackhamer, 2010). The short form of TSES includes 12 items; on the other hand, the long form of TSES includes 24 items related to three dimensions: efficacy for student engagement, efficacy for instructional strategies and classroom management. Items involved in the dimension of classroom management of TSES were not included in the SETMI (McGee, 2012). In this study, Turkish version of Teacher's Sense of Efficacy Scale (TTSES) adopted from the TSES was used for measuring sense of teacher self-efficacy of 5th grade mathematics teachers (Çapa, Çakıroğlu, & Sarıkaya, 2005).

### 2.2.2 Characteristics of Teachers Depending on the Level of Self-Efficacy

It was found in the studies that effective teachers monitor learning of students via diverse informal and formal assessments and provide significant feedback to students (Cotton, 2000; Hattie & Timperley, 2007). Similarly, Guskey (1996) stated that effective teachers examine student understanding during the course and settle the content of lesson based on the feedback. Teachers' affective skill is one of the most critical point differentiating teachers depending on level of their effectiveness (Emmer, Evertson, & Anderson, 1980). Teachers claiming that they concern about students have higher degree of student achievement than teachers who are seen as uncaring by students (Darling & Hammond, 2000; Wolk; 2002). Moreover, it was stated that teachers with high sense of efficacy are open to new ideas and have higher tendency to try with new methods to better provide the requirements of their students (Berman et al., 1977; Stein & Wang, 1988). Higher teacher efficacy is concerning the health of the organizational climate (Hoy & Woolfolk, 1993), an organized and positive school environment, more classroom-based decision making (Moore &

Esselman, 1992), and the strength of the collective efficacy (Fuller & Izu, 1986) at the school level.

Furthermore, teachers with high sense of self-efficacy were said to have more ability for effective use of instructional strategies, for emphasizing student participation and for being successful in classroom management (Caprara, Barbaranelli, Steca & Malone (2006); Brouwers & Tomic, 2000; Woolfolk, Rosoff & Hoy, 1990; Babadoğan & Korkut, 2010) and seldomly prefer direct instruction method (Ashton & Webb, 1986). It was also argued that showing greater commitment to job (Coladarci, 1992) being more willing to renewals, investing more endeavor in teaching, experiencing lower levels of long-term exhaustion and having higher job satisfaction are remarkable features of teachers with higher sense of self-efficacy (Hoy & Spero, 2005; Skaalvik & Skaalvik, 2010; Tschannen-Moran & Woolfolk Hoy, 2001). According to Czernaik (1990), teachers with high teaching efficacy have a good potential to prefer inquiry and student-centered instructional methods, on the other hand, teachers who have a lower sense of efficacy are tend to use teacher-centered methods like direct instruction and reading. Moreover, highly efficacious teachers have more tendencies to try new teaching strategies even if they might be difficult to implement because of risks (Riggs & Enochs, 1990). The strategies that highly efficacious teachers use in teaching and learning process are more coherent with the sight of mathematics proposed by NCTM (2000).

Considering teacher behaviors, teachers with high efficacy persist in their efforts with challenging students and rarely criticize students giving incorrect answers (Gibson & Dembo, 1984). They also have a tendency to apply varied instruction methods, look for better teaching methods, and use instructional materials (Allinder, 1994; Guskey, 1988; Stein & Wang, 1988). Furthermore, teachers with a strong sense of efficacy show higher efforts for planning and organization (Allinder, 1994). Sense of self-efficacy has an effect on teachers' perseverance for the things that are not smooth and their resilience when facing with handicaps. Teachers with stronger efficacy are less critical about students' mistakes (Ashton & Webb, 1986), spend more time for a challenging student (Gibson & Dembo, 1984), and rarely tend to refer a struggling student to special education (Meijer & Foster, 1988). Teachers with higher level of sense of efficacy have a greater enthusiasm for teaching (Allinder, 1994; Guskey, 1984).

### 2.2.3 Studies on Teachers' Self- Efficacy

In their study Tschannen-Moran and Woolfolk Hoy (2001) defined teacher efficacy as "a teacher's judgement of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated" (p.783).

Teacher efficacy was firstly examined by the Rand Corporation (Dembo & Gibson, 1985). It was found in projects related to education that what percent of the project targets accomplished, the number of change in the amount of teacher, the continuity of materials and methods, and the advancement in student performance was positively assigned to teachers' sense of efficacy. Instructional strategies in class and desire to adopt innovations were also correlated with teacher efficacy. As well as preservice teachers, in-service teachers with high degree of teacher-efficacy use miscellaneous instructional strategies in class (Riggs & Enochs, 1990; Wenta, 2000). The findings of a study showed that teachers at later stages in their career had a lower sense of efficacy (Brown & Gibson, 1982), however other study revealed that there were no differences in across career stages among outstanding teachers (Pigge & Marso, 1993) and another study indicated that more experienced and highly educated teachers had higher levels of both personal and general teaching efficacy (Hoy & Woolfolk, 1993). On the other hand, there were no significant differences found between mean scores of efficacy of non-graded primary school teachers at different stages in their careers (DeMesquita & Drake, 1994).

Studies showed that there is a remarkable difference between having knowledge and skills and being able to use them well in challenging conditions. Not only skills but also sense of self-efficacy is necessary to reach personal achievement. Self-efficacy is affected by gaining of skills, but is not just a reflection of them. Therefore, because of unsteadiness in degree of self-efficacy, a person with the same acknowledgement and competencies may exhibit poor, sufficient, or extraordinary performance (Bandura, 1993).

Considering teachers self-efficacy in terms of the students' grade levels, it can be said that teachers show a low sense of efficacy to develop students' learning because of the fact that scholastic desires are minimal at the entry level. The low sense of instructional efficacy may moderately reflect the perceived unpreparedness of the children for classroom instruction. Teachers represent a stronger sense when

students are more adapted to school routines and academic demands are not too severe in the early grades. On the other hand, in following grades, when the complicatedness of scholastic needs increase and academic deficiencies become increasingly of notable significant, teachers view of their sense decreasing in instructional efficacy (Bandura, 1993).

It was also stated in the literature that when students especially who have a low opinion of their scholastic capabilities were taught by teachers who have a low sense of efficacy, students lose their perceived self-efficacy and performance expectations in the transition from elementary school to high school. Students' self-doubts become even more rigorous if the teachers contribute self-doubts about their capabilities to achieve academic goals. Longevity in teaching symbolizes the total number of years teaching, years teaching in the same school and same grade, and the number of different grades taught. Findings of the studies indicated that teaching longevity has a small positive effect on school achievement; but, engrossingly, it also seems to create a prejudiced view of their schools' collective instructional efficacy for teachers. Staffs' collective sense of efficacy on developing high levels of academic progress contributes significantly to their schools' level of scholastic achievement (Bandura, 1993).

It has showed that teachers differ in using new techniques and giving response to students with learning disabilities depending on level of their sense of efficacy (Tschannen-Moran & Hoy, 2001; Özkan, Tekkaya & Çakıroğlu, 2002; Ross, 1992). Moreover, according to Bandura (1986), teachers with high self-efficacy make longstanding endeavour to deal with the troubles that they are faced with. Teachers' sense of self-efficacy influences and also allows the teacher to be willing to new ideas and to enable positive attitudes for teaching (Gibson & Dembo, 1984; Tschannen-Moran & Hoy, 1998), and to be accountable for teaching (Coladarci, 1992). It was explained that perceived teaching self-sufficiency is positively joint to teachers' job satisfaction (Caprara, Barbaranelli, Steca, & Malone, 2006). According to the study by Tschannen-Moran & Hoy (2007) the satisfaction gathered from classroom performance is positively associated with self-efficacy belief for teaching. In a study which was carried out in different countries, Klassen et. al., (2009) also detected a high correlation, between teachers' job satisfaction levels and sense of self-efficacy on teaching. Many teachers find themselves beset by trouble or

difficulty by disruptive and unmotivated students during the day. Chwalisz et al. (1992) found out that teacher with high self-efficacy deals with academic stressors effectively by directing his/her efforts at resolving problems. However, without a secure sense of instructional efficacy teachers demonstrate weaker devotion to teaching and spend less time on academic matters (Bandura, 1993).

Studies provided evidence that sense of teachers in their personal efficacy to motivate and encourage learning has an influence on the types of learning environments to be designed and the level of academic improvement of students' success (Bandura, 1993). The work of building environments which are contributive to learning process varies depending on the teachers' talents and self-efficacy. It was indicated that teachers' sense of efficacy in terms of instructional strategies affects the design of classroom atmospheres. Gibson and Dembo (1984) detected that teachers with the sense of high level instructional efficacy provide help needed to succeed for students who have difficulty in learning, and express approval of students' achievements. Conversely, teachers with low sense of instructional efficacy consume more time on nonacademic pursuits, easily become discouraged when students could not get results quickly, and criticize them because of their failures. Those surrounded by self-doubts design classroom environments in which students' sense of efficacy and cognitive development are probably undermined. As Woolfolk and Hoy (1990) informed, teachers' sense of personal efficacy have effects both on their general orientation toward the educational process and their particular instructional practices. Those who have a low sense of instructional efficacy generally use external inducements and sanctions whereas teachers who have a high sense of instructional efficacy prefer supporting progress in students' internal interests and scholastic self-directedness in order to get students to study. In addition, teachers who have a strong belief in their instructional efficacy provide mastery experiences for their students.

### 2.2.4. Studies on Teachers' Self-Efficacy on Teaching Mathematics

Teachers are the most important part of the mathematics education while pursuing the success of the constructivist approach (Battista, 1994). Teacher efficacy has been associated to teachers' practices of effective instructional strategies in mathematics (Enon, 1995). Self-efficacy for teaching mathematics is a teacher's beliefs about his or her ability to teach others mathematics (Kahle, 2008). Perceived

self-efficacy predict positive attitudes toward mathematics more than actual ability (Bandura, 1993). Despite of several studies about teacher efficacy especially about science teaching, there is restricted research on mathematics teacher efficacy. The findings of few studies on mathematics teacher efficacy of elementary preservice teachers showed that preservice teachers' participation in a mathematics methods course matched to significant increases in mathematics teacher efficacy (Huinker & Madison, 1997). Another study revealed that mathematics teacher efficacy has also been connected to mathematics anxiety among elementary preservice teachers (Swars, 2004). It was stated that there was a remarkable consistency between sense of teachers' efficacy and their classroom practices (Peterson, Fennema, Carpenter, & Loef, 1989). As concerns mathematics, according to Stipek (2001), a teacher's self-confidence for teaching mathematics and student's self-confidence as mathematics learners was related to each other. There is a negative relationship between mathematics teacher efficacy and mathematics anxiety. Highly efficacious elementary preservice mathematics teachers demonstrate lower levels of mathematics anxiety. For instance, the findings of a study conducted to explore perceptions of effectiveness in teaching mathematics among preservice teachers having different degrees of mathematics teacher efficacy revealed that the preservice teachers with the lowest level of mathematics teacher efficacy reported negative experiences with mathematics in school (Swars, 2005). According to Bandura (1977) while producing an outcome or completing a task, someone's personal characteristics might have an influence on his/her efficacy; however, considering teaching mathematics, it seems that personal characteristics could promote one's self-efficacy for teaching mathematics. Since there is a relationship between teacher beliefs and practices (Beswick, 2012; Ernest, 1989) teacher's beliefs are crucial to interpret their practices. Findings of the studies showed that there is also a significant relationship between teacher practices and student learning (Darling-Hammond & Youngs, 2002), therefore, the beliefs of a teacher is very important to interpret. In order to improve student achievement in mathematics, the nature of a mathematics teacher's beliefs is to be clearly realized.

## 2.3 Studies on New Education System in Turkey

As stated in the introduction chapter, the new regulation in education system resulted in many critics in Turkey. While some of the educators were supporting the new system, others opposed to the regulation.

In one of the articles about the new school reform bill Güven (2012) mentioned that considering educational sciences the regulation was organized depending on not educational necessities and realities but personal preferences. There were no sufficient discussions about the regulation in educational system and the opinions of educators were not taken into consideration which might result in serious problems. Furthermore, it was stated that children must be in the scope of formal education in every steps of basic education, and open schooling is never to be applied in any school grade. Actually the longer the period of basic education is, the more quality it gets. Therefore, regulations in basic education require absolute necessity of not random attempts but conscious efforts (Güven, 2012). Similarly, opinions of faculty committees of education faculties of leading universities in Turkey like Middle East Technical University, Boğaziçi University and Hacettepe University met at common problematic points about the school reform. These points include age for starting school, problems caused in early childhood education, the transition from primary school to middle school, the opportunity to complete secondary school education via open high school and timing for occupational preferences.

The age of 60-72 months for starting school was found to be inconvenient to start first class because a child's cognitive level is not sufficient enough to make basic numeric evaluation and arithmetic operations at this age (Boğaziçi, 2012). Moreover, in the first year of the reform, there would be an extended range of student age in first grade classes, wich might result in different instructional gaining of students because of their dissimilar cognitive and psychomotor development (Hacettepe, 2012).

The law also brought about the issue of the transition of a student from primary school to middle school after fourth grade. A fourth grade student is still in the period of concrete operations, but the transition to middle school at this stage requires the ability of students to do abstract operations (Boğaziçi, 2012). Moreover,

training given to pre-service teachers at faculties of education is not designed for teaching students at the age of 60-72 months for classroom teachers (ODTÜ, 2012).

Findings of Dinç, Uzun, and Çoban (2014) indicated that some teachers had positive attitudes toward TEOG (Transition Examinations from Primary to Secondary Education), whereas, they had negative view points regarding the new school reform about transition system because of insufficient substructure, the implementation of the system without pilot application, the reduction of the students' age for starting school, and the inclusion of grade 5 in middle schools (Dinç, Uzun, & Çoban, 2014).

In contrast to the opinions mentioned above, Akpınar, Dönder, Yıldırım, and Karahan, (2012) stated that "4+4+4 education system can be seen as a step towards reducing the alleged troubles concerning the developmental features of children caused by eight-year non-stop primary education, facilitating vocational education and ensuring the equal opportunity in education, except possible problems during changeover process", even 4+4+4 education system can be seen as reconstruction or improvement of available system and curriculum (Akpınar, Dönder, Yıldırım, & Karahan, 2012).

Epçaçan (2014) examines the opinions of primary and secondary school teachers and administrators on 4+4+4 education system put into effect by rationales and objectives determined by MoNE in another study. In the light of findings of the study, it was concluded that according to the teachers and administrator, system can be analyzed in terms of both weaknesses and strengths. The findings of the study indicated that almost half of the participants had a negative, 28 percent of participants had a positive attitude towards new education system. Moreover, 4+4+4 education system was accepted "scientific" by few of the participants, "ideological" by one third of the participants and " both scientific and ideological" nearly by one third of the participants. Epçaçan (2014) argues that these findings showed that the practitioners of the new 4+4+4 system did not have parallel thoughts with policy-makers and decision-makers. Besides, it can be said that most of the time, theory and practice did not suit well. Content analysis of the study indicated that according to teachers the strengths of 4+4+4 system were determined as "separation of primary and secondary schools" and "subject teachers' teaching beginning from the fifth grade students". Moreover, many of the teachers supported the compulsory 12 years

of education. On the contrary, “the insufficient readiness of the students” and “the imposing, sudden and unexpected, and ideologically applied structure of the system”, “late start to read and write”, “the increase in the course loading in fifth grades”, “exclusion of early childhood education from the compulsory education”, and “the application of new system without pilot studies” were stated as weaknesses of 4+4+4 system by the teachers and administrators (Epçaçan, 2014).

The opinions of mathematics teachers regarding mathematics curriculum of fifth grades were investigated by İzci and Göktaş (2014). The findings of this study indicated that teachers had difficulties in getting students to comprehend the subjects due to the lack of sufficient equipment and there was need for in-service training for teachers. Moreover, the teachers stated that one of the most problematic issue they face were about classroom management of fifth grade students. Besides, most of the teachers claimed that neither parents nor students get accustomed to subject teacher after classroom teacher. On the other hand, this study revealed that teachers seemed to be satisfied with the increase in weekly class hours of mathematics courses (İzci & Göktaş, 2014).

In another study, Tangülü and Çıdaçı (2014) examined the problems faced by subject teachers in teaching to fifth grade students. They found that teachers had troubles in terms of classroom management, instructional processes, guidance, assessment, and readiness level of students. More specifically, in mentioned study, teachers thought that curriculum was heavy and inappropriate for fifth grade students. In addition, teachers stated that they had difficulty in adapting themselves to students’ level while teaching fifth grades. Moreover, one of the participants of the study expressed that fifth grade students took school counsellor into consideration, but they did not care subject teachers (Tangülü & Çıdaçı, 2014).

**2.4 Summary of the Literature Review**

This chapter has reviewed theoretical background of the concepts of self-efficacy, teachers’ self-efficacy and self-efficacy for teaching mathematics. Research studies about these concepts has also been handled in this chapter. In addition to these, the issue of new education system in Turkey and its critiques were covered.

Literature review revealed that many ideas regarding self-efficacy and teachers’ self-efficacy were based on Bandura’s studies. In these studies level of teachers’ sense of self-efficacy were associated with student achievement, student

motivation, classroom management behavior, responsibility for student learning and job satisfaction. In addition, in these studies classroom organization, instructional strategies, questioning techniques, levels of resistance at a task, degree of risk-taking and innovation, teacher feedback to students and time management while students are on task were also evaluated in a relation with teachers' self-efficacy (Gibson & Dembo, 1984). Teachers' sense of efficacy has also been related to positive teaching behavior and student outcomes (Henson, 2001). Classroom management strategies of teachers with strong sense of self-efficacy are more organized, better planned, student-centered and humanistic when compared to strategies of teachers with lower sense of self-efficacy (Anthony & Kritsonis, 2007). It was also found that teachers reported high levels of self-efficacy in behavior reported using effective strategies in the classroom frequently (Main & Hammond, 2008). It was also reported that teachers with a perceived high level of self-efficacy in classroom management were better in coping with unmanageable behaviors than teachers with lower self-efficacy (Giallo & Little, 2003). It was found that "a string of highly effective or ineffective teachers will have an enormous impact on a child's learning trajectory during the course of Grades K-12" (Palardy & Rumberger, 2008). In a support with this finding, in another study there found to be differences in student achievement in mathematics and reading for effective teachers and less effective teachers were more than 30 percentile points (Stronge, Ward, & Grant, 2011).

Efficacy beliefs of preservice teachers were connected to attitudes toward children and control (Woolfolk & Hoy, 1990). Once sense of efficacy is formed, it is resistant to alter therefore; the development of sense of teacher efficacy among prospective teachers has established a great extent of research (Tschannen-Moran, Hoy & Hoy, 1998). Studies conducted to investigate about self-efficacy showed that highly self-efficacious teachers are more likely to be open new ideas and try new strategies in order to meet their students' needs (Tschannen-Moran et al., 1998).

This study has also covered the issue of integration of the fifth graders into secondary school with the regulation of school reform bill popularly known as 4+4+4 approved by The Grand National Assembly in 2012. Studies showed that the opinions of teachers about new education system were mostly handled in qualitative studies (Demir, Doğan, & Pınar, 2013; Epçaçan, 2014; Tangülü & Çıdacı, 2014; İzci & Göktaş, 2014; Dinç, Uzun & Çoban, 2014). Since there was a lack of quantitative

studies related to this issue, in this study, middle school mathematics teachers' self-efficacy for teaching mathematics to fifth grades was examined by using quantitative data. More specifically, in this study the degree of sense of self-efficacy of middle school mathematics teachers for teaching fifth grades and teaching independent from grade levels were examined in terms of faculty graduated, gender and year of teaching experience with respect to dimensions of efficacy for student engagement, efficacy for instructional strategies and efficacy for classroom management by using two scales.

# CHAPTER 3

# METHODOLOGY

In this chapter, methods and procedures of the study were summarized. Particularly, design of the study, population and sample, instruments, data collection procedure, data analysis procedure, internal and external validity and limitations of the study were discussed in detail.

## 3.1. Design of the Study

The goal of present study was to investigate middle school mathematics teachers' self-efficacy beliefs about teaching mathematics to fifth grade students with respect to gender, type of teaching licence, and year of teaching experience via a survey prepared by researcher named Mathematics Teachers' Sense of Efficacy Scale for teaching 5th grades. Moreover, it was also aimed to investigate mathematics teachers' self-efficacy scores in teaching mathematics, independent from grade levels, through a survey named Turkish version of the Teachers' Sense of Efficacy Scale (TTSES) (Çapa, Çakıroğlu & Sarıkaya, 2005). Dimensions of TTSES were (1) efficacy for student engagement, (2) efficacy for student engagement, and (3) efficacy for classroom management. Quantitative methods were used for the examination of research questions. Fraenkel and Wallen (2006) stated that survey research is related to the opinions of a large group of people about a specific issue. Therefore, because of the fact that it is concerning mathematics' teachers' sense of self-efficacy on teaching fifth grades survey research design has been used in this study. In detail, since the data has been drawn from a predetermined population at just one point in time, cross-sectional surveys has been performed (Fraenkel and Wallen, 2006, p.398). Moreover, causal comparative research design has also been used because of the other purpose of the study, which was the investigation of differences among teachers in terms of gender, type of teaching licence and year of teaching experience. More specifically, "the cause or consequences of differences

that already exist between or among groups of individuals" was the emphasis of causal comparative research (Fraenkel and Wallen, 2006, p.370). In fact, variables of gender, type of teaching licence, and year of teaching experience already existed for teachers were handled in order to compare mathematics' teachers' sense of self-efficacy for teaching mathematics to fifth grades.

### 3.2. Population and Sample

The target population was middle school mathematics teachers teaching 5th graders, in Ankara. Middle school mathematics teachers teaching 5th graders were selected as accessible population in the central area of Ankara. In fact, teachers working in core center of city were more experienced, which may cause biased results in research. For this reason, in order to keep variety of participants, schools were chosen from different districts of the city on the base of convenience of access. More specifically, data were collected from 208 teachers from 50 public middle schools located in the central Ankara area. Data were collected by the researcher, who reached all 50 schools and available 208 teachers contributed to the study. Distribution of the participants is shown in Table 3.1, Table 3.2 and Table 3.3.

Table 3.1

*Distribution of Participants with respect to Gender, Type of Teaching Licence and Year of Teaching Experience*

| | N | Percentage |
|---|---|---|
| Gender | | |
| Female | 147 | 70.7 % |
| Male | 61 | 29.3 % |
| Type of Teaching Licence | | |
| Education | 150 | 72.1 % |
| Other | 58 | 27.9 % |
| Year of Teaching Experience | | |
| 0-5 years | 32 | 15.4 % |
| 6-10 years | 50 | 24.0 % |
| 11-15 years | 55 | 26.4 % |
| 16-20 years | 21 | 10.1 % |
| Above 20 years | 50 | 24.0 % |

According to Table 3.1, the number of female teachers was 147, while, the number of male teachers was 61. In fact, number of female teachers was more than twice of male teachers'. Similarly, the number of teachers graduated from faculties of education (N=150) was more than twice of teachers' graduated from other faculties (N=58). In addition, most of the participants were among the teachers with experience of 11-15 years with the number of 55 (26.4%) while the least number of participants were among teachers with experience of 16-20 years with the number of 21 (10.1%).

Table 3.2

*Distribution of Participants with respect to Education Level*

| Education Level | N | Percentage |
|---|---|---|
| Teacher Training High School | 7 | 3.4 % |
| Two-year University | 3 | 1.4 % |
| Undergraduate | 173 | 83.2 % |
| Post-graduate | 25 | 12.0 % |
| Total | 208 | 100.0 % |

Table 3.3

*Distribution of Participants with respect to Fifth Grade Teaching Experience*

| Education Level | N | Percentage |
|---|---|---|
| Experienced | 160 | 76.9 % |
| Inexperienced | 48 | 23.1 % |
| Total | 208 | 100.0 % |

Table 3.2 indicated that from a total of 208 participants, 173(83.2%) of them have an undergraduate and 25 (12%) of them had a post graduate degree. In addition, 7 of the participants were graduates of teacher training high school and 3 had a two-year degree at university.

According to Table 3.3, most of the participants (N=160) had an experience in teaching 5th grades. More specifically, the percentage of teachers having experience in teaching 5th grades was 76.9, whereas, the percentage of teachers inexperienced in teaching 5th grades was 23.1.

### 3.3. Data Collection Instruments

A survey named "Turkish version of the Teachers' Sense of Efficacy Scale (TTSES)'' developed by Tschannen-Moran & Hoy (2001) and adopted into Turkish by Çapa, Çakıroğlu & Sarıkaya (2005) and a survey named "Mathematics Teachers Sense of Efficacy Scale (MTSES)'' developed by researchers (2015) were used in order to gather data to answer research questions. These instruments were detailed in the following sections.

#### 3.3.1 Turkish version of the Teachers' Sense of Efficacy Scale (TTSES)

TTSES designed to help researchers gain a better understanding of the kinds of things that create difficulties for teachers in their school activities included 24 items about teaching in general. Çapa, Çakıroğlu, Sarıkaya (2005) stated that TTSES which was developed by Tschannen-Moran & Hoy (2001) was composed of three sub-dimensions as *efficacy for student engagement* (SE), *efficacy for instructional strategies* (IS) and *efficacy for classroom management* (CM). Among 24 items of TTSES, 8 items (with numbers 1, 2, 4, 6, 9, 12, 14, 22) were related to the dimension of SE, 8 items (with numbers 7, 10, 11, 17, 18, 20, 23, 24) were related to the dimension of IS and 8 items (with numbers 3, 5, 8, 13, 15, 16, 19, 21) were related to the dimension of CM. (See Appendix A). Table 3.4 indicated the items for each dimension separately.

Table 3.4

*Items of TTSES for each Dimension*

| Dimensions | Items |
|---|---|
| Efficacy for SE | 1. How much can you do to get through to the most difficult students? |
| | 2. How much can you do to help your students think critically? |
| | 4. How much can you do to motivate students who show low interest in school work? |
| | 6. How much can you do to get students to believe they can do well in school work? |
| | 9. How much can you do to help your students value learning? |
| | 12. How much can you do to foster student creativity? |

Table 3.4 (continued)

*Items of TTSES for each Dimension*

| Dimensions | Items |
|---|---|
| | 14. How much can you do to improve the understanding of a student who is failing? |
| | 22. How much can you assist families in helping their children do well in school? |
| Efficacy for IS | 7. How well can you respond to difficult questions from your students? |
| | 10. How much can you gauge student comprehension of what you have taught? |
| | 11. To what extent can you craft good questions for your students? |
| | 17. How much can you do to adjust your lessons to the proper level for individual students? |
| | 18. How much can you use a variety of assessment strategies? |
| | 20. To what extent can you provide an alternative explanation or example when students are confused? |
| | 23. How well can you implement alternative strategies in your classroom? |
| | 24. How well can you provide appropriate challenges for very capable students? |
| Efficacy for CM | 3. How much can you do to control disruptive behavior in the classroom? |
| | 5. To what extent can you make your expectations clear about student behavior? |
| | 8. How well can you establish routines to keep activities running smoothly? |
| | 13. How much can you do to get children to follow classroom rules? |
| | 15. How much can you do to calm a student who is disruptive or noisy? |
| | 16. How well can you establish a classroom management system with each group of students? |

Table 3.4 (continued)

*Items of TTSES for each Dimension*

| Dimensions | Items |
|---|---|
| | 19. How well can you keep a few problem students from ruining an entire lesson? |
| | 21. How well can you respond to defiant students? |

TTSES was a 9-point Likert-type scale with degree 1 (nothing) to 9 (a great deal). A mean score was calculated in terms of dimensions SE, IS and CM for each participant. Particularly, in order to calculate a participant's mean score on dimension of efficacy for student engagement, scores of related 8 items were added and total score was divided into 8 to get a mean score. For this reason, the least possible mean score was 1 and the highest possible mean score was 9 for any dimension. More specifically, scores close to 9 means that the teachers have high sense of efficacy on that dimension, while scores close to 1 means that teachers have less sense of efficacy on that dimension.

Confirmatory factor analysis (CFA) based on efficacy data for 628 preservice teachers was conducted to model a three factor solution in order to check validity of TTSES by Çapa, Çakıroğlu, Sarıkaya (2005). Three subscales of the instrument efficacy for student engagement (SE), efficacy for instructional strategies (IS), and efficacy for classroom management (CM) were selected as three factors. The coefficient alpha values for the Turkish preservice teachers were .82 for *SE*, .86 for *IS*, and .84 for *CM*. Çapa, Çakıroğlu & Sarıkaya stated that for the whole scale, the reliability of self-efficacy scores was .93. All items were contributing to the reliability with high item-total correlations. Supporting these, result of reliability check indicated Cronbach's alpha with the value of .95 for the whole scale, and with the value of .87 for SE, .86 for IS and .89 for CM in the present study.

### 3.3.2 Mathematics Teachers' Sense of Efficacy (for Teaching Mathematics to Fifth Grades) Scale (MTSES)

MTSES was formed by the researcher in order to gain a better understanding of the kinds of things that create difficulties for middle school mathematics teachers for teaching mathematics to fifth grades. The scale had a design of 9 point likert type which increases internal consistency of the survey presenting answerer more

alternatives to select (Köklü, 1995). The items were determined by interviewing with middle school mathematics teachers, analyzing researches done about the issue and problems about the issue which were handled in some studies. For example, in a study Tangülü and Çıdacı (2014) investigated the problems that middle school social sciences teachers face with while teaching fifth grades by using qualitative methods. In mentioned study, there emerged many aspects that teachers had difficulty in teaching fifth grades like time management, adaptation. The scale was formed by considering the issues gathered from middle school mathematics teachers and related studies. At the beginning, the scale composed of 31 items. After an expert review of a professor of faculty of education, number of items decreased to 28 due to repetitive statements in the 3 items. Then, the researcher contacted with her supervisor again, and the items were redesigned. After that, the researcher asked ideas of some of mathematics teachers of state schools about the items. They analyzed the items with respect to clarity, language and meaningfulness. At the end of this process, number of items decreased to 23, after the removal of 5 unclear statements. Moreover, the researcher asked opinions of graduate student studying in the area of assessment and evaluation about whether there is a problem with clarity, sentence structure, and test construction process. There was no change made with the items except in numbering items. After this review, the final version of the scale was formed, which included 23 items. Before the collection of final data, a pilot study was conducted based on 50 participants. The Cronbach's alpha coefficient from this study was found to be .830, which indicated reasonable internal consistency reliability for a scale with this sample. Reliability check with the 208 participants of real study also showed high internal consistency with Cronbach's alpha value of .89.

In order to check the factor structure of the new scale, a factor analysis was run with 211 participants by the researcher. Kaiser-Mayer-Olkin Measure of Sampling Adequecy (KMO) value was .89, exceeding the recommended value of .6 (Kaiser, 1970, 1974) and the Bartletts' Test of Sphericity showed significant result (p=.000), supporting the factorability of the correlation matrix. Principal components analysis indicated the presence of five components with eigenvalues exceeding 1, explaining 33.77 percent, 9.05 percent, 6.58 percent, 5.00 percent and 4.80 percent respectively. Actually, it was suggested to look for screeplot, eigen values and variances for deciding the number of factors of a scale (Büyüköztürk, 2002).

Therefore, since the value of variance is 33.77 for the first factor and component matrix indicated that 20 of 23 items indicated values more than .400, just 3 of 23 items had values of .387, .388, and .352 respectively, it was decided to retain one component in the present study. Table 3.5 indicates the items of the scale. The (original) version of scale was also given in Appendix B.

Table 3.5

*Items of MTSES*

| Scale | Items |
|---|---|
| Efficacy for Teaching Fifth Grades | 1. I have difficulty in coming to 5th grades' level in the class.<br>2. I have difficulty in teaching topics for 5th grades in comparison with 6th, 7th and 8th grades.<br>3. I can provide opportunity for fifth grade students who have difficulty in expressing himself/herself.<br>4. I can keep 5th grade students' concentration on the topic long enough.<br>5. I can organize in class activities in an interesting way in 5th grades<br>6. I can concretize abstract mathematical concepts properly for the 5th grades' level.<br>7. I can provide sufficient interest for 5th grade students to learn topic.<br>8. Feedback given for the homework in 5th grade classes is as efficient as in 6th, 7th, and 8th grade classes.<br>9. I can allow enough time for the 5th grade students need one-to-one attention.<br>10. I can satisfy personal requirement of 5th graders as in 6th, 7th and 8th graders.<br>11. I can deal with 5th grade students' behaviors ruining the lesson.<br>12. I have difficulty in rewarding 5th grade students according to their needs. |

Table 3.5 (continued)

*Items of MTSES*

| Scale | Items |
|---|---|
| Efficacy for Teaching Fifth Grades | 13. I know what I have to do to make 5th grade students be able to learn mathematical concepts. |
| | 14. I can deal with 5th grade students behaving improperly as in 6th, 7th, and 8th grades. |
| | 15. I can gauge 5th grade students comprehension of what I have taught. |
| | 16. I have difficulty in dealing with repeating undesirable behaviors of 5th grade students. |
| | 17. I have more difficulty in preventing non-essential time loss in 5th grade classes compared to 6th, 7th and 8th grade classes. |
| | 18. I can make 5th grade students obey class rules. |
| | 19. I can make support in terms of how to do homework to 5th grade students who have difficulty in understanding homework. |
| | 20. I have difficulty in preparing suitable assessment strategies for 5th grade students' level. |
| | 21. I have difficulty in assisting 5th grade students insufficient in terms of readiness. |
| | 22. I have difficulty in explaining class rules to $5^{th}$ grade students. |
| | 23. I can assist $5^{th}$ grade students to solve issues among themselves. |

MTSES was also a 9-point Likert-type scale with degree 1 (nothing) to 9 (a great deal). A mean score was calculated for each participant. Particularly, in order to calculate a participant's mean score on efficacy on teaching fifth grade students, scores of 23 items were added and total score was divided into 23 to get a mean score. For this reason, the least possible score was 1 and the highest possible was 9. More specifically, scores close to 9 in positive statements mean that the teachers

have high sense of efficacy for teaching to 5th graders, while scores close to 1 means that teachers have less sense of efficacy for teaching to 5th graders.

### 3.4. Variables

As mentioned before there are four basic research problems in the present study. Research problems were about difference in middle school mathematics' teachers' self-efficacy scores in terms of gender, type of teaching licence and year of teaching experience, respectively. Gender was independent variable for the first research problem, type of teaching licence was independent variable for the second problem, and year of teaching experience was independent variable for the last research problem. Whereas, scores on the self-efficacy for teaching mathematics to fifth grades, self-efficacy on student engagement, self-efficacy on instructional strategies and self-efficacy on classroom management scales were dependent variables in three of the research problems.

### 3.5. Data Collection Procedure

The survey was administered to 208 middle school mathematics teachers from 50 schools in Ankara. Required data was collected in the spring semester of 2014-2015 academic year. In the fall semester of 2014-2015 academic year, the researcher contacted the developers of TTSES by email to ask for a permission to use it. At the same time, the researcher developed the survey named MTSES. During this procedure, experts' opinions were taken into consideration. Before starting to get real data, pilot study was conducted on 50 middle school mathematics teachers. In addition, official permissions were obtained from Middle East Technical University Human Subjects Ethic Committee and Ankara Provincial Directorate for National Education in Ankara. Appendix C and D show the certificate of the permission.

During data collection procedure, all the participants took part in the study on a voluntary basis. Moreover, it was not required for participants to write their names in order to maintain confidentiality of the data. For collecting first hand data, researcher went to all the schools on Mondays and participants filled the surveys in their schools and the data collector took back these filled surveys on the same day. However, when some teachers were absent or had not enough time to fill the survey on that day, the survey sheets were left to school administration. Then, researcher took them back in another day from the school administration. Teachers filled the surveys in their rest times. Some teachers filled the survey in break time, some in

lunch time, some in time with no class. Filling the survey lasted approximately 10-15 minutes.

### 3.6. Data Analysis

Since the variable being studied was measured along a scale showing how much of the variable is present requires getting quantitative data (Fraenkel and Wallen, 2006), quantitative methods were used in the present study. SPSS (Statistical Package for Social Sciences) version 20 was used for statistical analyses. There were four dependent variables which were scores of efficacy for teaching to 5th grade students, scores of efficacy for student engagement, scores of efficacy on instructional strategies and scores of efficacy on classroom management. In the analysis of dependent variables more than one requires conducting MANOVA (Multivariate Analysis of Variance) (Pallant, 2007). Firstly basic descriptive statistics like frequencies, mean, standard deviation were calculated. Then, in order to investigate self-efficacy scores of mathematics teachers with respect to gender, type of teaching licence and year of teaching experience, one-way MANOVA was run. Finally, eta square was used to evaluate practical significances of the findings.

### 3.7. Validity of the Study

Validity which was defined as "appropriateness, correctness, meaningfulness and usefulness" of findings based on data collected (Fraenkel and Wallen, 2006, p.151) was handled in two sections of this part. Internal validity of the study and external validity of the study was mentioned, respectively.

#### 3.7.1. Internal Validity

Fraenkel and Wallen stated that internal validity means observed differences on the dependent variable were directly related to the independent variable (2006). In other words, internal validity was defined as any relationship appeared between variables is to be certain (Fraenkel and Wallen, 2006). According to Fraenkel and Wallen (2006), location, mortality (loss of subjects), subject characteristics and instrumentation are possible threats in survey and causal-comparative researches.

Location threat took place when the interpretations of findings were affected by the places in which data was collected (Fraenkel and Wallen, 2006). Since the data were collected from the participants in similar places, that is, teachers' room of state school location was kept the same for all participants. Therefore, it was assumed that there was no location threat.

Mortality (loss of subjects) threat was tried to be controlled by checking the number of teachers available on data collection day at school via telephoning and giving unfilled surveys to school administration for absent teachers during the collection of data. In addition, since survey was applied in a short time, dropout of subjects did not take place. For these reasons, mortality threat was assumed to be removed.

Subject characteristics, in other words, selection bias was explained as the fact that "the selection of people for a study may result in the individuals (or groups) differing from one another in unintended ways that are related to the variables to be studied" (Fraenkel and Wallen, 2006). In this study, teachers had some different characteristics in terms of personal attitude, age, cultural background, motivation. It was difficult to select participants having similar characteristics. However, mathematics teachers working all in state middle schools and teaching 5th grades were chosen in this study. Furthermore, most of the participants had bachelor's degree only. Depending on the issues mentioned above, subject characteristics threat was assumed to be controlled.

Instrumentation threat is to be handled in terms of checking instrument decay, data collector characteristics and data collector bias (Fraenkel and Wallen, 2006). Firstly, instrument decay is the case when the instrument permits different interpretations of findings. In the present study, the survey includes 9-point Likert type scale and the researcher entered the data to SPSS by giving numbers all scales, therefore, it is possible to correct any mistakes in entering data by an easy way. Furthermore, since there were not long items taking too much time which may result in teachers to get tired, instrument decay was assumed to be controlled. Another issue to be controlled was data collector characteristics taking place when data collectors have different characteristics like gender, age or ethnicity. Actually, the data was collected by the researcher only in the current study. The researcher did not interact with the participants, just informed them about the research. Therefore, it was assumed that data collector characteristics did not exist as a threat in the study. The last issue about instrumentation is data collector bias which takes place when the data collectors unconsciously distort the data. This was tried to be controlled by standardizing all procedures during the data collection. Therefore, it was assumed that data collector bias was not a threat for the current thesis.

### 3.7.2 External Validity

Fraenkel and Wallen (2006, p.108) defined external validity as "generalizability" of the findings "from a sample to a population". As mentioned in population and sample part of this chapter, the target population in the present study was middle school mathematics teachers teaching 5th graders, in Ankara. Middle school mathematics teachers teaching $5^{th}$ graders were selected as accessible population in the center of Ankara. Sample included most of the individuals of the population. Since all of the teachers participated in the present study work in state schools, working conditions, educational level, educational sources and standards were similar. In addition to these, public schools were selected not only from core center of Ankara but also from off-center counties of Ankara. Therefore, the participants were of different age ranges. For these reasons, the findings of the study could be ecologically generalized to state schools and the results could not be generalized externally because of convenience sampling. In addition, since working conditions and facilities of private schools were not as the same as state schools, the findings of the study could not be generalized to all schools.

## 3.8. Limitations of the Study

In this final section of methodology chapter, limitations of the study were summarized. Firstly, data was collected just from mathematics teachers working at state middle schools because administration of some private schools did not give permission to collect data from teachers. Therefore, the findings could not be generalized to all mathematics teachers. Moreover, since the data was collected only in Ankara, the findings of results could not be generalized to all of the country. Furthermore, scores of mathematics teachers are limited to answers given for the questions of survey used in present study.

# CHAPTER 4

## FINDINGS

In this chapter, the findings from the data analysis were given. The purpose of this research study was to investigate whether middle school mathematics teachers' self-efficacy for teaching mathematics to fifth grades differ in terms of the variables *type of teaching licence*, *gender,* and *year of teaching experience*. In a more detailed way, differences among fifth grade mathematics teachers' self-efficacy was examined in terms of two aspects, namely self-efficacy for teaching mathematics to fifth grades, and self-efficacy for teaching independent from grade levels. Teachers' sense of efficacy for teaching mathematics to 5th grades was measured by Mathematics Teachers' Sense of Efficacy Scale with one dimension and teachers' sense of efficacy for teaching independent from grade levels was measured by Turkish version of the Teachers' Sense of Efficacy Scale, which consist of three dimensions namely efficacy for student engagement (SE), efficacy for instructional strategies (IS) and efficacy for classroom management (CM) and Therefore, in total, four different efficacy scores were calculated in this research. Since there is more than one dependent variable, Multivariate Analysis of Variance (MANOVA) was used in order to control Type 1 error (Pallant, 2007). The other aim of this study was to determine whether there exist a relationship between self-efficacy scores of middle school mathematics teachers' for teaching mathematics to fifth grades and teaching independent from grade levels. In order to examine this, correlation analysis was conducted because there were two continuous variables (Pallant, 2007). For these reasons, this chapter of research study included the results of one-way MANOVA based on three independent variables and the results of correlation analysis. With respect to independent variables, results were presented in three sections including parts of both descriptive statistics and inferential statistics and the comparison of scores of MTSES and TTSES were summarized in another section.

### 4.1 Comparisons Based on Educational Background

One way MANOVA was conducted to examine differences in self efficacy scores of mathematics teachers graduate of faculty of education and other faculties. In this analysis type of teaching licence was independent variable, on the other hand, scores of MTSES and scores of TTSES in three dimensions were dependent variables. The results were evaluated in the following two parts separately.

#### 4.1.1 Descriptive Statistics

In this part of this section, mean scores of teachers graduated from faculties of education and other faculties were presented for both MTSES and TTSES. Scores of MTSES were presented totally, whereas, scores of TTSES were represented for three dimensions separately. As shown in Table 4.1, mean scores of teachers graduated from other faculties were higher than scores of teachers graduated from faculty of education. In a detailed way, for the MTSES, mean scores of teachers graduated from education faculty was 6.75 (SD=.978); however, mean scores of teachers graduated from other faculties was 6.91 (SD=1.149).

Table 4.1

*Descriptive Statistics of MTSES Scores with respect to Type of Teaching Licence*

| Type of Teaching Licence | M | SD | N |
|---|---|---|---|
| Education | 6.75 | .978 | 150 (72.1 %) |
| Other | 6.91 | 1.149 | 58 (27.9 %) |
| Total | 6.80 | 1.028 | 208 (100 %) |

Moreover, Table 4.2 showed that mean scores of TTSES of teachers graduated from other faculties were higher than mean scores of TTSES of teachers graduated from faculties of education. More specifically, for the dimension of *efficacy for SE*, mean score of teachers graduated from faculty of education was 6.35 (SD=1.041), on the other hand, mean score of teachers graduated from other faculties was 6.75 (SD=1.033). Furthermore, for the dimension of *efficacy for IS*, mean score of teachers graduated from faculty of education was 7.08 (SD=.944), however, mean score of teachers graduated from other faculties was 7.38 (SD=.944). Moreover, for the dimension of *efficacy for CM*, mean score of teachers graduated from faculty of education was 7.07 (SD= 1.069), whereas, mean score of teachers graduated from

other faculties was 7.33 (SD= 1.050). In addition to these, it can be seen that regardless of type of faculty, the highest mean score of teachers belonged to the dimension of *efficacy for IS* and the lowest mean score of teachers belonged to the dimension of *efficacy for SE*.

Table 4.2

*Descriptive Statistics of TTSES Scores with respect to Type of Teaching Licence*

| Type of Teaching Licence | M | SD | N |
|---|---|---|---|
| Dimension 1: Efficacy for Student Engagement | | | |
| Education | 6.35 | 1.041 | 150 (72.1 %) |
| Other | 6.75 | 1.033 | 58 (27.9 %) |
| Total | 6.47 | 1.052 | 208 (100 %) |
| Dimension 2: Efficacy for Instructional Strategies | | | |
| Education | 7.08 | .944 | 150 (72.1 %) |
| Other | 7.38 | .944 | 58 (27.9 %) |
| Total | 7.16 | .951 | 208 (100 %) |
| Dimension 3: Efficacy for Classroom Management | | | |
| Education | 7.07 | 1.069 | 150 (72.1 %) |
| Other | 7.33 | 1.050 | 58 (27.9 %) |
| Total | 7.14 | 1.068 | 208 (100 %) |

### 4.1.2 Inferential Statistics

In this section, inferential statistics of MANOVA conducted to investigate the research question "is there a significant difference in middle school mathematics teachers' scores of self-efficacy for teaching mathematics to fifth grades and teaching independent from grade levels in terms of type of teaching licence?" and assumptions of one way MANOVA were presented.

#### 4.1.2.1 Assumptions of One-way MANOVA

Before conducting one-way MANOVA, assumptions were checked, which include sample size, normality, outliers, linearity, multicollinearity and singularity, and homogeneity of variance-covariance matrices (Pallant, 2007).

The first assumption checked was sample size. According to the Pallant (2007), it is necessary to have more cases than the number of dependent variables. In this research study, having 8 cells and 4 dependent variables, minimum sample size required was 32 (8*4). Since the subject number was 208 in this research, sample size was not a problem to conduct MANOVA.

The second assumption checked was normality including both univariate and multivariate normality. According to the Pallant (2007) the values of skewness and kurtosis must be in the interval of -2 to 2 in order to satisfy the assumption of univariate normality. In this research, as seen in Table 4.3 and Table 4.4, these values were minimum -,620 and maximum ,270. In addition to these values, histograms were also examined to be sure that the scores were normally distributed. Histograms designed for each dependent variable separately were presented in Appendix D. Therefore, it was ensured that there was no violation of univariate normality. Moreover, in order to check multivariate normality, it was necessary to calculate Mahalanobis distance whose critical value stated as 18.47 for studies with the number of four dependent variables (Pallant, 2007). Analysis conducted to calculate Mahalanobis distance showed that, all of the values were less than 18.47 therefore it was safely assumed that there were not substantial multivariate outliers. For these reasons, it was assumed that there was no violation of normality in this research.

Table 4.3

*Skewness and Kurtosis Values of MTSES with respect to Type of Teaching Licence*

| Type of Teaching Licence | Skewness | Kurtosis | N |
|---|---|---|---|
| Education | -,017 | -,305 | 150 |
| Other | -,365 | ,121 | 58 |

Table 4.4

*Skewness and Kurtosis Values of TTSES with respect to Type of Teaching Licence*

| Type of Teaching Licence | Skewness | Kurtosis | N |
|---|---|---|---|
| Dimension 1: Efficacy for Student Engagement | | | |
| Education | -,015 | -,215 | 150 |
| Other | -,144 | -,418 | 58 |
| Dimension 2: Efficacy for Instructional Strategies | | | |
| Education | ,000 | -,037 | 150 |
| Other | -,277 | -,620 | 58 |
| Dimension 3: Efficacy for Classroom Management | | | |
| Education | -,397 | ,270 | 150 |
| Other | -,210 | -,426 | 58 |

Having satisfied the first two assumptions, the existence of univariate and multivariate outliers is to be checked. Boxplots revealed to explore outliers and extreme values in Appendix E showed that there were no extreme values and not too many outliers. Since it was stated that MANOVA can tolerate a few outliers when there is a reasonable size data file, it was assumed that there was no existence of univariate outliers. Moreover, since multivariate normality requires the check of multivariate outliers (Pallant, 2007) it was assumed that there was no existence of multivariate outliers. The other assumption to be checked is linearity representing the presence of a straight-line relationship between each pair of dependent variables (Pallant, 2007). A matrix of scatterplots between each pair of four variables formed to check linearity was demonstrated in Figure 4.1. It was seen that there was no violation of linearity.

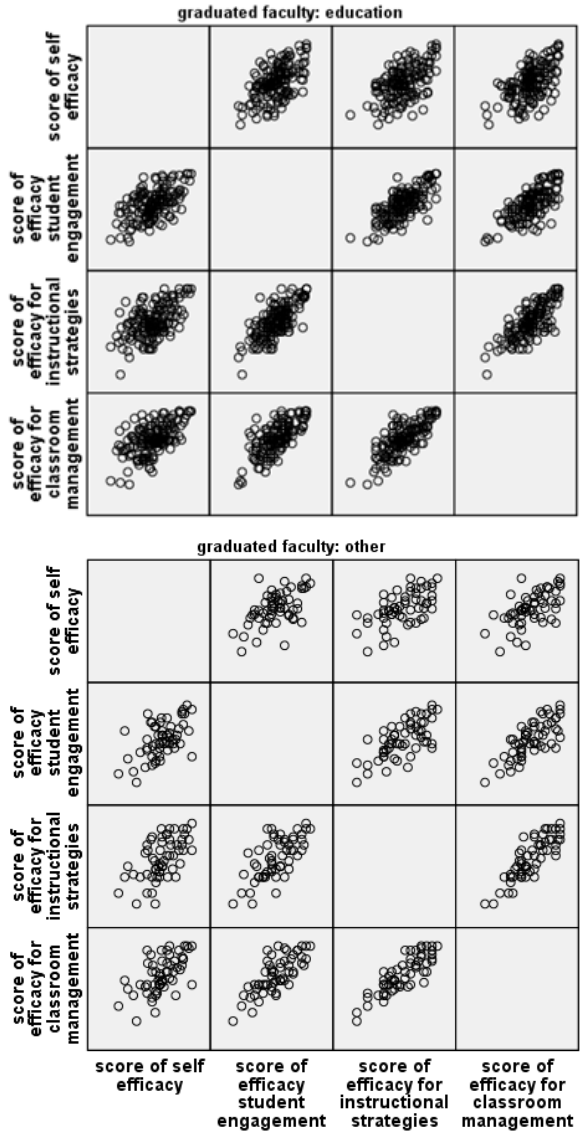


*Figure 4.1* A matrix of scatterplots between dependent variables in terms of type of teaching licence

Moreover, another assumption to be checked was multicollinearity and singularity. Multicollinearity refers to high correlation (.50 to 1) between dependent variables; on the other hand, singularity refers to low correlation (.10 to .29) between dependent variables. In addition, Pallant (2007) stated that correlations around .8 or .9 result in violation of the assumption of multicollinearity. At this point, Table 4.5 showed that all values were higher than .10 and under .8. Therefore, it could be assumed that there was no violation of singularity and multicollinearity.

Table 4.5

*Summary of Correlations between the scores of MTSES and dimensions of TTSES*

| | Self Efficacy MTSES | Efficacy for SE | Efficacy for IS | Efficacy for CM |
|---|---|---|---|---|
| Self Efficacy MTSES | 1.000 | - | - | - |
| Efficacy for SE | .563* | - | - | - |
| Efficacy for IS | .562* | .726* | - | - |
| Efficacy for CM | .577* | .728* | .786* | - |

Next assumption to be checked was homogeneity of variance controlling the similarity of the variability of the scores for each group (Pallant, 2007). Significant values of Levene's Test of Equality of Error Variances indicate the violation of assumption of equality of variances. Table 4.6 revealed that all of the values are more than .05. Hence, equal variances can be assumed in this study.

Table 4.6

*Levene's Test of Equality of Error Variances with respect to Type of Teaching Licence*

| Scores | Significance |
|---|---|
| Efficacy for Teaching Mathematics | .248 |
| Efficacy for Student Engagement | .980 |
| Efficacy for Instructional Strategies | .589 |
| Efficacy for Classroom Management | .627 |

The last assumption to be checked was homogeneity of variance matrices which was controlled by Box's M Test of Equality of Covariance Matrices as a part of MANOVA. The p value of Box Test .327 (> .001) resulting in assurance of the assumption of homogeneity of variance matrices.

#### 4.1.2.2 One-way MANOVA Results with respect to Type of Teaching Licence

Having checked all of the assumptions in previous section, the results of one-way MANOVA were explained in this section. In order to be able to investigate differences in self-efficacy scores of mathematics teachers with respect to teaching licence one-way MANOVA was performed at .05 significance level. Scores of efficacy for teaching mathematics to fifth grades, scores of efficacy for student engagement, scores of efficacy for instructional strategies and scores of efficacy for classroom management were four dependent variables whereas type of teaching licence was independent variable of this analysis. According to Table 4.7 indicating the results of the analysis, there was not a significant difference in self-efficacy scores of mathematics teachers graduated from faculty of education and other faculties on the combined dependent variables: F(4,206)= 1.70, p=.151;Wilk' Lambda= .97; partial eta squared=.03. More specifically, teachers both graduated from faculty of education and other faculties had similar efficacy scores for all aspect of self-efficacy. Since there was not significance, there was no need to consider between subject results.

Table 4.7

*One-way MANOVA Results with respect to Type of Teaching Licence*

| IV | Wilk's Lambda | F | df | Significance | Eta Squared |
|---|---|---|---|---|---|
| Type of Teaching Licence | .97 | 1.70 | 4 | .151 | .03 |

### 4.2 Comparisons Based on Gender

One-way MANOVA was performed to examine differences in scores of female and male mathematics teachers' self-efficacy for teaching. In this analysis gender was independent variable, on the other hand, scores of MTSES and scores of TTSES in three dimensions were dependent variables. In the following sections, descriptive and inferential statistics of one-way MANOVA results were indicated.

#### 4.2.1 Descriptive Statistics

Mean scores of female and male mathematics teachers were presented for both MTSES and TTSES in this part of this section. Scores of MTSES were presented totally; on the other hand, scores of TTSES were explained for each three dimension separately in Table 4.8 and Table 4.9, respectively. According to Table

4.8, mean score of male teachers was higher than that of female teachers. More specifically, the mean score of female teachers was 6.78 (SD=1.045); on the other hand, mean score of male teachers was 6.83 (SD=.995) for MTSES.

Table 4.8

*Descriptive Statistics of MTSES Scores with respect to Gender*

| Gender | M | SD | N |
|---|---|---|---|
| Female | 6.78 | 1.045 | 147 (70.7 %) |
| Male | 6.83 | .995 | 61 (29.3 %) |
| Total | 6.80 | 1.028 | 208 (100 %) |

Furthermore, it could be seen at Table 4.9 that for the dimension of *efficacy for SE*, mean score of male teachers was 6.71 (SD=1.112), however, mean score of female teachers was 6.37 (SD=1.013). Moreover, for the dimension of *efficacy for IS*, mean score of male teachers was 7.36 (SD=.980), however, mean score of female teachers was 7.08 (SD=.931). In addition, for the dimension of *efficacy for CM*, mean score of male teachers was 7.25 (SD= 1.081), whereas, mean score of teachers graduated other faculty was 7.10 (SD= 1.063). Considering these statistics, it could be explained that for all dimensions of TTSES mean scores of female teachers were lower than mean scores of male teachers. Besides, it could be seen that regardless of gender the lowest mean score of teachers belonged to the dimension of *efficacy for SE*. In addition, the highest mean score of male teachers was for the dimension of *efficacy for IS,* whereas the highest score of female teachers was for the dimension of *efficacy for CM.*

Table 4.9

*Descriptive Statistics of TTSES Scores with respect to Gender*

| Gender | M | SD | N |
|---|---|---|---|
| Dimension 1: Efficacy for Student Engagement | | | |
| Female | 6.37 | 1.013 | 147 (70.7 %) |
| Male | 6.71 | 1.112 | 61 (29.3 %) |
| Total | 6.47 | 1.052 | 208 (100 %) |

Table 4.9 (continued)

*Descriptive Statistics of TTSES Scores with respect to Gender*

| Gender | M | SD | N |
|---|---|---|---|
| Dimension 2: Efficacy for Instructional Strategies | | | |
| Female | 7.08 | .931 | 147 (70.7 %) |
| Male | 7.36 | .980 | 61 (29.3 %) |
| Total | 7.16 | .951 | 208 (100 %) |
| Dimension 3: Efficacy for Classroom Management | | | |
| Female | 7.10 | 1.063 | 147 (70.7 %) |
| Male | 7.25 | 1.081 | 61 (29.3 %) |
| Total | 7.14 | 1.068 | 208 (100 %) |

### 4.2.2 Inferential Statistics

In this section, inferential statistics of MANOVA performed to examine the research question "Is there a significant difference in middle school mathematics teachers' scores of self-efficacy for teaching mathematics to fifth grades and teaching independent from grade levels in terms of gender?" were covered. Particularly, assumption check and results of one-way MANOVA were mentioned in terms of gender.

#### 4.2.2.1 Assumptions of One-Way MANOVA

Sample size was the first assumption to be checked in one-way MANOVA. Since the number of participants were 208 in this study, in more detail, the number of cells 8 requires a sample size of at least 32 (8*4), assumption of sample size was assured. The second assumption to be controlled was normality. Table 4.10 and Table 4.11 revealed that all of the values of skewness and kurtosis were in the interval of -2 to 2.

Table 4.10

*Skewness and Kurtosis Values of MTSES with respect to Gender*

| Gender | Skewness | Kurtosis | N |
|---|---|---|---|
| Female | -,199 | -,175 | 147 |
| Male | ,132 | -,086 | 61 |

Table 4.11

*Skewness and Kurtosis Values of TTSES with respect to Gender*

| Gender | Skewness | Kurtosis | N |
|---|---|---|---|
| Dimension 1: Efficacy for Student Engagement | | | |
| Female | -,095 | -,362 | 147 |
| Male | -,440 | ,204 | 61 |
| Dimension 2: Efficacy for Instructional Strategies | | | |
| Female | -,020 | -,107 | 147 |
| Male | -,251 | -,413 | 61 |
| Dimension 3: Efficacy for Classroom Management | | | |
| Female | -,178 | -,232 | 147 |
| Male | -,762 | 1,286 | 61 |

Moreover, in Appendix D, histograms with normal curves showed that the scores had normal distribution. Therefore, the assumption of univariate normality was not violated. Mahalanobis distances examined to check the assumption of multivariate normality in section 4.1.2.1 showed that there was no violation of multivariate normality. Furthermore, boxplots given in Appendix E illustrated that there was no extreme values. In addition, Figure 4.2 revealed that there was no clear existence of non-linearity.

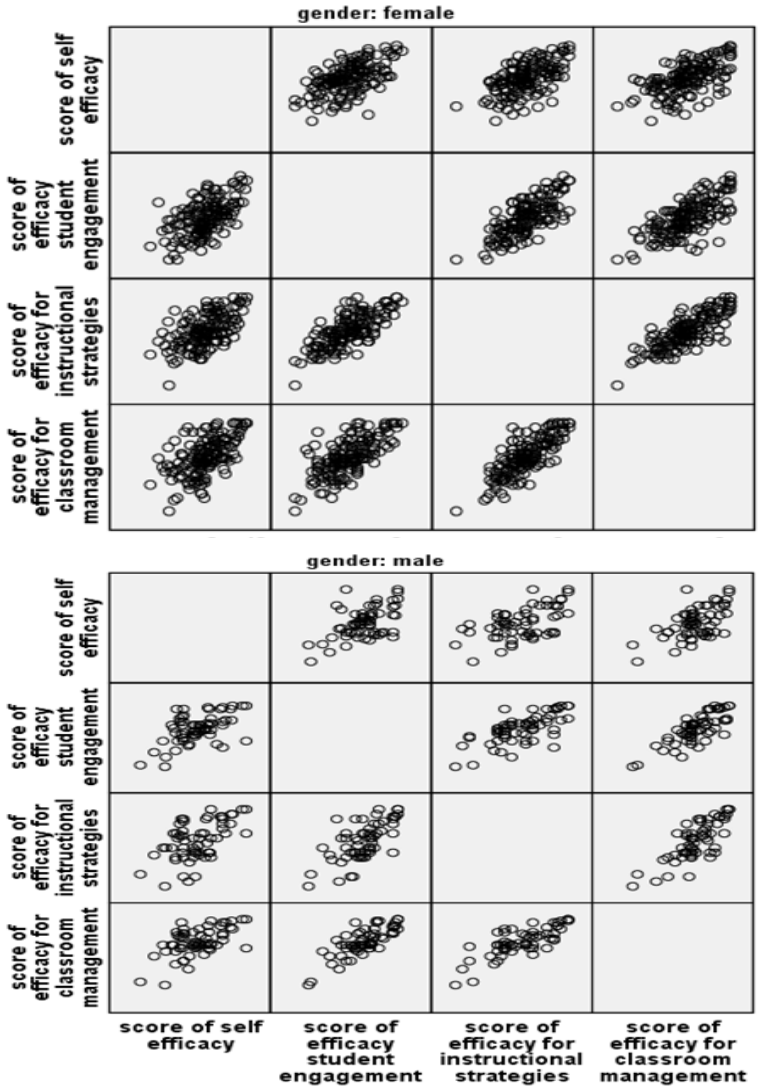


*Figure 4.2* A matrix of scatterplots between dependent variables in terms of gender

The next assumption to be checked was multicollinearity and singularity which was verified in section 4.1.2.1. Homogeneity of variance was another assumption to be checked. According to the Table 4.12 indicating the result of Levene's Test, all of the significance values were greater than .05, therefore it could be explained that there was no violation of homogeneity of variance.

Table 4.12

*Levene's Test of Equality of Error Variances with respect to Gender*

| Scores | Significance |
|---|---|
| Efficacy for Teaching Mathematics | .843 |
| Efficacy for Student Engagement | .642 |
| Efficacy for Instructional Strategies | .448 |
| Efficacy for Classroom Management | .783 |

Lastly, homogeneity of variance matrices was to be controlled by performing Box's M test of Equality of Covariance Matrices. The result of this test revealed that there was not a significance ($p > .001$) with the value of $p= .661$. Therefore, one-way MANOVA was allowed to be conducted.

**4.2.2.2 One-Way MANOVA Results with respect to Gender**

In order to investigate whether female and male middle school mathematics teachers' scores of self-efficacy in four different dimensions differ, one-way MANOVA was conducted at .05 significant level. In this analysis, gender was independent variable; on the other hand, self-efficacy for teaching mathematics to fifth grades, efficacy for student engagement, efficacy for instructional strategies and efficacy for classroom management were dependent variables. The results of one-way MANOVA summarized in Table 4.13 indicated that there was not a statistically significant difference in mathematics teachers' self-efficacy scores in teaching in terms of gender on the combined dependent variables, $F(4,206)=1.96$, $p=.102$; Wilk's Lambda=.96; partial eta squared=.37. Particularly, it can be explained that both female and male mathematics teachers gave similar importance to all dimensions. Since there was not a statistically significant result, there was no need to consider between subject effects.

Table 4.13

*One-way MANOVA Results with respect to Gender*

| IV | Wilk's Lambda | F | df | Significance | Eta Squared |
|---|---|---|---|---|---|
| Gender | .96 | 1.96 | 4 | .102 | .037 |

### 4.3 Comparisons Based on Year of Teaching Experience

The final issue of differences in middle school mathematics teachers' self-efficacy scores in teaching with respect to year of teaching experience was investigated by conducting one-way MANOVA at .05 significance level. In this analysis year of teaching experience was independent variable. On the other hand self-efficacy scores of mathematics teachers in teaching in four dimensions were dependent variables. In the following two parts, the results were summarized as descriptive statistics and inferential statistics, respectively.

#### 4.3.1 Descriptive Statistics

In this part, mean scores of mathematics teachers who were classified into five groups according to year of teaching experiences like 0-5 years, 6-10 years, 11-15 years, 16-20 years and $20^{+}$ were mentioned for both MTSES and TTSES. Table 4.14 represented the scores of MTSES; on the other hand, Table 4.16 showed the scores of TTSES for each three dimension separately. According to Table 4.14, mean score of teachers experienced of 16-20 years was higher than the scores of other teachers. More specifically, mean score of teachers with 16-20 years teaching experience was 7.14 (SD=1.111); on the other hand, mean score of teachers experienced of 0-5 years was 6.68 (SD= .888). When the scores of teachers were ordered, it was clear that more experienced teachers had more scores of self-efficacy for teaching 5th grades except the teachers experienced of more than 20 years.

Table 4.14

*Descriptive Statistics of MTSES Scores with respect to Year of Teaching Experience*

| Year of Teaching Experience | M | SD | N |
|---|---|---|---|
| 0-5 | 6.68 | .888 | 32 (15.4 %) |
| 6-10 | 6.77 | 1.086 | 50 (24.0 %) |
| 11-15 | 6.85 | 1.083 | 55 (26.4 %) |
| 16-20 | 7.14 | 1.111 | 21 (10.1 %) |
| $20^{+}$ | 6.69 | .957 | 50 (24.0 %) |
| Total | 6.80 | 1.028 | 208 (100 %) |

Moreover, Table 4.15 illustrated that for the dimension of *efficacy for student engagement*, mean score of teachers with a teaching experience of 16-20 years was 7.09 (SD=1.040) the highest score, mean score of teachers with a teaching

experience of 6-10 years was 6.11 (SD=1.132) the lowest score. Furthermore, for the dimension of *efficacy for instructional strategies*, mean score of teachers with a teaching experience of 16-20 years was 7.76 (SD=.958) the highest score, mean score of teachers with a teaching experience of 0-5 years was 6.83 (SD=.916) the lowest score. In addition, for the dimension of *efficacy for classroom management*, mean score of teachers with a teaching experience of 16-20 years was 7.46 (SD= 1.004) the highest score, whereas, mean score of teachers with a teaching experience of 0-5 years was 6.76 (SD= 1.147) the lowest score. Summary of these statistics showed that for all dimensions of TTSES mean scores of teachers experienced of 16-20 years were higher than mean scores of others.

Table 4.15

*Descriptive Statistics of TTSES Scores with respect to Year of Teaching Experience*

| Year of Teaching Experience | M | SD | N |
|---|---|---|---|
| Dimension 1: Efficacy for Student Engagement | | | |
| 0-5 | 6.41 | .936 | 32 (15.4 %) |
| 6-10 | 6.11 | 1.132 | 50 (24.0 %) |
| 11-15 | 6.25 | .921 | 55 (26.4 %) |
| 16-20 | 7.09 | 1.040 | 21 (10.1 %) |
| $20^{+}$ | 6.84 | .984 | 50 (24.0 %) |
| Total | 6.47 | 1.052 | 208 (100 %) |
| Dimension 2: Efficacy for Instructional Strategies | | | |
| 0-5 | 6.83 | .916 | 32 (15.4 %) |
| 6-10 | 7.08 | 1.025 | 50 (24.0 %) |
| 11-15 | 7.10 | .893 | 55 (26.4 %) |
| 16-20 | 7.76 | .958 | 21 (10.1 %) |
| $20^{+}$ | 7.28 | .859 | 50 (24.0 %) |
| Total | 7.16 | .951 | 208 (100 %) |
| Dimension 3: Efficacy for Classroom Management | | | |
| 0-5 | 6.76 | 1.147 | 32 (15.4 %) |
| 6-10 | 7.19 | 1.147 | 50 (24.0 %) |
| 11-15 | 7.08 | 1.094 | 55 (26.4 %) |
| 16-20 | 7.46 | 1.004 | 21 (10.1 %) |
| $20^{+}$ | 7.26 | .883 | 50 (24.0 %) |
| Total | 7.14 | 1.068 | 208 (100 %) |

### 4.3.2 Inferential Statistics

In this part, the summary of inferential statistics about the results of research addressed to investigate whether there is a difference in middle school mathematics teachers' scores of self-efficacy for teaching mathematics to fifth grades and teaching independent from grade levels with respect to year of a teaching experience were presented. Firstly, assumptions of one-way MANOVA and results were summarized.

#### 4.3.2.1. Assumptions of One-Way MANOVA

The first assumption to be checked was sample size in one-way MANOVA. A sample size of at least 80 (20*4) was required for 20 cells sample size of 208 prevented the violation of assumption of sample size. Then normality was the second assumption to be checked. Considering the values of skewness and kurtosis in order to check normality it was seen in Table 4.16 and Table 4.17 that all of the values of skewness and kurtosis were in the interval of -2 to 2 except the value of kurtosis (2,366) for teachers with an experience of 16-20 years. Considering this situation, analyzing histograms was another way to check normality. Histograms shown in Appendix E demonstrate that the scores were normally distributed. Hence, it was assumed that there was no explicit violation of univariate normality. In terms of Mahalanobis distance, another assumption to be checked, calculated distances stated in section 4.1.2.1 were all under the critical value, therefore it could be stated that there was no violation of multivariate normality. In addition to these, boxplots given in Appendix F revealed that there were not extreme values. Besides, Figure 4.3 illustrates there was no obvious existence of non-linearity.

Table 4.16

*Skewness and Kurtosis Values of MTSES with respect to Year of Teaching Experience*

| Year of Teaching Experience | Skewness | Kurtosis | N |
|---|---|---|---|
| 0-5 | -,047 | ,059 | 32 |
| 6-10 | -,067 | -,196 | 50 |
| 11-15 | -,033 | -,612 | 55 |
| 16-20 | -1,270 | 2,366 | 21 |
| 20+ | ,076 | ,447 | 50 |

Table 4.17

*Skewness and Kurtosis Values of TTSES with respect to Year of Teaching Experience*

| Year of Teaching Experience | Skewness | Kurtosis | N |
|---|---|---|---|
| Dimension 1: Efficacy for Student Engagement | | | |
| 0-5 | ,041 | ,585 | 32 |
| 6-10 | ,363 | -,053 | 50 |
| 11-15 | -,318 | ,012 | 55 |
| 16-20 | -,687 | ,548 | 21 |
| $20^{+}$ | -,139 | -,640 | 50 |
| Dimension 2: Efficacy for Instructional Strategies | | | |
| 0-5 | -,671 | 1,896 | 32 |
| 6-10 | ,417 | -,742 | 50 |
| 11-15 | -,143 | -,123 | 55 |
| 16-20 | -1,043 | ,082 | 21 |
| $20^{+}$ | ,048 | -,436 | 50 |
| Dimension 3: Efficacy for Classroom Management | | | |
| 0-5 | -,468 | -,430 | 32 |
| 6-10 | -,274 | -,215 | 50 |
| 11-15 | -,210 | ,738 | 55 |
| 16-20 | -,541 | -,625 | 21 |
| $20^{+}$ | -,196 | ,220 | 50 |

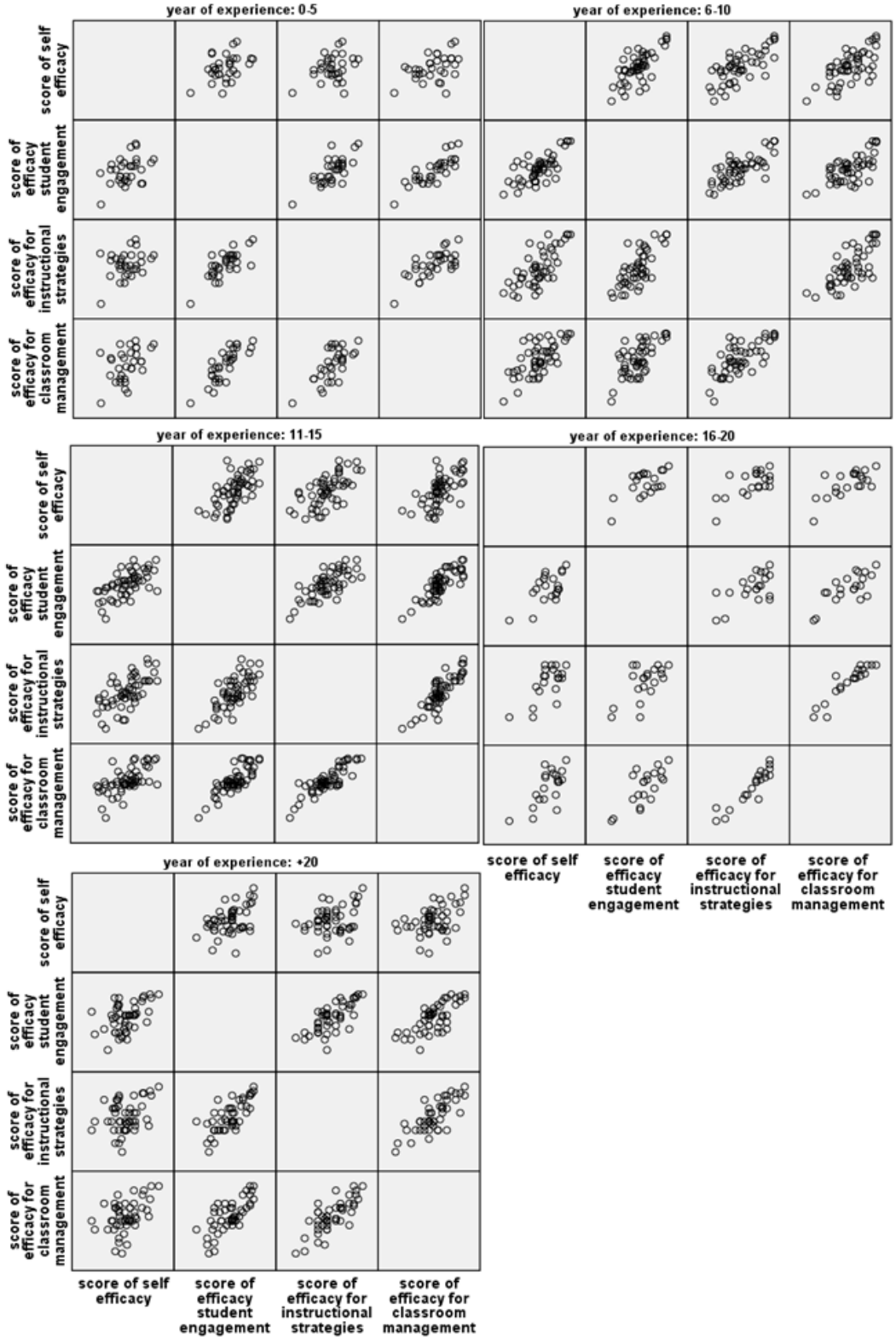


*Figure 4.3* A matrix of scatterplots between dependent variables in terms of year of a teaching experience

Multicollinearity and singularity was also to be checked before conducting one-way MANOVA. This assumption was assured and explained in section 4.1.2.1. The following assumption to be checked wass homogeneity of variance. Table 4.18 summarized the result of Levene's Test indicating that all of the values were insignificant (>.05), hence it was assumed that there was no violation of homogeneity of variance.

Table 4.18

*Levene's Test of Equality of Error Variances with respect to Year of Teaching Experience*

| Scores | Significance |
|---|---|
| Efficacy for Teaching Mathematics | .620 |
| Efficacy for Student Engagement | .768 |
| Efficacy for Instructional Strategies | .694 |
| Efficacy for Classroom Management | .253 |

The last assumption to be checked was homogeneity of variance matrices. The result of Box's M test of Equality of Covariance Matrices showed that there was not a significance ($p > .001$) with the value of $p= .021$ resulting in permission to conduct one-way MANOVA.

**4.3.2.2 One-Way MANOVA Results with respect to Year of Teaching Experience**

In order to address whether middle school mathematics teachers' scores of self-efficacy for teaching mathematics to 5th grades and teaching independent from grade levels differ with respect to year of a teaching experience, one-way MANOVA was conducted at .05 significant level. Efficacy for teaching mathematics to fifth grades, efficacy for student engagement, efficacy for instructional strategies and efficacy for classroom management were dependent variables, whereas, year of teaching experience was independent variable in this analysis. According to the one-way MANOVA results outlined in Table 4.19, there was a statistically significant difference in middle school mathematics teachers' self-efficacy scores for teaching mathematics to fifth grades and teaching independent from grade levels in terms of year of teaching experience on the combined dependent variables, $F(4,206)=3.79$,

p=.000; Wilk's Lambda=.75; partial eta squared=.07. Particularly, it can be stated that mathematics teachers with different years of teaching experience gave changing importance to dimensions.

Table 4.19

*One-way MANOVA Results with respect to Year of Teaching Experience*

| IV | Wilk's Lambda | F | df | Significance | Eta Squared |
|---|---|---|---|---|---|
| Year of Teaching Experience | .75 | 3.79 | 4 | .000 | .070 |

The results summarized in Table 4.19 detected that there was a statistically significant difference in mathematics teachers' scores of self-efficacy for teaching mathematics depending on the year of teaching experience. Significant result of one-way MANOVA gave permission to investigate further in relation to each of dependent variables (Pallant, 2007). More specifically, in order to address self-efficacy scores of teachers with different year of teaching experience alter on all of dependent measures, Tests of Between Subjects Effects output was analyzed. Since there was a number of a separate analysis, in order to reduce the risk of Type 1 error, it was suggested to apply Bonferroni adjustment which means to divide original alpha level of .05 by the number of dependent variable (Pallant, 2007). In this case, the alpha level was calculated .012. Table 4.20 illustrated the results of between subjects effects.

Table 4.20

*Results of Follow-up Analysis for MANOVA*

| Dependent Variables | *df* | F | Significance *(p)* |
|---|---|---|---|
| Efficacy for Teaching Mathematics | 4 | ,884 | ,474 |
| Efficacy for Student Engagement | 4 | 5,96 | ,000 |
| Efficacy for Instructional Strategies | 4 | 3,55 | ,008 |
| Efficacy for Classroom Management | 4 | 1,74 | ,143 |

When the results for dependent variables were considered separately, it could be seen in Table 4.20 that one of the differences to reach statistical significance using

Bonferroni adjusted alpha level of .012 was efficacy for student engagement: F(4,206)=5.96, p=.000, partial eta squared=.11. An inspection of the mean scores revealed that teachers with experience of 16-20 years reported slightly highest level of efficacy for student engagement (M=7.09, SD=1.040, 95% CI [6.66-7.52]) compared to teachers with a teaching experience of $20^{+}$ years (M=6.84, SD=.984, 95% CI [6.56-7.12]), teachers with a teaching experience of 0-5 years (M=6.41, SD=.936, 95% CI [6.06-6.77]), teachers with a teaching experience of 11-15 years (M=6.25, SD=.921, 95% CI [5.98-6.52]), teachers with a teaching experience of 6-10 years (M=6.11, SD=1.132, 95% CI [5.83-6.39]). Table 4.21 also indicated that the second one of the difference to reach statistical significance was efficacy for instructional strategies: F (4,206)=3.55, p=.008, partial eta squared=.07. An examination of the mean scores showed that teachers with experience of 16-20 years reported highest level of efficacy for instructional strategies (M=7.76, SD=.958, 95% CI [7.36-8.16]) contrasted to teachers with a teaching experience of $20^{+}$ years (M=7.28, SD=.859, 95% CI [7.02-7.54]), teachers with a teaching experience of 11-15 years (M=7.10, SD=.893, 95% CI [6.85-7.34]), teachers with a teaching experience of 6-10 years (M=7.08, SD=1.025, 95% CI [6.82-7.34]), teachers with a teaching experience of 0-5 years (M=6.83, SD=.916, 95% CI [6.50-7.15]).

### 4.4 Summary for Results of One-Way MANOVA

The aim of present study was to address the difference in middle school mathematics teachers' scores of self-efficacy for teaching mathematics to fifth grades and teaching independent from grade levels in terms of type of teaching licence, gender and year of teaching experience. Mathematics teachers' scores of self-efficacy for teaching were evaluated in four perspectives as *efficacy for teaching mathematics to fifth grades*, *efficacy for student engagement*, *efficacy for instructional strategies*, and *efficacy for classroom management.* The results of the analysis indicated that there were not a statistically significant difference in teachers' scores of self-efficacy for teaching mathematics with respect to type of teaching licence and gender. On the other hand, the results revealed that there was a statistically significant difference in teachers' scores of self-efficacy for teaching independent from grade levels in the sense of year of teaching experience. In particular, teachers with a teaching experience of 16-20 years had more scores in both efficacy for student engagement and for instructional strategies than other

teachers. Moreover, teachers with teaching experience of 0-5 years had fewer score in efficacy for instructional strategies than others. In addition, teachers with a teaching experience of 6-10 years had fewer score in efficacy for student engagement than others.

### 4.5 Comparison Based on the Relationship between MTSES and TTSES

The issue of whether there exists a relationship between middle school mathematics teachers' self-efficacy scores for teaching mathematics to 5th grades (MTSES) and teaching independent from grade levels (TTSES) was investigated by conducting correlation analysis at .05 significance level. The results were summarized as descriptive statistics and inferential statistics in the following two parts, respectively.

#### 4.5.1 Descriptive Statistics

In this part, mean scores for both MTSES and TTSES of all middle school mathematics teachers participated in this study were summarized. Table 4.21 showed the mean scores for both MTSES and TTSES. According to this table, mean score for TTSES was higher than mean score for MTSES. More specifically, the mean score for TTSES was 6.92 (SD=.933); whereas, mean score for MTSES was 6.80 (SD=1.028).

Table 4.21

*Descriptive Statistics of MTSES and TTSES Scores*

| Scores | M | SD | N |
|---|---|---|---|
| MTSES | 6.80 | 1.028 | 208 (100%) |
| TTSES | 6.92 | .933 | 208 (100%) |

#### 4.5.2. Inferential Statistics

In this part, the summary of inferential statistics about the results of investigation whether there was a relationship between MTSES and TTSES scores of middle school mathematics teachers were presented. Firstly, assumptions of bivariate correlation analysis and then results were summarized.

#### 4.5.2.1 Assumptions of Correlation Analysis

Before conducting correlation analysis, assumptions were checked, which include independence of observations, normality, outliers, linearity, homoscedasticity (Pallant, 2007).

Firstly, it was assumed in this study that the assumption of independent observations were satisfied.

The second assumption checked was normality. According to the Pallant (2007) the values of skewness and kurtosis must be in the interval of -2 to 2 for satisfying the assumption of univariate normality. In this research, as seen in Table 4.22, these values were minimum -,188 and maximum ,079.

Table 4.22

*Skewness and Kurtosis Values for MTSES and TTSES Scores*

| Score | Skewness | Kurtosis | N |
|---|---|---|---|
| MTSES | -,116 | -,156 | 208 |
| TTSES | -,188 | ,079 | 208 |

In addition to these values, histograms given in Figure 4.4 revealed that both MTSES and TTSES scores were normally distributed. Hence, it was ensured that there was no violation of univariate normality. For these reasons, it was assumed that there was no violation of normality in this research.

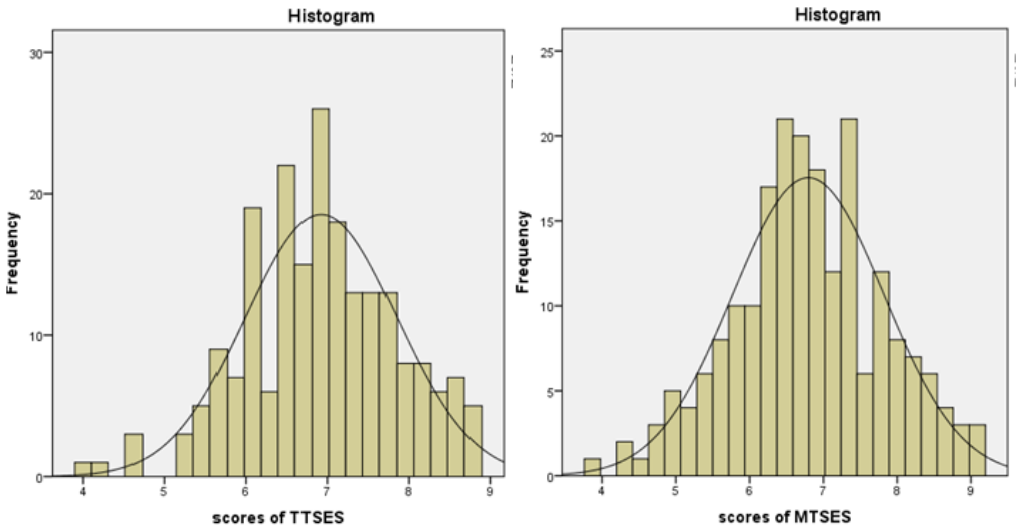


*Figure 4.4* Histograms of both TTSES and MTSES scores

In order to check the assumptions outliers, linearity and homoscedasticity scatterplot was checked.

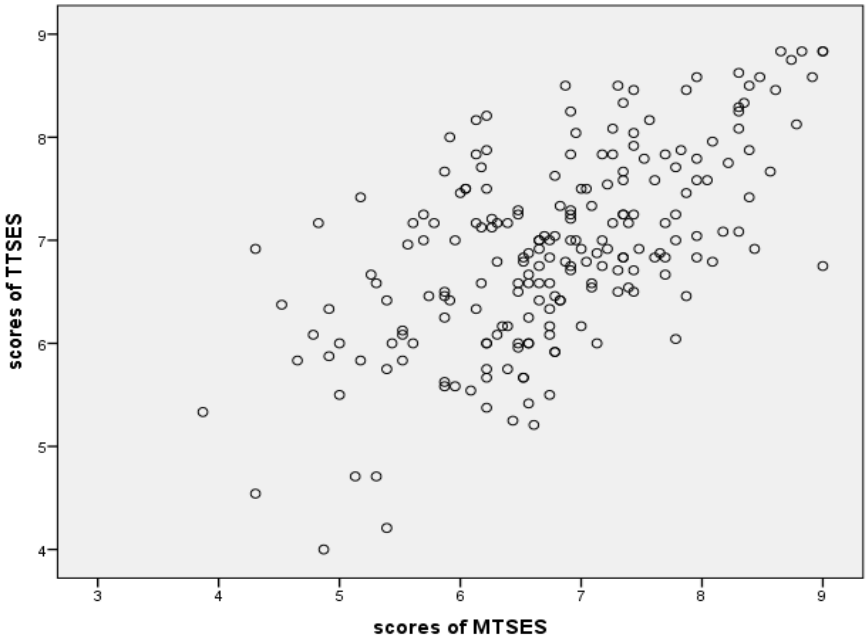


*Figure 4.5* Scatterplot of TTSES and MTSES scores

Figure 4.5 showed that the relationship between the TTSES and MTSES scores was roughly linear and the scores were spread in a cigar shape, therefore there was no violation of assumptions required to proceed with calculating Pearson's correlation.

**4.5.2.2 Correlation Analysis Results for MTSES and TTSES**

In order to address whether there exists a relationship between middle school mathematics teachers' MTSES and TTSES scores correlation analysis was conducted at .05 significant level. According to the correlation analysis results which were summarized in Table 4.23, there was a strong, positive correlation between middle school mathematics teachers' MTSES and TTSES scores, [r=.62, n=208, p<.005], with higher levels of TTSES scores with higher MTSES scores.

Table 4.23

*Summary of Correlations between MTSES and TTSES Scores*

| Variables | Pearson Correlation (r) | p | N | Eta Squared |
|---|---|---|---|---|
| Scores of MTSES & TTSES | .62 | .000 | 208 | 38.81 |

Table 4.23 also showed that when squared the correlation .62 revealed 38.81 per cent shared variance, that is, TTSES scores helps to explain nearly 39 per cent of the variance in middle school mathematics teachers' MTSES scores.

# CHAPTER 5

# DISCUSSION, IMPLICATIONS, RECOMMENDATIONS

The purpose of the study was to investigate the issue of whether middle school mathematics teachers' sense of self-efficacy for teaching mathematics to fifth grades and teaching independent from grade levels differs in terms of type of teaching licence, gender and year of teaching experience. Present study also aimed at examining the relationship between middle school mathematics teachers' sense of self-efficacy for teaching mathematics to fifth grades and teaching independent from grade level.

In the light of the literature review, the results of the study were discussed and implications and recommendations were mentioned for further researches.

## 5.1. Differences among Middle School Mathematics Teachers' Sense of Efficacy Beliefs in terms of Type of Teaching Licence

The participants of the study were composed of teachers graduated from faculty of education and teachers graduated from other faculties mostly faculty of art and science. The findings of the present study showed that there was not a significant difference in self-efficacy scores of middle school mathematics teachers in terms of type of teaching licence in favor of teachers graduated from other faculties. The reason for similarity in self-efficacy scores of middle school mathematics teachers graduated from faculty of education and other faculties might be because of insufficient real classroom teaching practices for preservice teachers in the faculties of education, because of the fact that being an efficacious teacher requires teaching experiences in real classroom environments and because of being experienced in an occupation stultify the faculty graduated. There was not a growing body of research investigating self-efficacy scores of teachers in terms of type of teaching licence but paralel with the finding of the current study, Azar (2010) found in a study conducted to investigate secondary science and mathematics teachers' self-efficacy beliefs that

there were no significant difference in self-efficacy scores of teachers in terms of graduated university. In most of the studies self-efficacy scores of preservice teachers were examined in terms of graduated high school. Another reason for the similarity in self-efficacy scores of teachers independent from the type of teaching licence might be because of focusing on just courses of educational sciences in the last year of faculty of education. For this reason, the program followed in faculties of should focus on both real classroom experiences and mathematics courses during the whole teacher training program.

### 5.2 Differences among Middle School Mathematics Teachers' Sense of Efficacy Beliefs in terms of Gender

The findings of present study indicated that gender had not a significant effect on self- efficacy belief scores of middle school mathematics teachers for teaching mathematics to fifth grades and teaching independent from grade level. This result is consistent with the findings of a study conducted to investigate mathematics and science teachers' self-efficacy beliefs that there was not a significant difference between self-efficacy scores of teachers with respect to gender (Azar, 2010). Similarly, in a thesis study Zengin (2003) found that elementary teachers' self-efficacy beliefs did not differ with respect to gender.

Similarly, results of a study aimed to determine the teachers' self-efficacy on student engagement, instructional strategies and classroom management in relation to gender and age revealed that there was no significant difference in male and female teachers' self-efficacy scores for student engagement and instructional strategies. However, male teachers had higher scores than females (Shaukat & Iqbal, 2012).

Moreover, consistent with the findings of the present study, in a study Taskin-Sahin and Hacıomeroglu (2010) found that efficacy beliefs of preservice classroom teachers did not differ in terms of gender. This was interpreted as female and male preservice classroom teachers had similar efficacy beliefs. In contrast with the findings of the current research, in a study conducted to explore the effect of gender on preservice teachers' self-efficacy beliefs, Cakiroglu & Isiksal (2009) found that male preservice teachers had higher self-efficacy beliefs about mathematics than females (Cakiroglu & Isiksal, 2009).

On the other hand, in a study about pre-service elementary mathematics teachers' self-efficacy beliefs Yenilmez & Kakmacı (2008) found that female

preservice teachers had higher self-efficacy belief scores than males. However, in the present study, no significant difference was found between female and male middle school mathematics teachers' self-efficacy scores for teaching mathematics to fifth grades and teaching independent from grade levels. This indicated that both female and male teachers have similar self-efficacy scores for teaching mathematics to fifth grades and teaching independent from grade levels in terms of student engagement, instructional strategies and classroom management. It might be because of the age interval of students that they teach mathematics. Since it is easier to manage classroom and take attention of students during class session in middle schools than in secondary schools, gender might not have an affect on self-efficacy scores of middle school mathematics teachers. On the other hand, if a similar study was conducted with high school teachers, male teachers might have higher scores of self-efficacy for teaching mathematics in terms of classroom management. In addition, the similarity in self-efficacy scores of male and female teachers might be because of uniform distribution of students for middle school grades. Since middle school students were not determined by an academic examination or aptitude tests, the distribution of students to middle public schools was mainly similar. On the other hand, if this study had conducted in a school in which students were selected according to their academic achievement, self- efficacy belief scores of teachers might differ depending on gender.

### 5.3 Differences among Middle School Mathematics Teachers' Sense of Efficacy Beliefs in terms of Year of Teaching Experience

The findings showed that there was a significant difference in self-efficacy scores of middle school mathematics teachers for student engagement and instructional strategies in terms of year of teaching experience. Consistent with the findings of this study, Hoy and Burke-Spero (2005) found that that novice teacher self-efficacy beliefs were relatively low, similar to those of teacher candidates in their first years in the faculty of education. However, this level increases in time as a novice teacher gains experience (Tschannen-Moran & Hoy, 2007). It was noticed that a teacher's experiences in teaching mathematics has an influence on his/her senses about mathematics schooling and the performance in mathematical tasks (Beswick, 2012).

In contrast to the findings of these studies, Burley et all (1991) and Hall et all (1992) argue in some other studies that novice teachers who completed first year of teaching had a high sense of teacher efficacy. According to these studies, novice teachers feel a sense of satisfaction in teaching, have a more positive attitude towards teaching, and experience less stress. Novice teachers who are highly efficacious evaluated the quality of their preparation higher and the challenge of teaching lower than those who were less efficacious. In addition, Teachers with a one year experience in teaching exhibited powerful optimism for remaining in the field of education.

The findings of Rockoff (2004) revealed that teaching experience has a significant influence on student test scores for both reading and math computation at the elementary level. In addition, Rivkin, Hanushek, and Kain (2005) found that teacher experience positively contributes to student achievement gains but only for the first few years. Similarly, it was found that there was no significant difference among achievement results of the teachers grouped with less than five years, five to ten years, and more than ten years of experience (Stronge, Ward, & Grant, 2011).

In addition to these, in a study examining predictors of sense of efficacy beliefs of classroom, science, and mathematics teachers it was found that gender, subject of teaching and years of teaching experience were not significant predictors of sense of efficacy of teachers in terms of all of the dimensions namely efficacy for student engagement, efficacy for instructional strategies and efficacy for classroom management (Gur, Cakiroglu, & Aydin-Capa, 2012). In contrast, in another study it was found that in spite of the fact that preservice teachers reported higher efficacy for implementing new strategies, experienced teachers had higher efficacy for classroom management, organization of instruction and impact on students (Gorrell & Dharmadasa, 1994). Similarly, Campbell (1996) found that practicing teachers reported higher efficacy beliefs than preservice teachers. In some research studies there was found no relation between years of experiences and efficacy beliefs (Guskey, 1987). Moreover, according to the results of this study, self-efficacy scores of younger teachers between 20-30 years were higher than experienced teachers between 31-40 and 41-50 years with respect to student engagement and classroom management. No significant results were found between self-efficacy scores of younger and experienced teachers in terms of instructional strategies (Shaukat &

Iqbal, 2012). However, in some studies it was found that there was a negative relation between years of experience and general teaching efficacy beliefs (Hoy & Woolfolk, 1993). On the other hand, similar with present study, Wolters and Daugherty (2007) found that teachers in their first year indicated lower self-efficacy for instructional practices and classroom management than more experienced teachers. In a similar way, Fives and Buehl (2010) found that teachers with 10 or more years of experience were significantly more efficacious then were preservice teachers. The findings of a study conducted to explore the effect of grade level on preservice teachers' self-efficacy beliefs indicated that there was a significant effect of grade level on mathematics self-efficacy scores where senior pre-service teachers had significantly higher scores compared to the other grade levels (Cakiroglu & Isiksal, 2009).

### 5.4 Implications and Recommendations

The study was conducted to investigate the issue of whether middle school mathematics teachers' sense of self-efficacy for teaching mathematics differs in terms of type of teaching licence, gender and year of teaching experience. Another purpose of present study was to examine the relationship between middle school mathematics teachers' sense of self-efficacy for teaching mathematics to fifth grades and teaching independent from grade levels. In this section of the chapter, implications and recommendations for further research were summarized.

The findings of present study showed that there was not a significant difference in self-efficacy scores of middle school mathematics teachers in terms of gender and type of teaching licence. This result indicated that teacher training programs were inefficient for contributing to self-efficacy scores of preservice teachers; therefore, teacher training programs of universities in faculties of education should focus on more practice and make a better difference than other faculties. According to this result, it could be implied that teacher educators might design their courses based on more classroom practices. In addition, preservice teachers might get more benefit from sources during university education. As real practitioners middle school teachers should attend inservice teacher training programs. Another finding of present study was that there was a statistically significant difference in middle school mathematics teachers' self-efficacy scores for teaching independent from grade levels in terms of year of teaching experience. This finding revealed that teacher

experiences and in-service trainings contribute to the teachers' self-efficacy for student engagement and instructional strategies. It was also found in present study that there was not a significant difference in middle school mathematics teachers' efficacy scores for teaching mathematics to fifth grades with respect to year of teaching experience. This represented that teaching experiences did not contribute to middle school mathematics teachers' self-efficacy for teaching mathematics to fifth grades. It was also revealed a positive relationship between the scores of middle school mathematics teacher for teaching mathematics to fifth grade and teaching middle school students exists. The meaning of this positive relationship is that when teachers' self-efficacy scores for teaching independent from grade levels increase, teachers' self-efficacy scores for teaching fifth grades also increase. However, year of teaching experience made significant difference in efficacy scores for teaching independent from grade levels in dimensions of student engagement and instructional strategies, not for teaching mathematics to fifth grades. This might be because of teaching fifth grades wass based on just 3-4 years with the application of new education system. It was also stated in the literature that it seems more difficult to make changes in efficacy beliefs among inservice teachers. That is particularly to say, efficacy beliefs of experienced teachers are quite stable even when they are involved in workshops and new teaching methods (Ross, 1994). For these reasons, in-service trainings might be required for middle school mathematics teachers for increasing their efficacy scores for teaching fifth grades in the new education system. In addition to these, there was not a significant difference in middle school mathematics teachers' self-efficacy scores for classroom management in terms of year of teaching experience. Actually it was expected that more experienced teacher had higher self-efficacy scores for classroom management. The reason for similarity in middle school teachers' self-efficacy scores for classroom management independent from year of teaching experience might be different characteristics of new generation from experienced teachers'. That is, more experienced teachers' in-class practices for classroom managemant might not meet the needs of students of today and traditional methods might be useless for satisfying classroom management. Therefore, teachers might get inservice training related to features of new generation.

Having summarized the implications of present study, suggestions were presented in this paragraph. Firstly, although the sample size of present study was

adequate it restricts generalization of findings, because just public school teachers were selected from some counties of Ankara only. Hence, self-efficacy of teachers working private schools and in broader environment remains unknown. In addition, convenience sampling was used in the present study which limits generalizability of the results (Fraenkel and Wallen, 2006). Actually, current study, which was conducted with a small sample, can be replicated with larger and random samples. In addition to this, further researches might be conducted with both middle school mathematics teachers working in private schools and public schools in different cities in Turkey. Moreover, the findings of the study are limited to answers of teachers to the questions included in the scales used in this study. For this reason, further studies might be done with other scales on teachers' self-efficacy. In addition, since there is an interlink between self-efficacy and teacher expectations, future studies might be carried out through interviews with teachers to confirm how highly efficacious teachers can affect classroom learning. In this way, qualitative studies could lighten the difficulties that middle school mathematics teachers have in teaching mathematics to fifth grades more deeply than quantitative study like present study. Therefore, qualitative studies including interview with teachers might be done. Furthermore, this study is limited to middle school mathematics teachers, therefore further researches might be done in other subjects.

## REFERENCES


Akpınar, B., Dönder, A., Yıldırım, B., & Karahan, O. (2012). The evaluation of 4+4+4 system (model) in education in the context of opposite curriculum. *M.Ü. Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi, 36*, 25-39.

Alden, L. (1986). Self-efficacy and causal attributions for social feedback. *Journal of Research in Personality, 20*, 460-473.

Allinder, R. M. (1994). The relationships between efficacy and the instructional practices of special education teachers and consultants. *Teacher Education and Special Education, 17,* 86-95.

Anderson, R., Greene, M., & Loewen, P. (1988). Relationships among teachers' and students' thinking skills, sense of efficacy, and student achievement. *Alberta Journal of Educational Research, 34*(2), 148-165.

Anthony, T. & Kritsonis, W. (2007). 'A mixed methods assessment of the effectiveness of strategic e-mentoring in improving the self-efficacy and persistence (or retention) of alternatively certified novice teachers within an inner city school'. *District Doctoral Forum National Journal for Publishing and Monitoring Doctoral Student Research, 4*(1),1-8.

Ashton, P. T., & Webb, R. B. (1986). *Making a difference: Teachers sense of efficacy and student achievement.* New York: Longman.

Azar, A. (2010). Ortaöğretim Fen Bilimleri ve Matematik Öğretimi Adaylarının Öz Yeterlik İnançları. *ZKÜ Sosyal Bilimler Dergisi, 6*(12), 235-252.

Bandura, A. (1977). Self-efficacy: toward a unifying theory behavioral change. *Psychological Review, 84*(2), 191-215.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1991). Self-regulation of motivation through anticipatory and self-regulatory mechanisms. In R. A. Dienstbier (Ed.), Perspectives on motivation: Nebraska symposium on motivation (Vol. 38, pp. 69-164). Lincoln: University of Nebraska Press.

Bandura, A. (1992). Exercise of personal agency through the self-efficacy mechanism. In R. Schwarzer (Ed.), Self-efficacy: Thought control of action (pp. 3-38). Washington, DC: Hemisphere.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*(2), 117-148.

Bandura, A. (1996). *Self-efficacy in changing societies.* New York: Cambridge University Press.

Bandura, A. (1997). *Self-efficacy: the exercise of control*. W. H. Freeman and Company, New York, NY.

Bandura, A. (2006). Guide for constructing self-efficacy scales. In F. Pajares & T. Urdan (eds.), *Self-efficacy beliefs of adolescents* (pp. 307-337). Greenwich, CT: Information Age Publishing.

Battista, M. T. (1994). Teacher beliefs and the reform movement in mathematics education. *Phi Delta Kappan, 75,* 462-470.

Berman, P., McLaughlin, M., Bass, G., Pauly, E., & Zellman, G. (1977). *Federal programs supporting educational change: Vol. 7. Factors affecting implementation and continuation.* Santa Monica, CA:RAND.

Beswick, K. (2012). Teachers' beliefs about school mathematics and mathematicians' mathematics and their relationship to practice. *Educational Studies in Mathematics,* 79, 127-147. Doi:10.1007/s10649-011-9333-2.

Betz, N. E., & Hackett, G. (1983). The relationship of mathematics self-efficacy expectations to the selection of science-based college majors. *Journal of Vocational Behavior, 23*, 329-345.

Bıkmaz, F. H. (2004).Öz yeterlik İnançları. *Eğitimde Bireysel Farklılıklar.* Y.Kuzgun ve D. Deryakulu (Ed.).Ankara: Nobel Yayın Dağıtım.

Bong, M., & Skaalvik, E. M. (2003). Academic self-concept and self-efficacy: How different are they really? *Educational Psychology Review,15*, 1-40.

Brown, R. & Gibson, S. (1982). Teachers' sense of efficacy: Changes due to experience. Paper presented at the annual meeting of the California Educational Research Association, Sacramento, CA.

Burley, W. W., Hall, B. W., Villeme, M. G., & Brockmeier, L. L. (1991). *A path analysis of the mediating role of efficacy in first-year teachers' experiences, reactions and plans.* Paper presented at the Annual Meeting of the American Educational Research Association, Chicago.

Büyüköztürk, Ş. (2002). Faktör Analizi: Temel Kavramlar ve Ölçek Geliştirmede Kullanımı. *Kuram ve Uygulamada Eğitim Yönetimi, 32*, 470-483.

Cakiroğlu, E., & Isiksal, M. (2009). Pre-service elementary teachers' attitudes and self-efficacy beliefs toward mathematics. *Education and Science, 34* (151).

Campbell, J. (1996). A comparison of teacher-efficacy for pre-and in-service teachers in Scotland and America. *Education, 36*(6), 33-39.

Caprara, G. V., Barbaranelli, C., Steca, P., & Malone, P. S. (2006). Teacher self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: A study at the school level. *Journal of school Psychology, 44,* 473-490.

Chwalsz, K. D., Altmaier, E. M., & Russell, D. W. (1992). Causal attributions, self-efficacy cognitions, and coping with stress. *Journal of Social and Clinical Psychology, 11,* 377-400.

Coladarci, T. (1992). Teachers' sense of efficacy and commitment to teaching. *Journal of Experimental Education, 60,* 323-337.

Collins, J. L. (1982, March). *Self-efficacy and ability in achievement behavior*. Paper presented at the annual meeting of the American Educational Research Association, New York.

Cotton, K. (2000). The schooling practices that matter most. Portland, OR, and Alexandria, VA: Northwest Regional Educational Laboratory and the Association for Supervision and Curriculum Development.

Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Educational Policy Analysis Archieve, 8*(1). Retrieved from http://olam.ed.asu.edu/epaa/v8n1

Darling-Hammond, L., & Youngs, P. (2002). Defining "highly qualified teachers": What does "scientifically-based research" actually tell us? *Educational Researcher, 31,* 13-25.

Dee, K., & Hoy, W. (2008). "Maybe I can teach those kids." The influence of contextual factors on student teachers' efficacy beliefs. *Teaching & Teacher Education, 24*(1), 166-179.

DeMesquita, P. B., & Drake, J. C. (1994). Educational reform and the self-efficacy beliefs of teachers implementing nongraded primary school programs. *Teaching and Teacher Education, 10,* 291-302.

Dinç, E., Uzun, C., & Çoban, O. (2014). Eğitimde kademeler arası geçişle ilgili öğretmen görüşlerinin incelenmesi. *Uşak Üniversitesi Sosyal Bilimler Dergisi, 7/3,* 210-235.

Emmer, E. T., Evertson, C. M., & Anderson, L. M. (1980). Effective classroom management at the beginning of the school year. *Elementary School Journal, 80*(5), 219-231.

Enochs, L. G., Smith, P. L., & Huinker, D. (2000). Establishing factorial validity of the Mathematics Teaching Efficacy Beliefs Instrument. *School Science and Mathematics, 100,* 194-202.

Enon, J. C. (1995). *Teacher efficacy: Its effects on teaching practices and student outcomes in mathematics.* Unpublished doctoral dissertation University of Alberta.

Epçaçan, C. (2014). İlkokul ve Ortaokul Öğretmen ve Yöneticilerinin 4+4+4 Eğitim Sistemine İlişkin Görüşleri (Siirt İli Örneği). *Ekev Akademi Dergisi, 18*(58).

Ernest, P. (1989). The impact of beliefs on the teaching of mathematics. In P. Ernest (Ed.), *Mathematics teaching: The state of art* (pp. 249-254). London, England: Falmer.

Fraenkel, J. R., & Wallen, N. E. (2006). *How to design and evaluate research in education*. New York: McGraw Hill Companies, Inc.

Fuller, B., & Izu, J. (1986). Explaining school cohesion: What shapes the organizational beliefs of teachers. *American Journal of Education, 94,* 501-535.

Giallo, R. & Little, E. (2003). 'Classroom behavior problems: the relationship between preparedness, classroom experiences, and self-efficacy in graduate and student teachers'. *Australian Journal of Educational & Developmental Psychology, 3,* 21-34.

Gibson, S., & Dembo, M. H. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology, 76,* 569-582.

Gist, M. E., & Mitchell, T. R. (1992). Self-efficacy: A Theoretical analysis of its determinants and malleability. Academy of Management Review, *17*(2), 183-211.

Goddard, R., Hoy, W. & Woolfolk, A. (2004). 'Collective efficacy beliefs: theoretical developments, empirical evidence, and future directions'. *Researcher, 3*(33), 3-13.

Gorrell, J., & Dharmadasa, K. H. (1994). Perceived self-efficacy of preservice and inservice Sri Lankan teachers. *International Education, 24,* 23-36.

Graham, S., Harris, K. R., Fink, B. & McArthur, C. A. (2001). Teacher efficacy in writing: A construct validation with primary grade teachers. *Scientific Studies of Reading, 5*(2*),* 177-203.

Gur, G., Cakiroglu, J., & Aydin-Capa, Y. (2012). Investigating predictors of sense of efficacy beliefs of classroom, science and mathematics teachers. *Education and Science, 37*(166).

Guskey, T. R. (1986). Staff development and the process of teacher change. *Educational Researcher, 15*(5), 5-12.

Guskey, T. R. (1987). Context variables that affect measures of teacher-efficacy. *The Journal of Educational Research, 81,* 41-47.

Guskey, T. R. (1988). Teacher efficacy, self-concept, and attitudes toward the implementation of instructional innovation. *Teaching and Teacher Education, 4,* 63-69.

Guskey, T. R. (1989). Attitude and perceptual change in teachers. *International Journal of Educational Research, 13,* 439-453.

Guskey, T. R. (Ed.). (1996). *Communicating student learning: 1996 yearbook of the Association for Supervision and Curriculum Development.* Alexandria, VA: Association for Supervision and Curriculum Development.

Güven, İ. (2012). The 4+4+4 School Reform Bill and the Fatih Project: is It a Reform?. *Elementary Education Online, 11*(3), 556-577.

Hall, B., Burley, W., Villeme, M., & Brockmeier, L. (1992). *An attempt to explicate Teacher efficacy beliefs among first year teachers.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research, 77*(1), 81-112.

Henson, R. K. (2001). *Teacher Self- Efficacy: Substantive Implications and Measurement Dilemmas.* Texas A&M University, College Station, Texas.

Hoover-Dempsey, K. V., Bassler, O. C., & Brissie, J. S. (in press). Parent efficacy, teacher efficacy, and parent involvement: Explorations in parent-school relations. *Journal of Educational Research*.

Hoy, A.W., & Hoy, W. K. (2003). *Instructional leadership: A learning-centered guide.* Boston: Allyn & Bacon.

Hoy, W. A. & Spero, B. R. (2005). Changes in teacher efficacy during the early years of teaching: Acomparison of four measures. *Teaching and Teacher Education, 21,* 343-356.

Hoy, W. K. & Woolfolk, A. E. (1993). Teachers' sense of efficacy and the organizational health of schools. *The Elementary School Journal, 93,* 356-372.

İzci, E. & Göktaş, Ö. (2014). Matematik öğretmenlerinin 5. sınıf matematik dersi

öğretim programına ilişkin görüşleri. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi, 41*.

Klassen, et. al., (2009). Exploring the validity of a teachers' self-efficacy scale in five countries, *Contemporary Educational Psychology, 34,* 67-76.

Köklü, N. (1995). Tutumların Ölçülmesi ve Likert Tipi Ölçeklerde Kullanılan Seçenekler. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi, 28* (2).

Main, S. & Hammond, L. (2008). 'Best practice or most practiced? Pre-service teachers' beliefs about effective behavior management strategies anf reported self-efficacy'. *Australian Journal of Teacher Education, 33*(4), 28-39.

Meijer, C., & Foster, S. (1988). The effect of teacher self-efficacy on referral chance. *Journal of Special Education, 22,* 378-385.

McAuley, E., Duncan, T. E., & McElroy, M. (1989). Self-efficacy cognitions and casual attributions for children's motor performance: An exploratory investigation. *The Journal of Genetic Psychology, 150,* 65-73.

McGee, J. R. (2012). *Developing and validating a new instrument to measure the self-efficacy of elementary mathematics teachers.* Unpublished doctoral dissertation, The University of North Carolina at Charlotte.

Midgley, C., Feldlaufer, H., & Eccles, J. (1989). Change in teacher efficacy and student self- and task- related beliefs in mathematics during the transition to junior high school. *Journal of Educational Psychology, 81,* 247-258.

Moore, W., & Esselman, M. (1992). Teacher efficacy, power, school climate and achievement: A desegregating district's experience. *Paper presented at the annual meeting of the American Educational Research Association,* San Francisco.

National Council of Teachers of Mathematics (1989). *Curriculum and evaluation standards for School Mathematics*, Reston, VA: Author.

National Council of Teachers of Mathematics (2000). *Principles and standards for school mathematics*. Reston, VA: Author.

Nolen, S., Ward, C., Horn, I., Campbel, S., Mahna, K. & Childers, S. (2007). Motivation to learn during student teaching. Paper presented at the annual meeting of the American Educational Research Association, Chicago.

Ozder, H. (2011). Self-Efficacy Beliefs of Novice Teachers and Their Performance in the Classroom. *Australian Journal of Teacher Education, 36*(5).

Özerkan, E. (2007). *Öğretmenlerin öz-yeterlik algıları ile öğrencilerin sosyal bilgiler benlik kavramları arasındaki ilişki.* Unpublished master's thesis, Trakya Üniversitesi, Sosyal Bilimler Enstitüsü, Edirne.

Özkan, Ö., Tekkaya, C., & Çakıroğlu, J. (2002). Fen bilgisi aday öğretmenlerin fen kavramlarını anlama düzeyleri, fen öğretimine yönelik tutum ve öz-yeterlik inançlar. *V. Fen Bilimleri Eğitimi Kongresi*, ODTÜ, Ankara.

Paglis, L. L., & Green, S. G. (2002). Leadership self-efficacy and managers' motivation for leading change. *Journal of Organizational Behavior, 23,* 215-235.

Pajares, F. (1997). Current directions in self-efficacy research. In M. Maehr & P. R.Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10, pp. 1-49). Greenwich, CT: JAI Press.

Pajares, F. (2002). *Overview of social cognitive theory and of self-efficacy.* Retrieved from http://www.des.emory.edu/mfp/eff.html.

Palardy, G. J., & Rumberger, R. W. (2008). Teacher effectiveness in first grade: The importance of background qualifications, attitudes, and instructional practices for student learning. *Educational Evaluation and Policy Analysis, 30*(2), 11-140.

Pallant, J. (2001). *SPSS survival manual: A step by step guide to data analysis using SPSS for windows*. New York: McGraw-Hill/Open University Press.

Peterson, P. L., Fennema, E., Carpenter, T. P., & Loef, M. (1989). Teachers' pedagogical content beliefs in mathematics. *Cognition and Instruction,* 6, 1-40.

Pigge, F. L., & Marso, R. N. (1993). *Outstanding teachers' sense of teacher efficacy at four stages of career development.* Paper presented at the Annual Conference of the Association of Teacher Educators, Los Angeles.

Pintrich, P. R., & Schunk, D. H. (1996). Motivation in education: Theory, research, and applications. Englewood Cliffs, NJ: Merrill/Prentice-Hall.

Podell, D., Soodak, L. (1993). Teacher efficacy and bias in special education referrals. *Journal of Educational Research, 86,* 247-253.

Raudenbush, S., Rowen, B., & Cheong, Y. (1992). Contextual effects on the self-perceived efficacy of high school teachers. *Sociology of Education, 65,* 150-167.

Riggs, I. M., & Enochs, L. G. (1990). Toward the development of an elementary teacher's science teaching efficacy belief instrument. *Science Education, 74,* 625-637.

Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica, 73*(2), 417-458.

Rockoff, J. E. (2004). The impact of individual teachers on student achievement: Evidence from panel data. *American Economic Review, 94*(2), 247-252.

Romberg, T., & Carpenter, T. (1986). *Research on teaching and learning mathematics: Two disciplines of scientific inquiry* (s. 850-873). Ed: W. C. Wittrock., Handbook of Research on Teaching, Macmillian: New York.

Ross, J. A. (1998). The antecedents and consequences of teacher efficacy. In J. Brophy (ed.) *Advances in Research on Teaching. Vol. 7* (pp. 49-74). Greenwich, CT: JAI Press.

Ross, J. A., Cousins, J. B., & Gaddalla, T. (1996). Within-teacher predictors of teacher efficacy. *Teaching and Teacher Education, 12*, 385-400.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs,* 80, 1-28

Schunk, D. H. (1987). Peer models and children's behavioral change. *Review of Educational Research, 57,* 149-174.

Schunk, D. H., & Meece, J. L. (2006). Self-efficacy development in adolescence. In F. Pajares & t. Urdan (Eds.), Self-efficacy beliefs of adolescents (pp. 71-96). Greenwich, CT: Information Age.

Shaukat, S., & Iqbal, H. M. (2012). Teacher self-efficacy as a function of student engagement, instructional strategies and classroom management. *Pakistan Journal of Social and Clinical Psychology, 10*(2), 82-85.

Silver, W. S., Mitchell, T. R., & Gist, M. E. (1989). *The impact of self-efficacy on casual attributions for successful and unsuccessful performance.* Unpublished manuscript, University of Washington, Seattle.

Skaalvik, E. M., & Skaalvik, S. (2010). Teacher self-efficacy and teacher burnout: A study of relations. *Teaching and Teacher Education, 26,* 1059-1069.

Skinner, E. A. (1996). A guide to constructs of control. Journal of Personality and Social Psychology, 71, 549-570.

Snyder, C. R. & Lopez, S. (2002). *Handbook of Positive Psychology*. Oxford University Press US.

Soodak, L., & Podell, D. (1993). Teacher efficacy and student problems as factors in special education referral. *Journal of Special Education, 27*, 66-81.

Stein, M. K. & Wang, M. C. (1988). Teacher development and school improvement: The process of teacher change. *Teaching and Teacher Education, 4*, 171-187.

Stronge, J. H., Ward, T. J. & Grant, L. W. (2011). What makes Good Teachers Good? A Cross-Case Analysis of the Connection Between Teacher Effectiveness and Student Achievement. *Journal of Teacher Education, 62(4).*

Swackhamer, L. E. (2010). Measuring mathematics specific teacher efficacy: Can a global instrument produce valid results? Paper presented at the 2010 American Educational Research Association Annual Meeting, Denver, CO.

Swars, S. L. (2005). Examining perceptions of mathematics teaching effectiveness among elementary preservice teachers with differing levels of mathematics teacher efficacy. *Journal of Instructional Psychology. Vol.32*(2), 139-147.

Tangulu, Z., & Cidaci, T. (2014). Ortaokul 5. sınıf sosyal bilgiler dersine giren branş öğretmenlerinin karşılaştığı sorunlar. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi (KEFAD), 15*(2), 227-242.

Taskin-Sahin, C., & Haciomeroglu, G., 2010). Sınıf öğretmeni adaylarının özyeterlik inançları: nicel ve nitel verilere dayalı bir inceleme. *İnönü Üniversitesi Eğitim Fakültesi Dergisi, 11*(1), 21-40.

Tschannen-Moran, M., Hoy, A. W. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced teachers. *Teaching & Teacher Education, 23*(6), 944-956.

Tschannen-Moran, M., & Woolfolk-Hoy, A. (2001). Teacher efficacy: capturing an elusive construct. *Teaching and Teacher Education, 17*, 783-805.

Tschannen-Moran, M., Woolfolk, Hoy, A. & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*, 202-248.

Wenta, R. G. (2000). *Efficacy of preservice elementary mathematics teachers.* Unpublished doctoral dissertation, Indiana University.

Wolk, S. (2002). *Being good: Rethinking classroom management and student discipline.* Portsmouth, NH: Heinemann.

Wolters, C. A., & Daugherty, S. G. (2007). Goal structures and teachers' sense of efficacy: Their relation and association to teacher experience and academic level. *Journal of Educational Psychology, 99*, 181-193.

Woolfolk, A. E., & Hoy, W. K. (1990). Prospective teachers' sense of efficacy and beliefs about control. *Journal of Educational Psychology, 82*, 81-91.

Woolfolk Hoy, A. & Spero, R. B. (2005). Changes in teacher efficacy during the early years of teaching: A comparison of four measures. *Teaching and Teacher Education, 21*, 343-356.

Yenilmez, K., & Kakmacı, Ö. (2008). İlköğretim matematik öğretmenliği bölümü öğrencilerinin öz-yeterlik inanç düzeyleri. *Eskişehir Osmangazi Üniversitesi Sosyal Bilimler Dergisi 9*(2).

Zengin, Umut (2003), "*İlköğretim Öğretmenlerinin Öz-yeterlik Algıları ve Sınıf İçi İletişim Örüntüleri",* Yayınlanmamış Yüksek Lisans Tezi, Dokuz Eylül Üniversitesi Eğitim Bilimleri Enstitüsü, İzmir.

Ziimerman, J. (2006). Factors that relate to educators' use of the Baldrige Framework. [Electronic version]. *Continuous Improvement Monitor, 2*(3).

# APPENDICES

## Appendix A: TTSES

Ölçekte yer alan soruların cevap seçenekleri 1 ile 9 arasında derecelendirilmiştir. Rakamların karşıladığı anlamlar şu şekildedir:

**1= yetersiz, 3= çok az yeterli, 5=biraz yeterli, 7= oldukça yeterli, 9= çok yeterli**

Aşağıda belirtilen ifadelere ne ölçüde katıldığınızı/katılmadığınızı size uygun olan rakamı yuvarlak içine alarak belirtiniz.

| | **yetersiz** | | **çok az yeterli** | | **biraz yeterli** | | **oldukça yeterli** | | **çok yeterli** |
|---|---|---|---|---|---|---|---|---|---|
| **1)** Çalışması zor öğrencilere ulaşmayı ne kadar başarabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **2)** Öğrencilerin eleştirel düşünmelerini ne kadar sağlayabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **3)** Sınıfta dersi olumsuz yönde etkileyen davranışları kontrol etmeyi ne kadar sağlayabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **4)** Derslere az ilgi gösteren öğrencileri motive etmeyi ne kadar sağlayabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **5)** Öğrenci davranışları ile ilgili beklentilerinizi ne kadar açık ortaya koyabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **6)** Öğrencileri okulda başarılı olabileceklerine inandırmayı ne kadar sağlayabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **7)** Öğrencilerin zor sorularına ne kadar iyi cevap verebilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **8)** Sınıfta yapılan etkinliklerin düzenli yürümesini ne kadar iyi sağlayabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **9)** Öğrencilerin öğrenmeye değer vermelerini ne kadar sağlayabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |

| | **yetersiz** | | **çok az yeterli** | | **biraz yeterli** | | **oldukça yeterli** | | **çok yeterli** |
|---|---|---|---|---|---|---|---|---|---|
| **10)** Öğrettiklerinizin öğrenciler tarafından kavranıp kavranmadığını ne kadar iyi değerlendirebilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **11)** Öğrencilerinizi iyi bir şekilde değerlendirmesine olanak sağlayacak soruları ne ölçüde hazırlayabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **12)** Öğrencilerin yaratıcılığının gelişmesine ne kadar yardımcı olabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **13)** Öğrencilerin sınıf kurallarına uymalarını ne kadar sağlayabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **14)** Başarısız bir öğrencinin dersi daha iyi anlamasını ne kadar sağlayabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **15)** Dersi olumsuz yönde etkileyen ya da derste gürültü yapan öğrencileri ne kadar yatıştırabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **16)** Farklı öğrenci gruplarına uygun sınıf yönetimi sistemi ne kadar iyi oluşturabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **17)** Derslerin her bir öğrencinin seviyesine uygun olmasını ne kadar sağlayabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **18)** Farklı değerlendirme yöntemlerini ne kadar kullanabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **19)** Birkaç problemli öğrencinin derse zarar vermesini ne kadar iyi engelleyebilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **20)** Öğrencilerin kafası karıştığında ne kadar alternatif açıklama ya da örnek sağlayabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **21)** Sizi hiçe sayan davranışlar gösteren öğrencilerle ne kadar iyi baş edebilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **22)** Çocuklarının okulda başarılı olmalarına yardımcı olmaları için ailelere ne kadar destek olabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **23)** Sınıfta farklı öğretim yöntemlerini ne kadar iyi uygulayabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **24)** Çok yetenekli öğrencilere uygun öğrenme ortamını ne kadar sağlayabilirsiniz? | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |

## Appendix B: MTSES

Ölçekte yer alan soruların cevap seçenekleri 1 ile 9 arasında derecelendirilmiştir. Rakamların karşıladığı anlamlar şu şekildedir:

**1= kesinlikle katılmıyorum, 3= katılmıyorum, 5= emin değilim,**

**7= katılıyorum, 9= kesinlikle katılıyorum**

Aşağıda belirtilen ifadelere ne ölçüde katıldığınızı/katılmadığınızı size uygun olan kutuya X işareti koyarak belirtiniz.

| | kesinlikle katılmıyorum | | katılmıyorum | | emin değilim | | katılıyorum | | kesinlikle katılıyorum |
|---|---|---|---|---|---|---|---|---|---|
| **1)** Derste 5.sınıf öğrencilerinin seviyesine inmekte zorlanırım. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **2)** 5.Sınıf öğrencilerine konuları anlatırken 6. 7. ve 8. sınıflara oranla zorlanırım. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **3)** Kendilerini ifade etmekte zorlanan 5.sınıf öğrencilerine bu konuda fırsatlar sunabilirim. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **4)** Ders esnasında 5. sınıf öğrencilerinin dikkatini uzun süre toplayabilirim. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **5)** 5. sınıflarda ders içi etkinlikleri ilgi çekici şekilde düzenleyebilirim. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **6)** Soyut matematik kavramlarını 5.sınıf öğrencilerinin seviyesine uygun şekilde somutlaştırabilirim. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **7)** 5. sınıf öğrencilerinin konuyu öğrenmek için ihtiyaç duyduğu ilgiyi sağlayabilirim. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **8)** 5. sınıflardaki ödev sonrası geri bildirimlerim 6, 7 ve 8. sınıflarda olduğu kadar verimli geçer. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **9)** 5. sınıflarda birebir ilgi isteyen öğrencilere gereken zamanı ayırabilirim. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **10)** 5. sınıftaki öğrencilerin bireysel ihtiyaçlarına 6, 7 ve 8. sınıflarda olduğu kadar cevap verebilirim. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **11)** 5. sınıf öğrencilerinin dersin akışını bozan davranışlarıyla başa | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |

| | | kesinlikle katılmıyorum | | katılmıyorum | | emin değilim | | katılıyorum | | kesinlikle katılıyorum |
|---|---|---|---|---|---|---|---|---|---|---|
| | çıkabilirim. | | | | | | | | | |
| **12)** | 5. sınıf öğrencilerinin ihtiyaçlarına yönelik ödüllendirme yapmakta zorlanırım. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **13)** | 5. sınıf öğrencilerinin kavramları öğrenebilmesi için ne yapmam gerektiğini biliyorum. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **14)** | 5. sınıflarda derste olumsuz davranış gösteren öğrencilerle 6, 7 ve 8. sınıflarla olduğu kadar baş edebilirim. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **15)** | 5. sınıflarda öğrettiklerimin öğrenciler tarafından ne kadar öğrenildiğini değerlendirebilirim. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **16)** | 5. sınıf öğrencilerinin tekrarlayan olumsuz davranışları ile başa çıkmakta zorlanırım. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **17)** | 5. sınıf derslerimde gereksiz zaman kayıplarını önlemekte 6, 7 ve 8. sınıflara oranla daha zorlanırım. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **18)** | 5. sınıf öğrencilerinin sınıf kurallarına uymalarını sağlayabilirim. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **19)** | Verilen ödevleri anlamakta zorlanan 5.sınıf öğrencilerine nasıl ödev hazırlayacakları konusunda gereken desteği sağlayabilirim. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **20)** | 5. sınıf öğrencilerinin seviyelerine uygun ölçme-değerlendirme uygulamaları hazırlamakta zorlanırım. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **21)** | 5. sınıflarda hazırbulunuşluğu tam olmayan öğrencilere yardımcı olmakta zorlanırım. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **22)** | 5. sınıf öğrencilerine ders kurallarını açıklamakta zorlanırım. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **23)** | 5. sınıf öğrencilerinin kendi aralarındaki sorunları çözmelerine yardımcı olabilirim. | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |

# Appendix C: Permissions

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
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Sayı: 28620816/ 567-1110

25.11.2014

Gönderilen : Prof. Dr. Erdinç Çakıroğlu
İlköğretim Bölümü

Gönderen : Prof. Dr. Canan Sümer
IAK Başkanı Vekili

İlgi : Etik Onayı

Danışmanlığını yapmış olduğunuz İlköğretim Fen ve Matematik Eğitimi Bölümü öğrencisi Esra Şener'in "Ortaokul Matematik Öğretmenlerinin 5. Sınıf Öğrencilerine Öğretim Yapabilmeye Yönelik Öz Yeterlik Algıları" isimli araştırması "İnsan Araştırmaları Komitesi" tarafından uygun görülerek gerekli onay verilmiştir.

Bilgilerinize saygılarımla sunarım.

Etik Komite Onayı

Uygundur

25/11/2014

Prof.Dr. Canan Sümer
Uygulamalı Etik Araştırma Merkezi
( UEAM ) Başkanı Vekili
ODTÜ 06531 ANKARA

T.C.
ANKARA VALİLİĞİ
Milli Eğitim Müdürlüğü

ÖĞRENCİ İŞLERİ DAİRE BAŞKANLIĞI Gv. Adı Soyadı :

**Sayı** : 14588481/605.99/1766791 17/02/2015
**Konu:** Araştırma izni

ORTA DOĞU TEKNİK ÜNİVERSİTESİNE
(Öğrenci İşleri Daire Başkanlığı)

İlgi: a) MEB Yenilik ve Eğitim Teknolojileri Genel Müdürlüğünün 2012/13 nolu Genelgesi.
b) 23/01/2015 tarihli ve 990 sayılı yazınız.

Üniversiteniz Sosyal Bilimler Enstitüsü Yüksek Lisans Öğrencisi Esra ŞENER' in **"Ortaokul Matematik Öğretmenlerinin 5. sınıf öğrencilerine öğretim yapabilmelerine yönelik öz yeterlik algıları"** başlıklı tezi kapsamında çalışma yapma talebi Müdürlüğümüzce uygun görülmüş ve araştırmanın yapılacağı İlçe Milli Eğitim Müdürlüğüne bilgi verilmiştir.

Anket formunun (5 sayfa) araştırmacı tarafından uygulama yapılacak sayıda çoğaltılması ve çalışmanın bitiminde iki örneğinin (cd ortamında) Müdürlüğümüz Strateji Geliştirme (1) Şubesine gönderilmesini arz ederim.

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Tel: (0 312) XXX XX XX
Faks: (0312) XXX XX XX

## AppendixD: Histograms

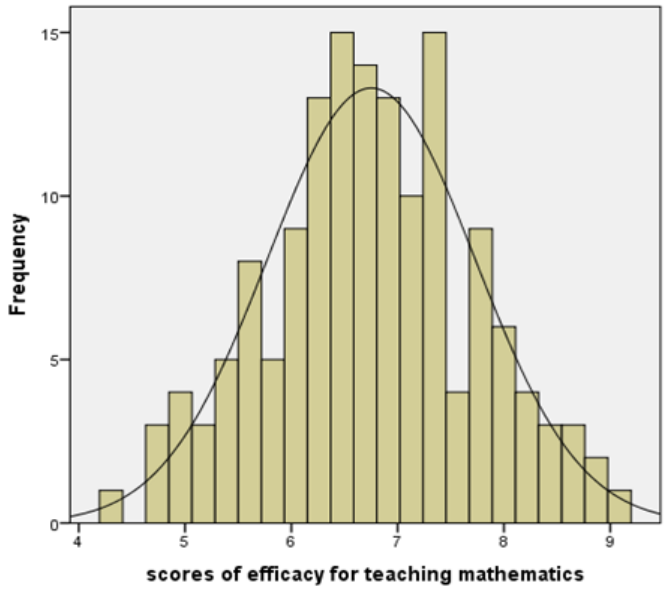


*Figure D.1* Histogram of MTSES scores of middle school mathematics teachers graduated from faculty of education in terms of efficacy for teaching mathematics to fifth grades.

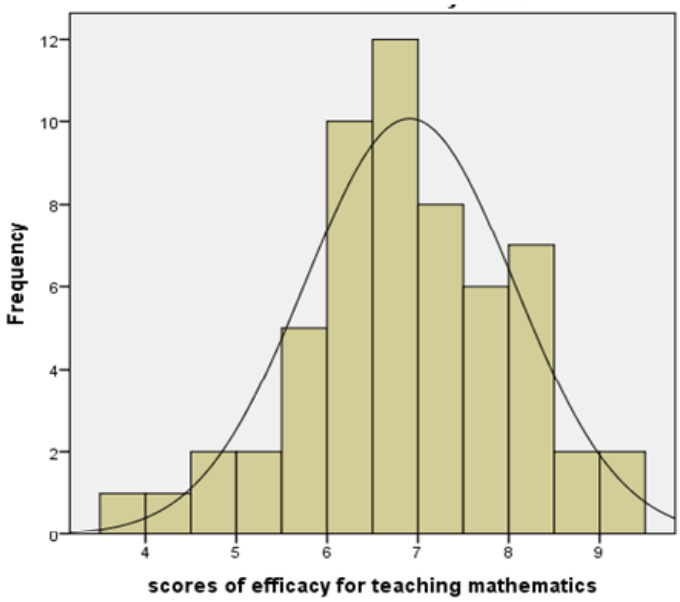


*Figure D.2* Histogram of MTSES scores of middle school mathematics teachers graduated from other faculties in terms of efficacy for teaching mathematics to fifth grades.

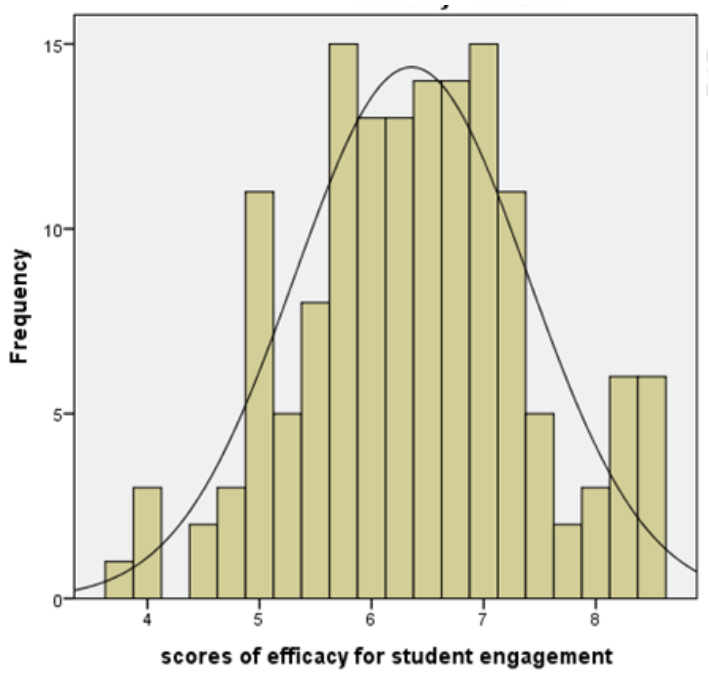


*Figure D.3* Histogram of TTSES scores of middle school mathematics teachers graduated from faculty of education in terms of dimension of efficacy for student engagement.

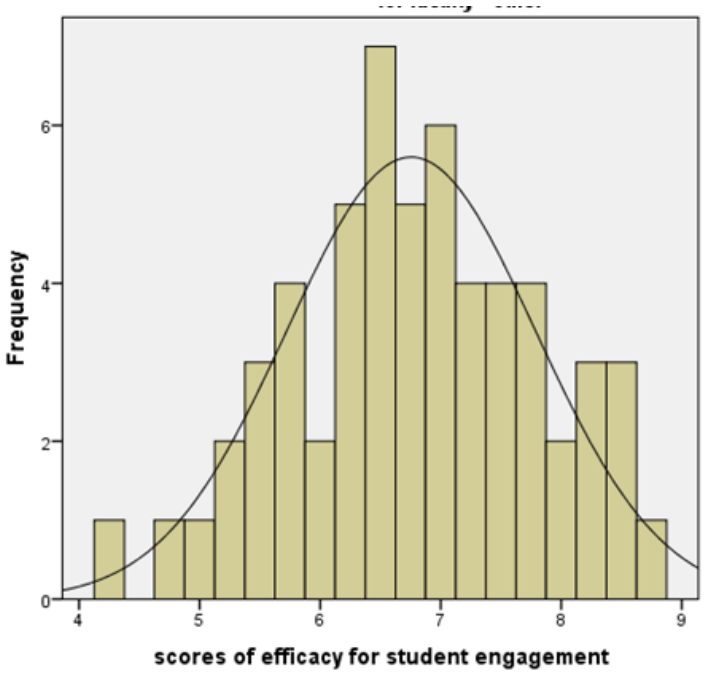


*Figure D.4* Histogram of TTSES scores of middle school mathematics teachers graduated from other faculties in terms of dimension of efficacy for student engagement.

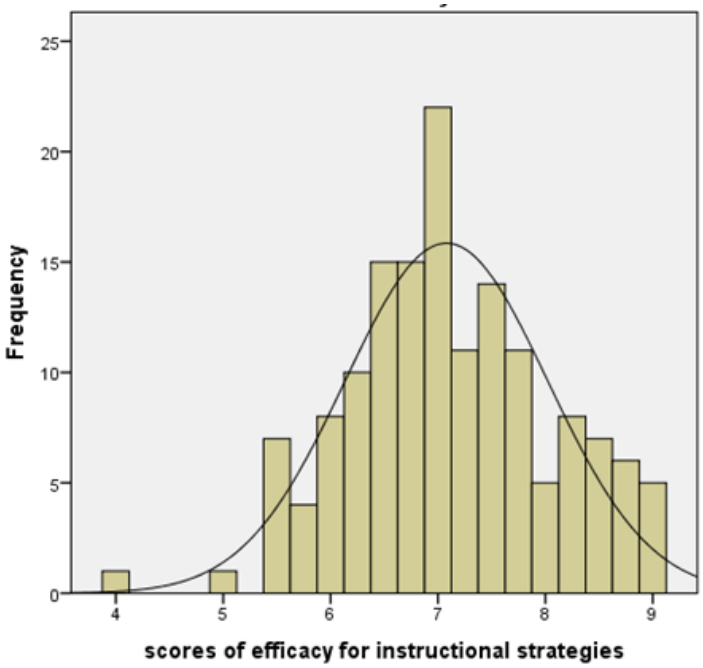


*Figure D.5* Histogram of TTSES scores of middle school mathematics teachers graduated from faculty of education in terms of dimension of efficacy for instructional strategies.

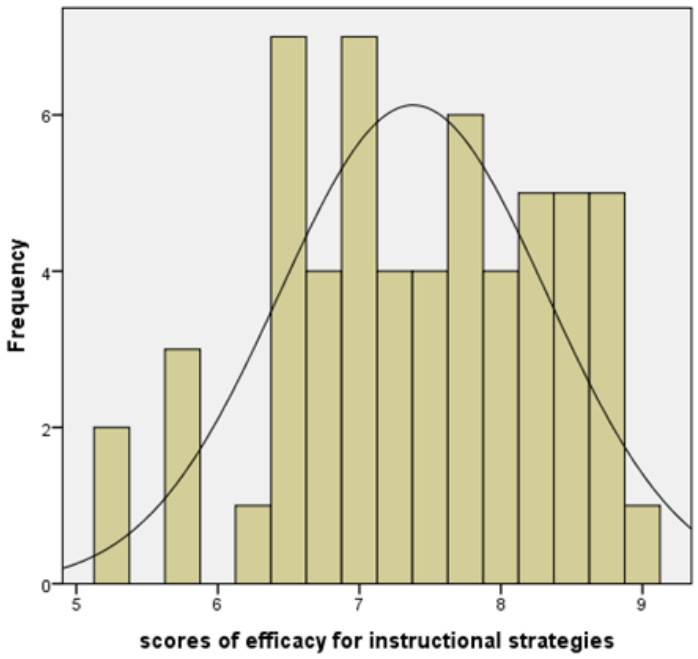


*Figure D.6* Histogram of TTSES scores of middle school mathematics teachers graduated from other faculties in terms of dimension of efficacy for instructional strategies.

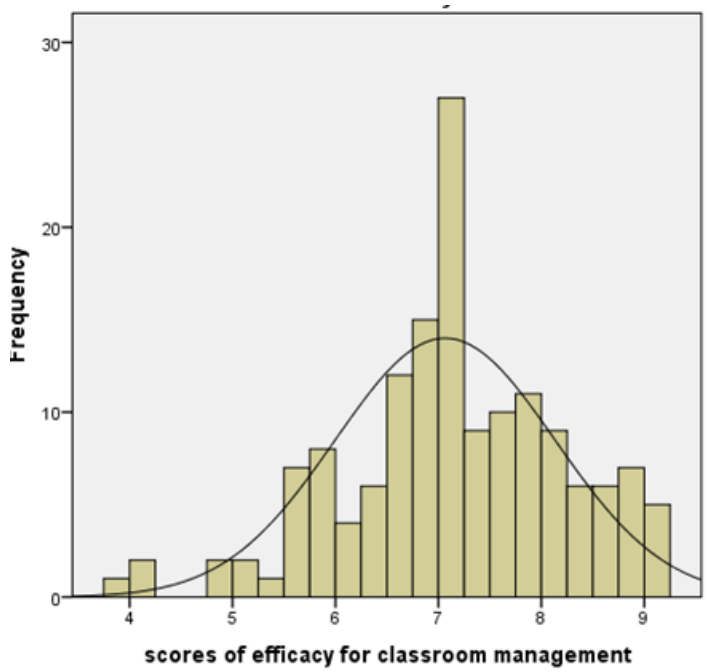


*Figure D.7* Histogram of TTSES scores of middle school mathematics teachers graduated from faculty of education in terms of dimension of efficacy for classroom management.

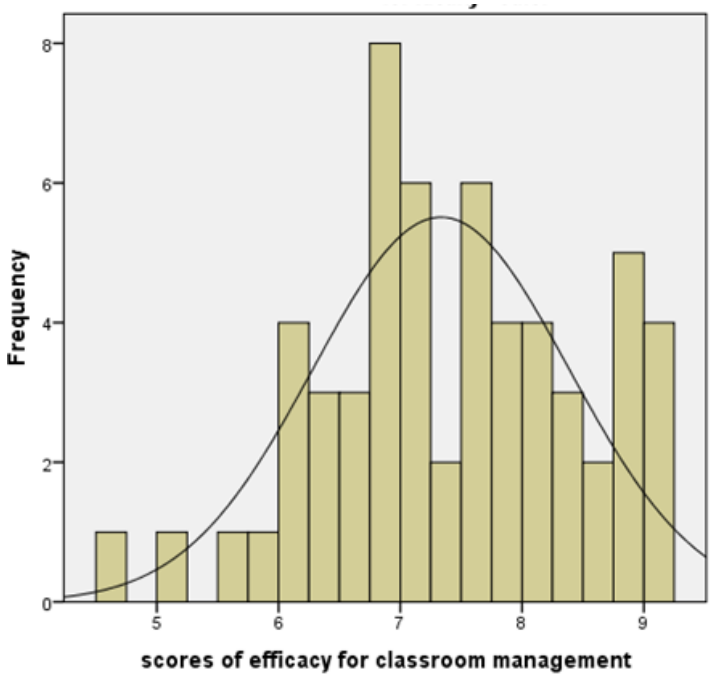


*Figure D.8* Histogram of TTSES scores of middle school mathematics teachers graduated from other faculties in terms of dimension of efficacy for classroom management.

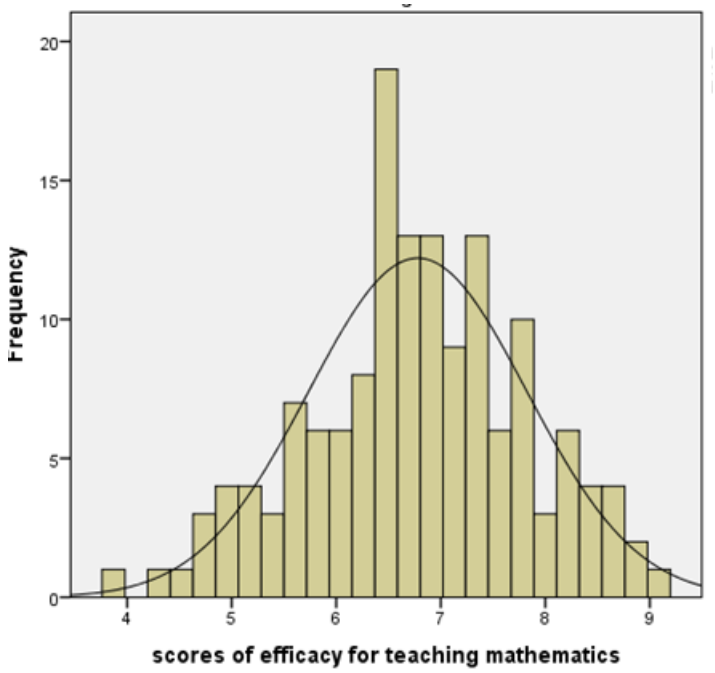


*Figure D.9* Histogram of MTSES scores of female middle school mathematics teachers in terms of efficacy for teaching mathematics to fifth grades.

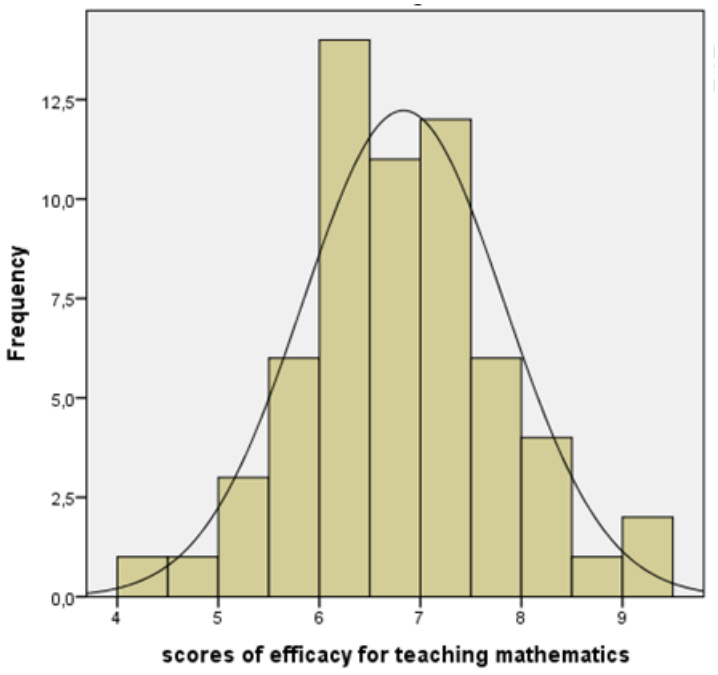


*Figure D.10* Histogram of MTSES scores of male middle school mathematics teachers in terms of efficacy for teaching mathematics to fifth grades.

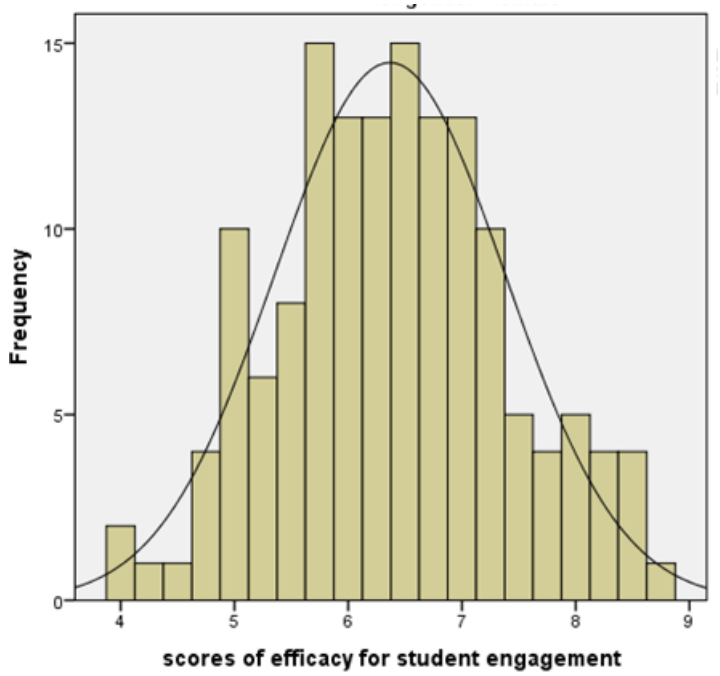


*Figure D.11* Histogram of TTSES scores of female middle school mathematics teachers in terms of dimension of efficacy for student engagement.

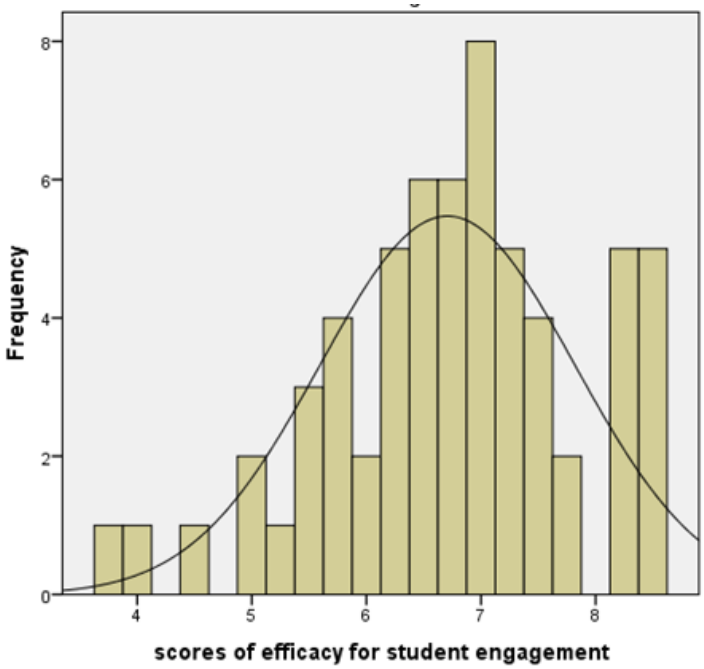


*Figure D.12* Histogram of TTSES scores of male middle school mathematics teachers in terms of dimension of efficacy for student engagement.

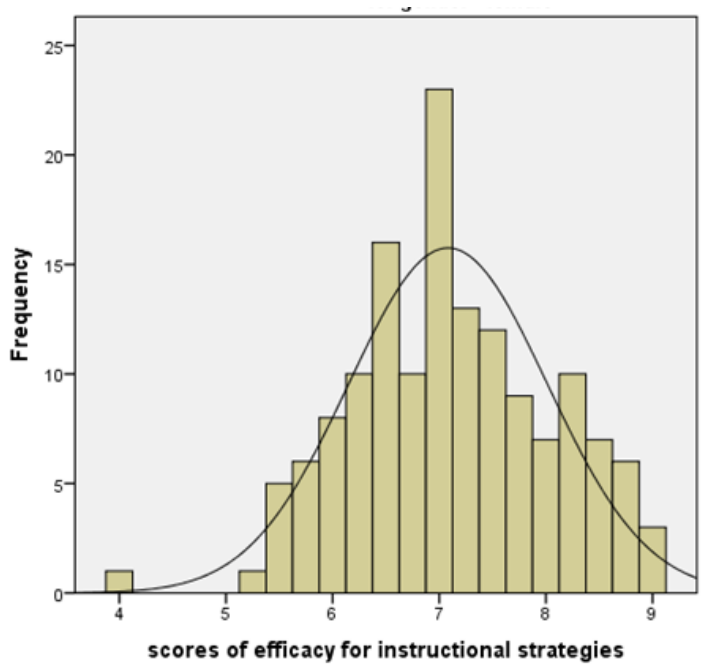


*Figure D.13* Histogram of TTSES scores of female middle school mathematics teachers in terms of dimension of efficacy for instructional strategies.

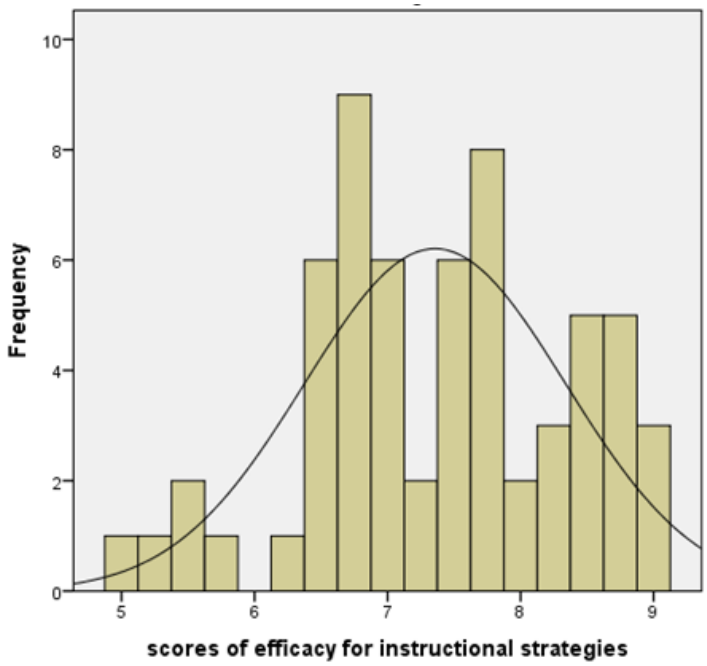


*Figure D.14* Histogram of TTSES scores of male middle school mathematics teachers in terms of dimension of efficacy for instructional strategies.

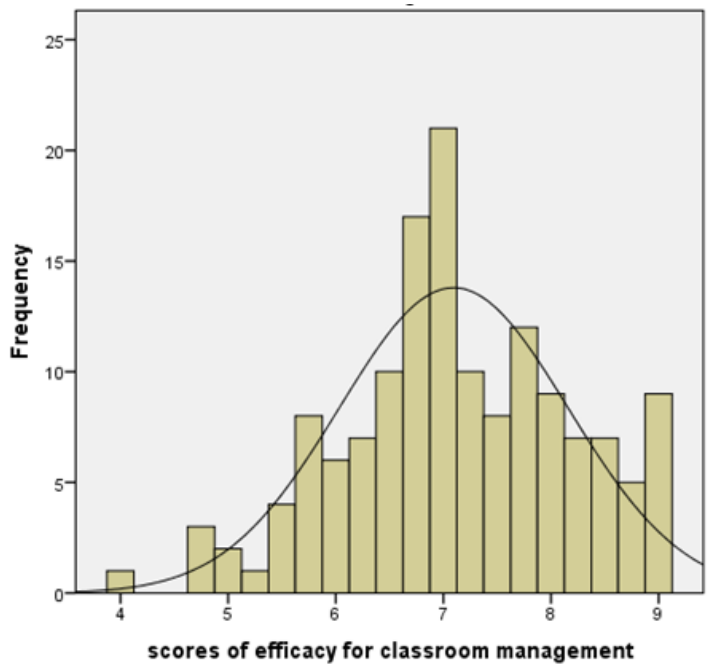


*Figure D.15* Histogram of TTSES scores of female middle school mathematics teachers in terms of dimension of efficacy for classroom management.

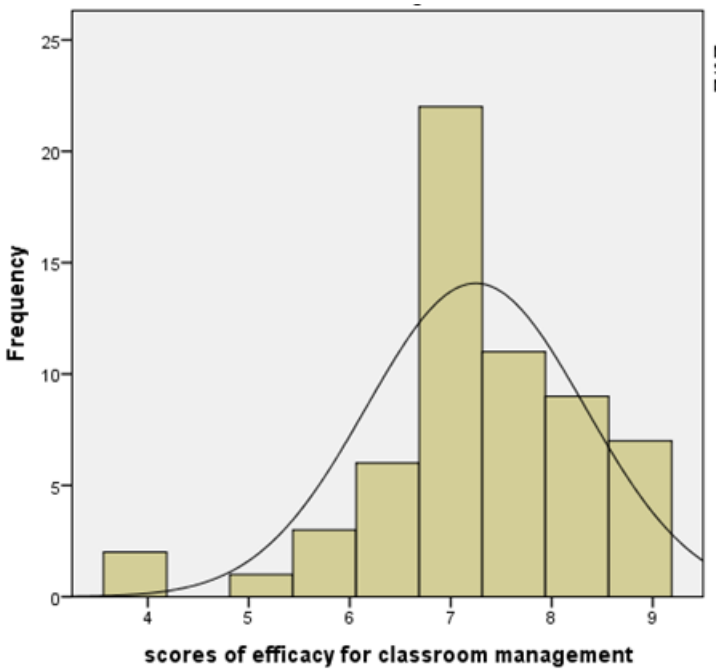


*Figure D.16* Histogram of TTSES scores of male middle school mathematics teachers in terms of dimension of efficacy for classroom management.


*Figure D.17* Histogram of MTSES scores of middle school mathematics teachers with a teaching experience of 0-5 years in terms of efficacy for teaching mathematics to fifth grades.

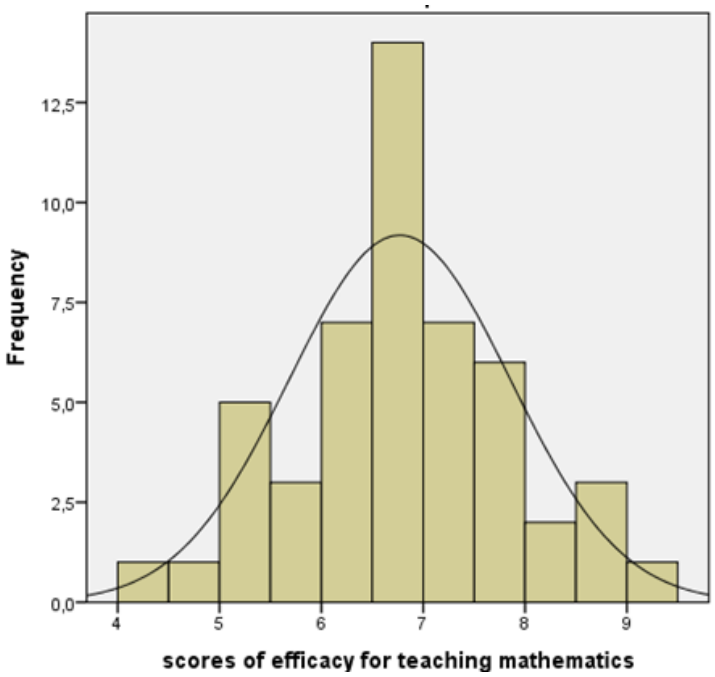


*Figure D.18* Histogram of MTSES scores of middle school mathematics teachers with a teaching experience of 6-10 years in terms of efficacy for teaching mathematics to fifth grades.

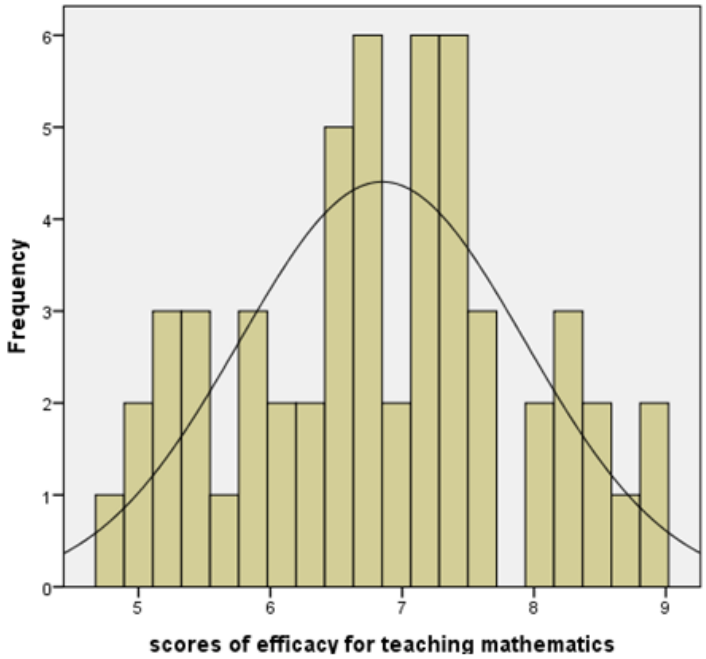


*Figure D.19* Histogram of MTSES scores of middle school mathematics teachers with a teaching experience of 11-15 years in terms of efficacy for teaching mathematics to fifth grades.

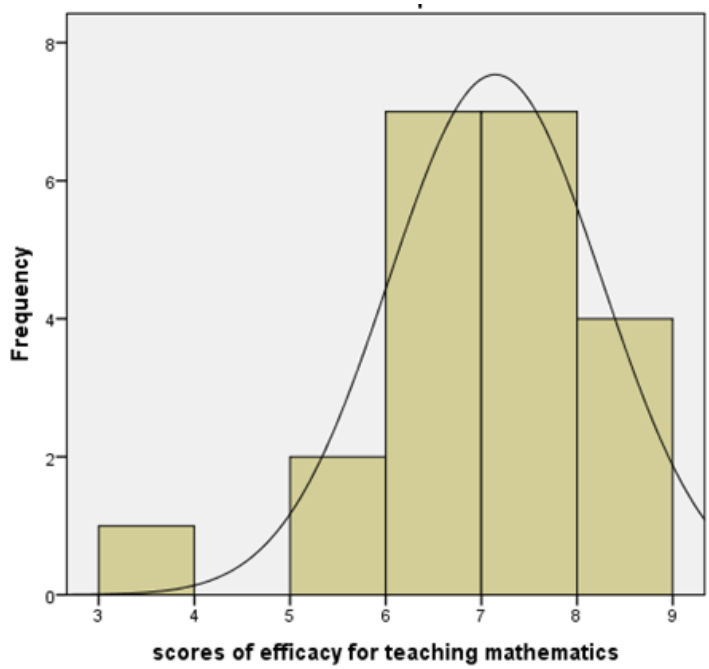


*Figure D.20* Histogram of MTSES scores of middle school mathematics teachers with a teaching experience of 16-20 years in terms of efficacy teaching mathematics to fifth grades.

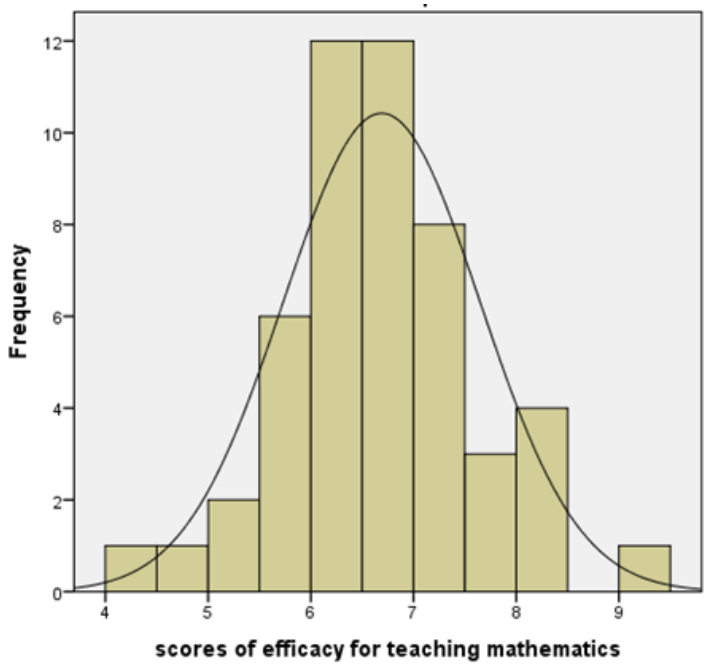


*Figure D.21* Histogram of MTSES scores of middle school mathematics teachers with a teaching experience of more than 20 years in terms of efficacy for teaching mathematics to fifth grades.

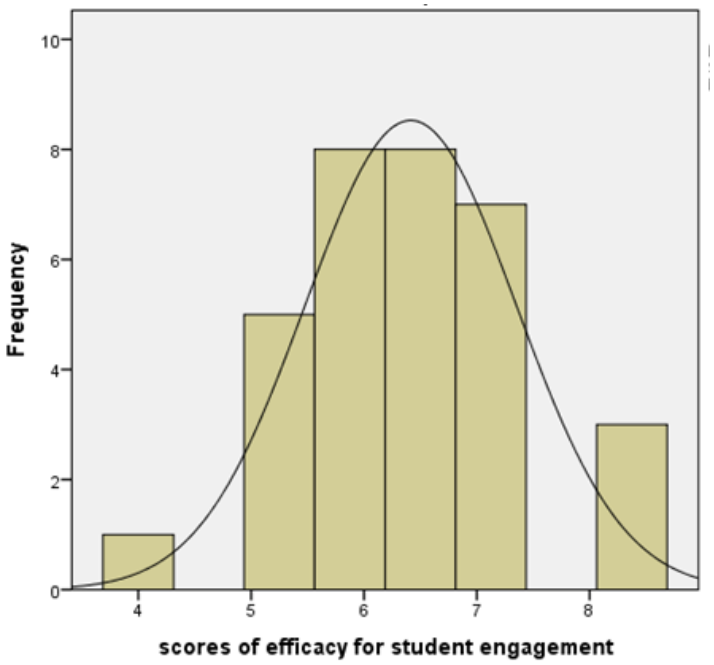


*Figure D.22* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of 0-5 years in terms of dimension of efficacy for student engagement.

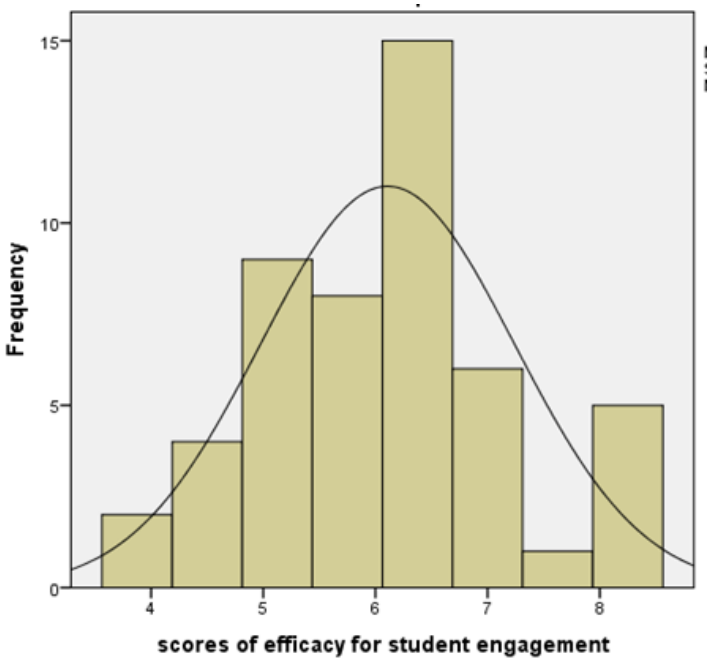


*Figure D.23* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of 6-10 years in terms of dimension of efficacy for student engagement.

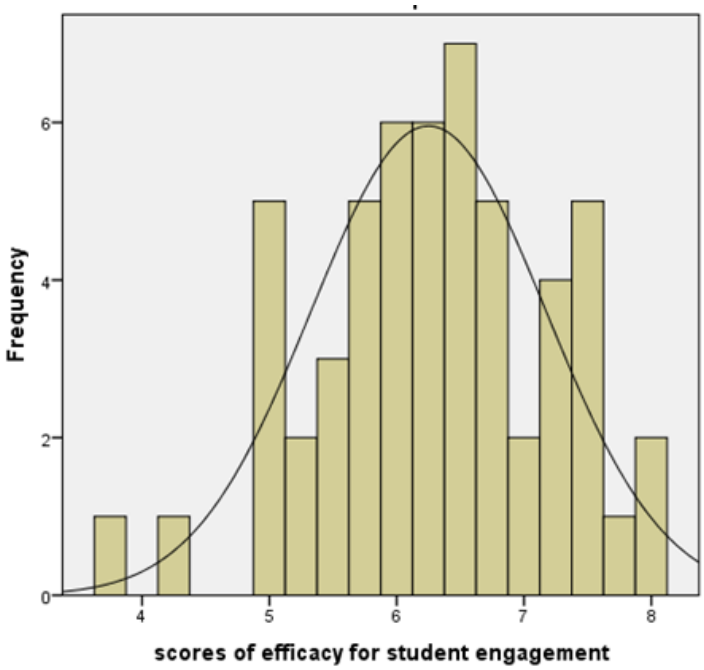


*Figure D.24* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of 11-15 years in terms of dimension of efficacy for student engagement.

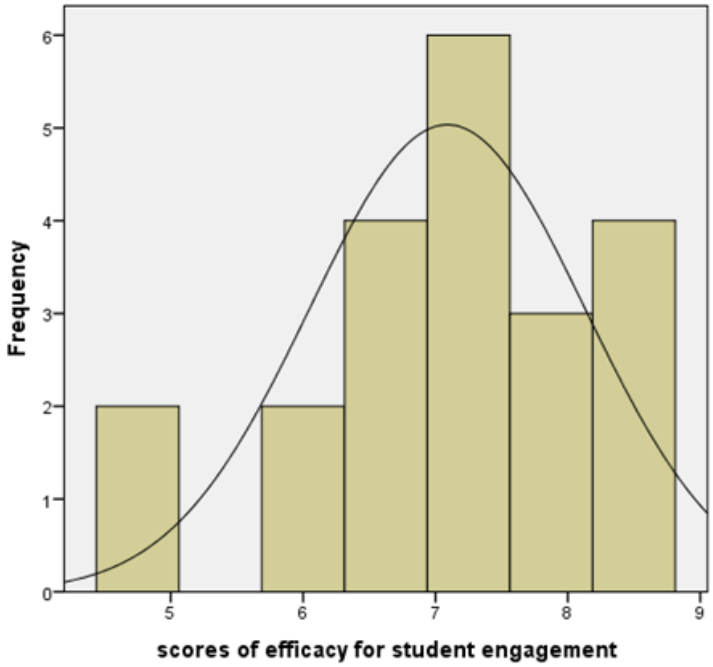


*Figure D.25* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of 16-20 years in terms of dimension of efficacy for student engagement.

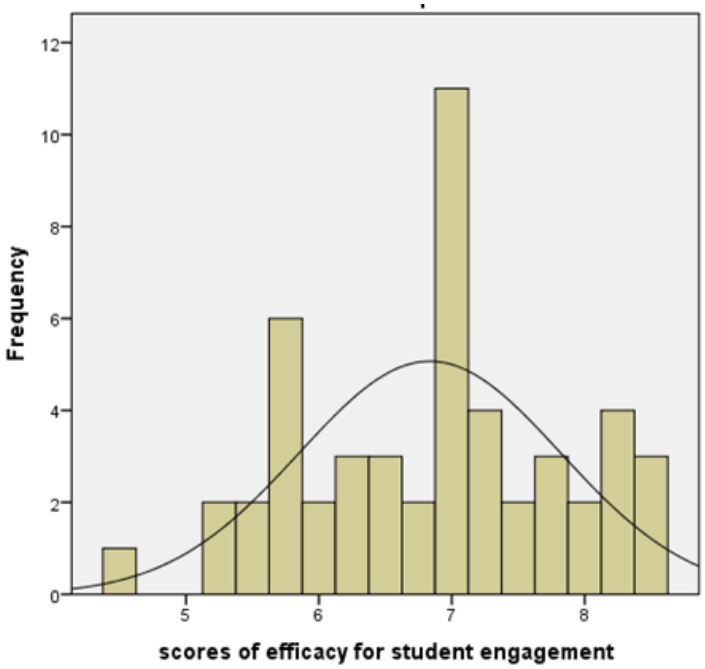


*Figure D.26* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of more than 20 years in terms of dimension of efficacy for student engagement.

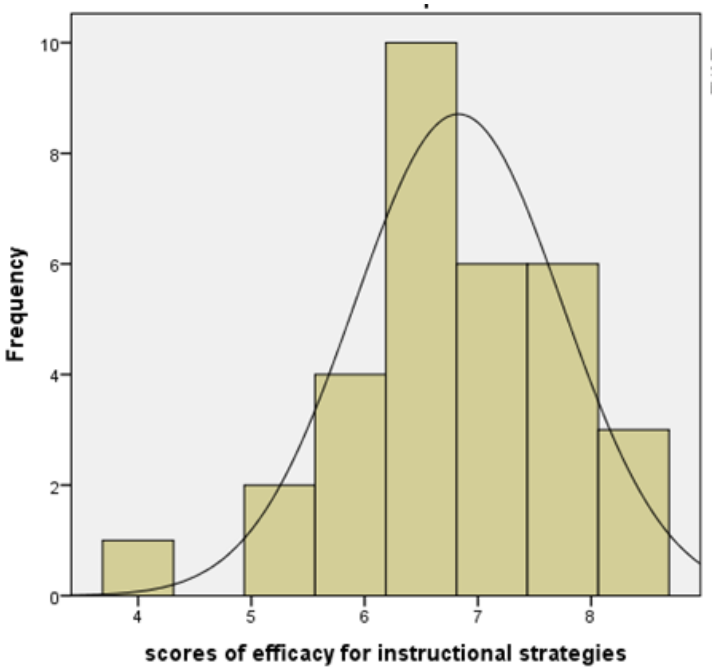


*Figure D.27* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of 0-5 years in terms of dimension of efficacy for instructional strategies.

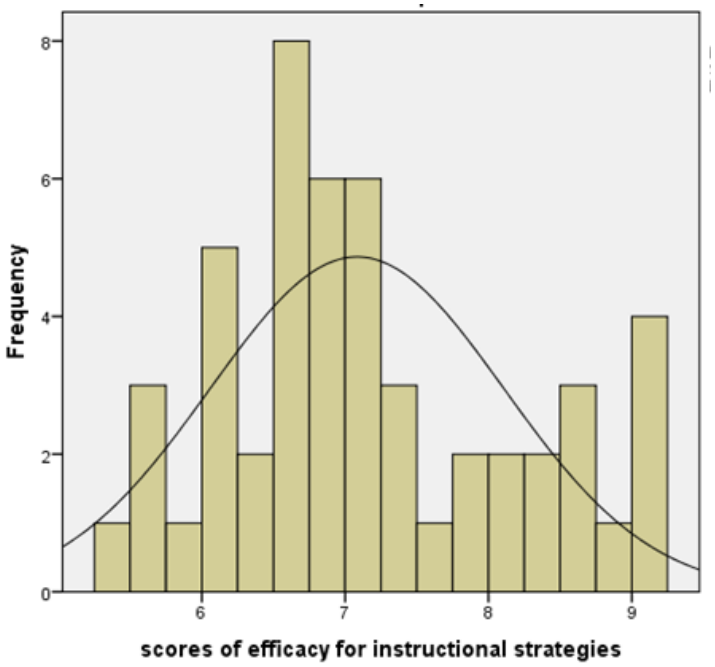


*Figure D.28* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of 6-10 years in terms of dimension of efficacy for instructional strategies.

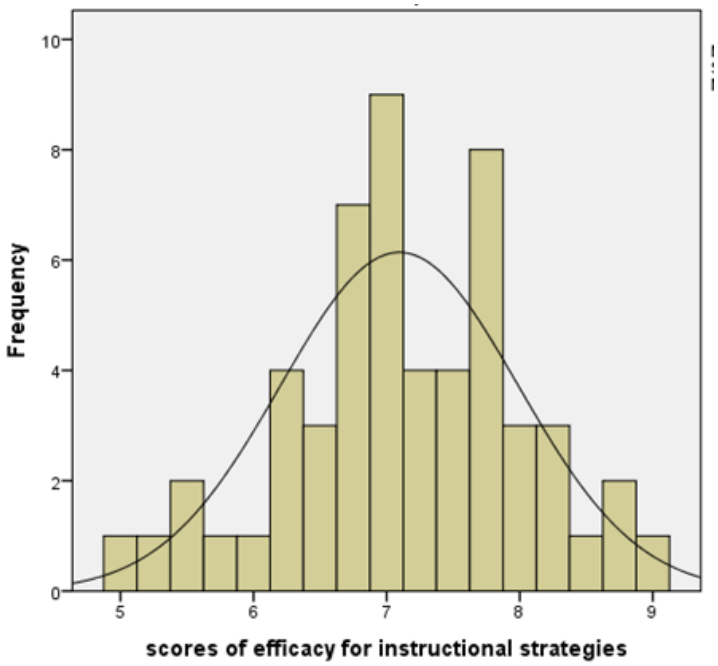


*Figure D.29* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of 11-15 years in terms of dimension of efficacy for instructional strategies.

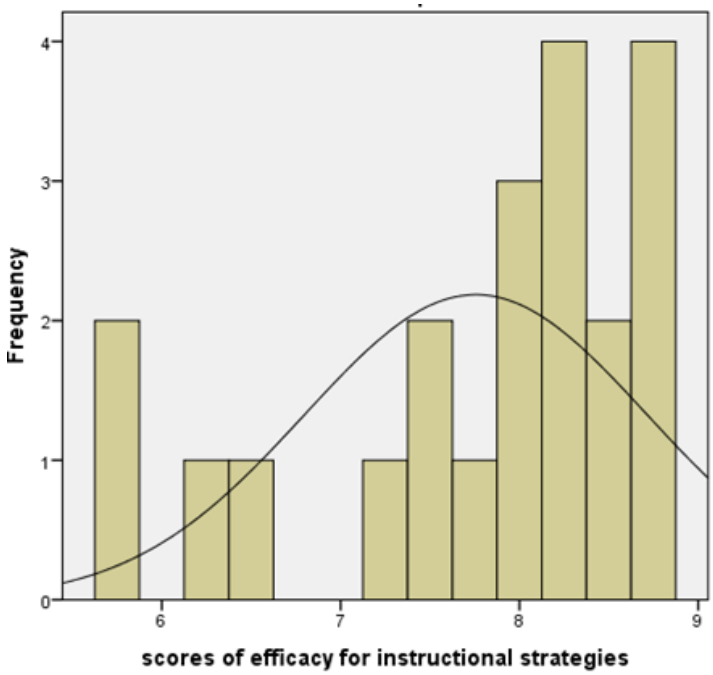


*Figure D.30* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of 16-20 years in terms of dimension of efficacy for instructional strategies.

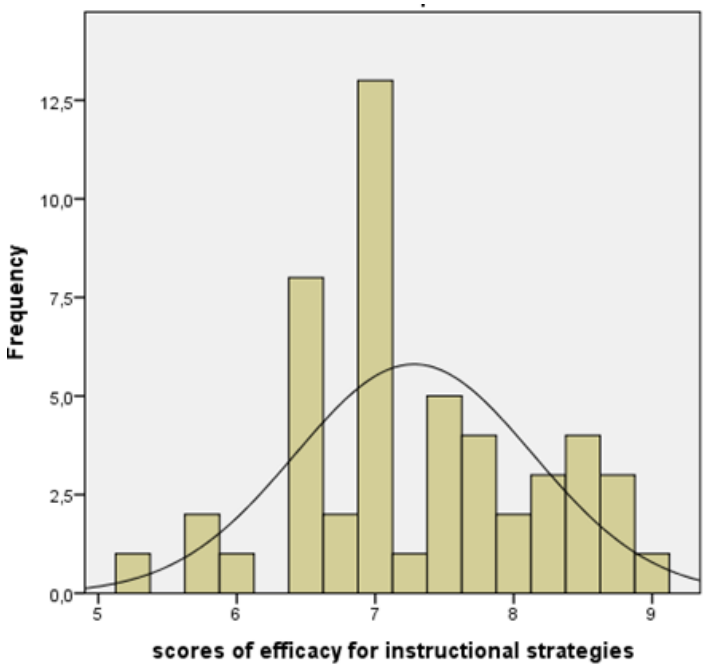


*Figure D.31* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of more than 20 years in terms of dimension of efficacy for instructional strategies.

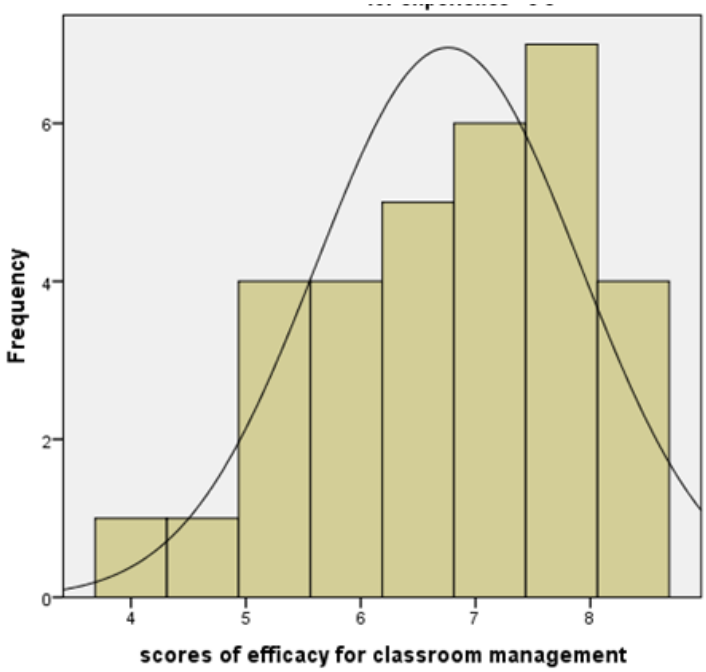


*Figure D.32* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of 0-5 years in terms of dimension of efficacy for classroom management.

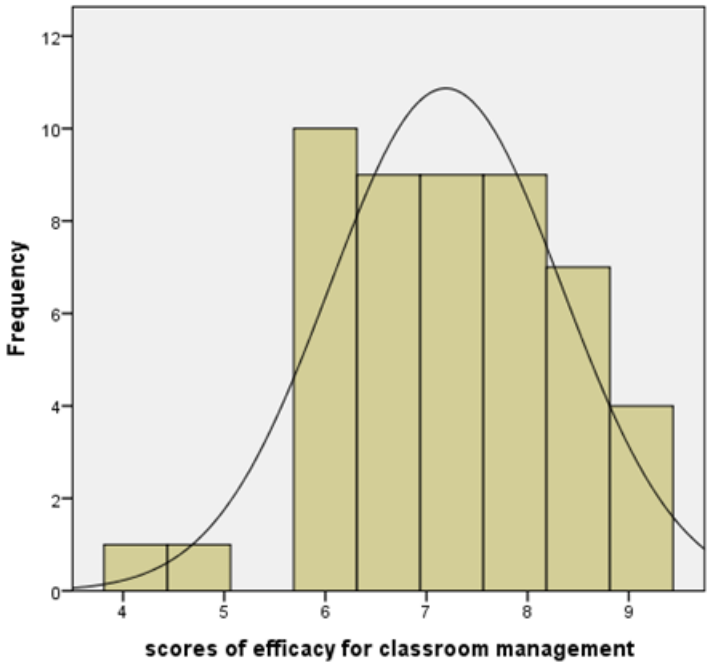


*Figure D.33* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of 6-10 years in terms of dimension of efficacy for classroom management.

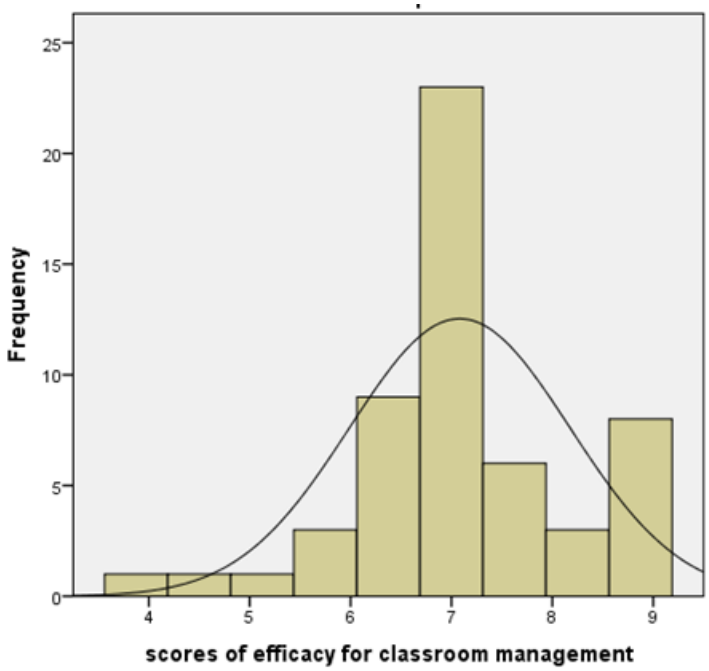


*Figure D.34* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of 11-15 years in terms of dimension of efficacy for classroom management.

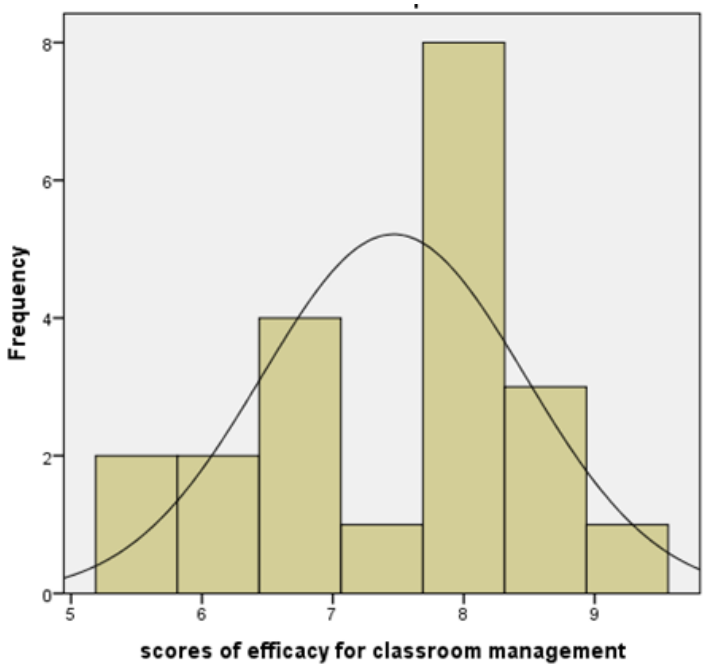


*Figure D.35* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of 16-20 years in terms of dimension of efficacy for classroom management.

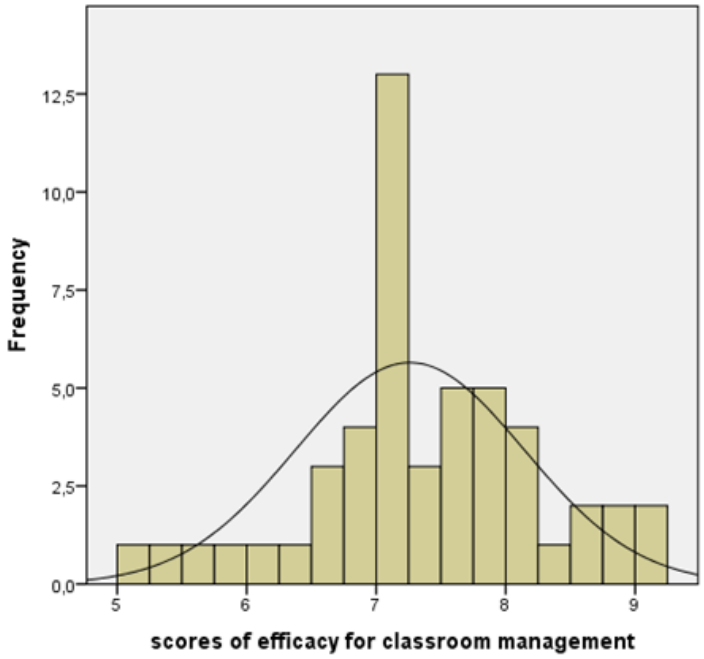


*Figure D.36* Histogram of TTSES scores of middle school mathematics teachers with a teaching experience of more than 20 years in terms of dimension of efficacy for classroom management.

## Appendix E: Boxplots

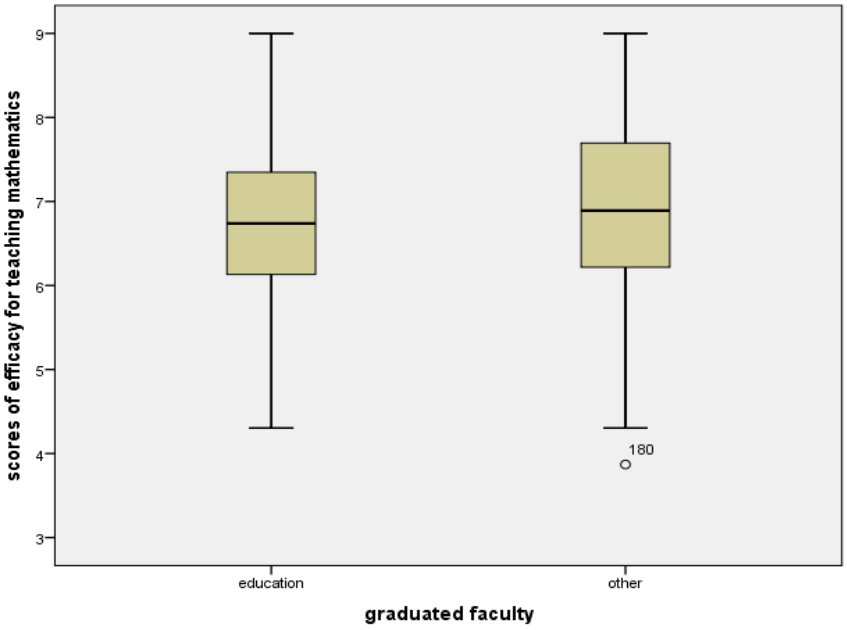


*Figure E.1* Boxplot for the dependent variable *efficacy for teaching mathematics* with respect to type of teaching licence.

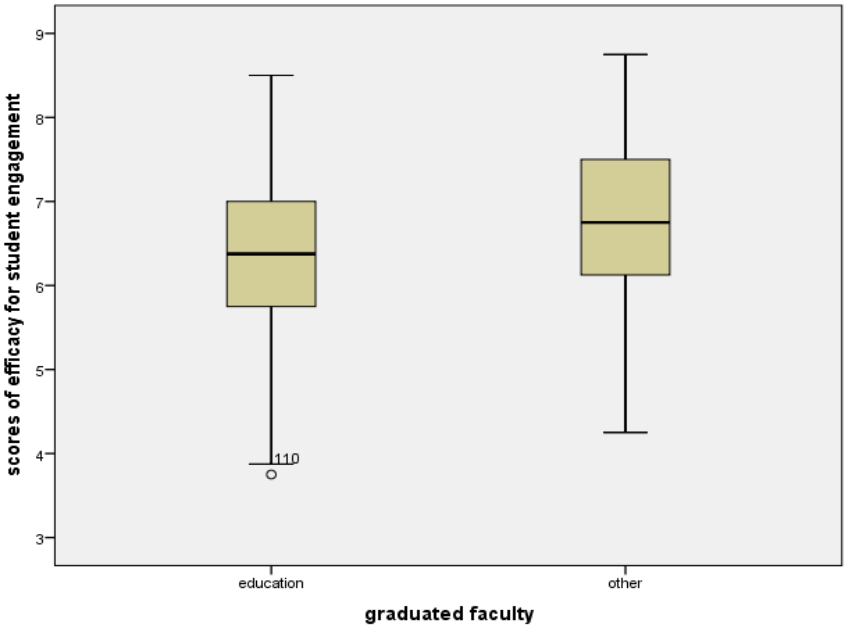


*Figure E.2* Boxplot for the dependent variable *efficacy for student engagement* with respect to type of teaching licence.

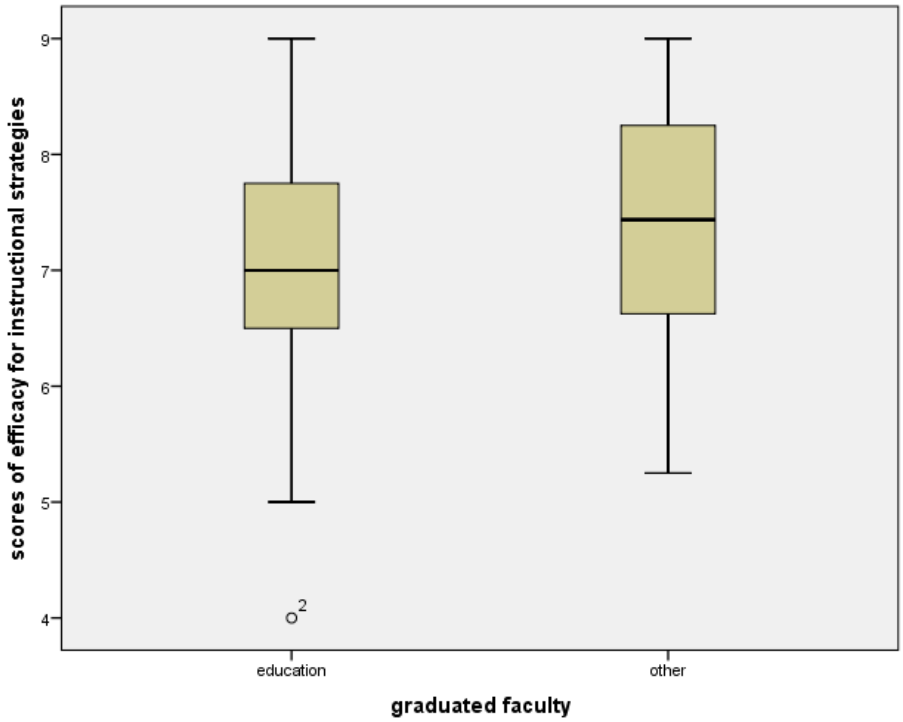


*Figure E.3* Boxplot for the dependent variable *efficacy for instructional strategies* with respect to type of teaching licence.

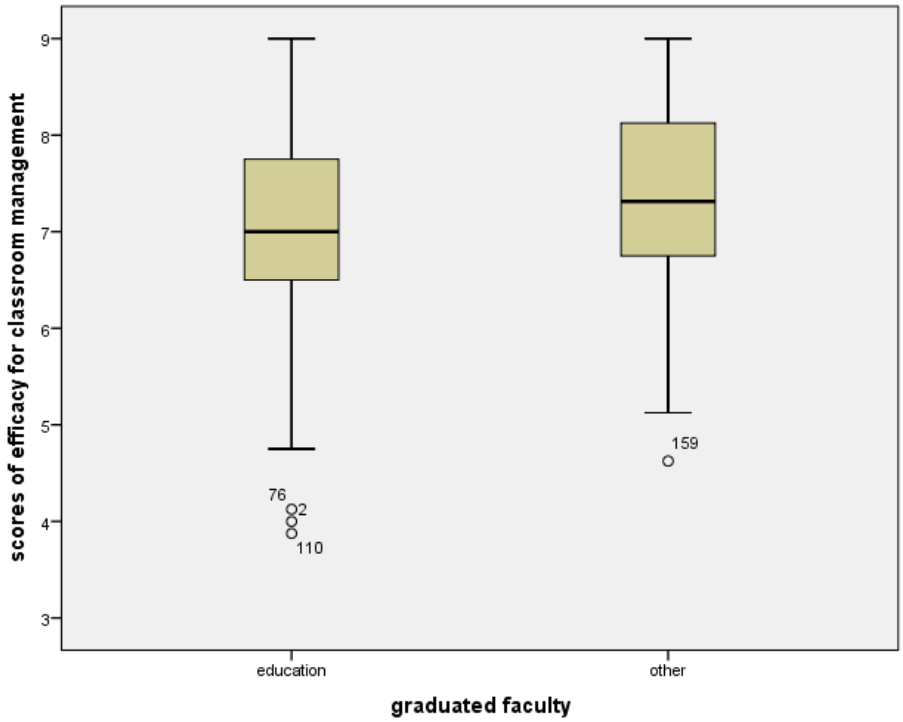


*Figure E.4* Boxplot for the dependent variable *efficacy for classroom management* with respect to type of teaching licence.

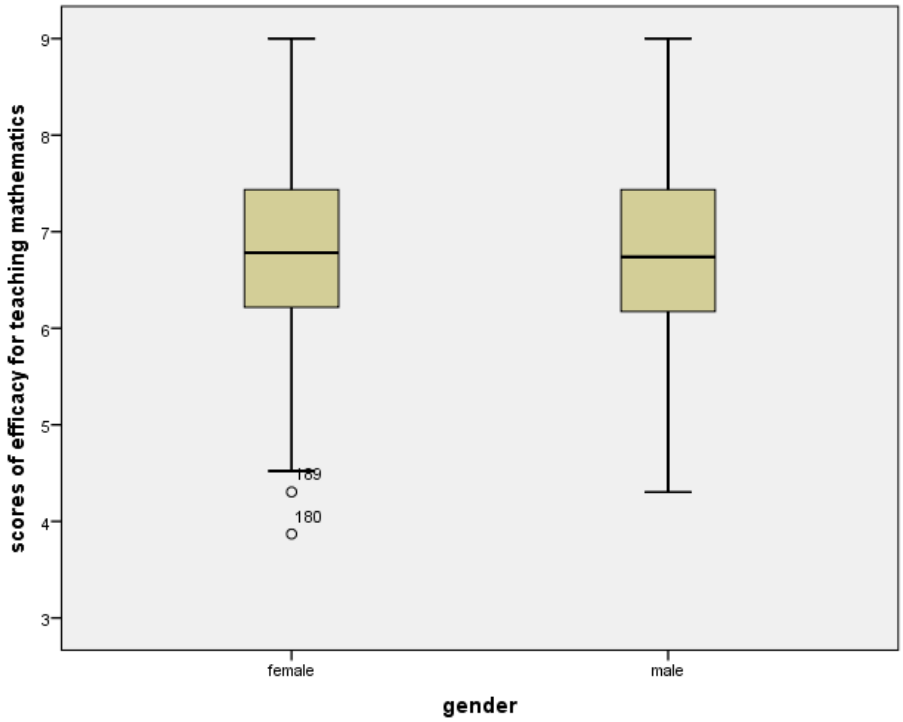


*Figure E.5* Boxplot for the dependent variable *efficacy for teaching mathematics* with respect to gender.

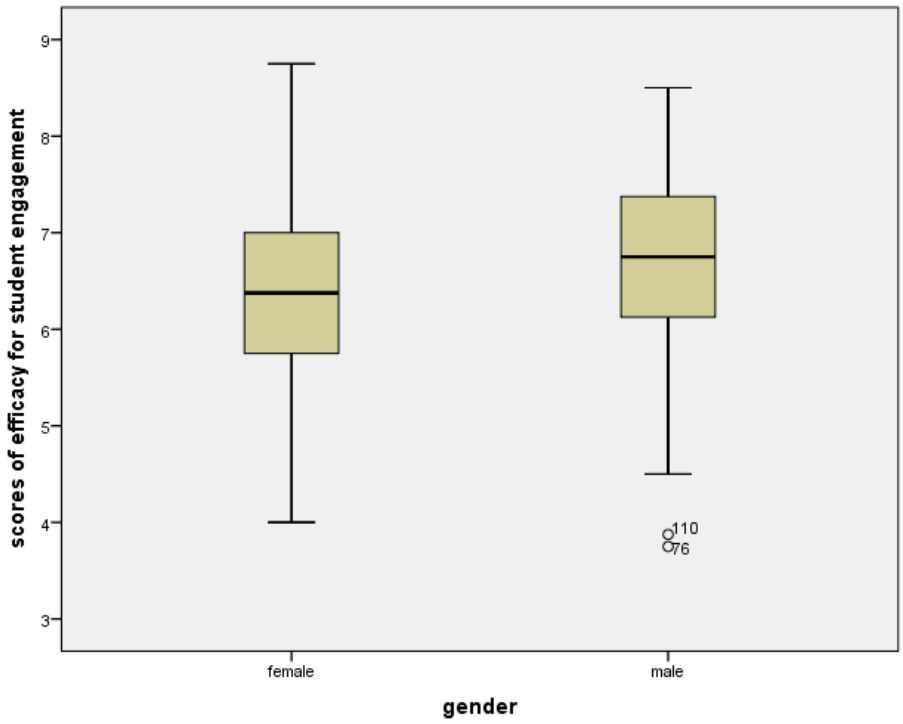


*Figure E.6* Boxplot for the dependent variable *efficacy for student engagement* with respect to gender.

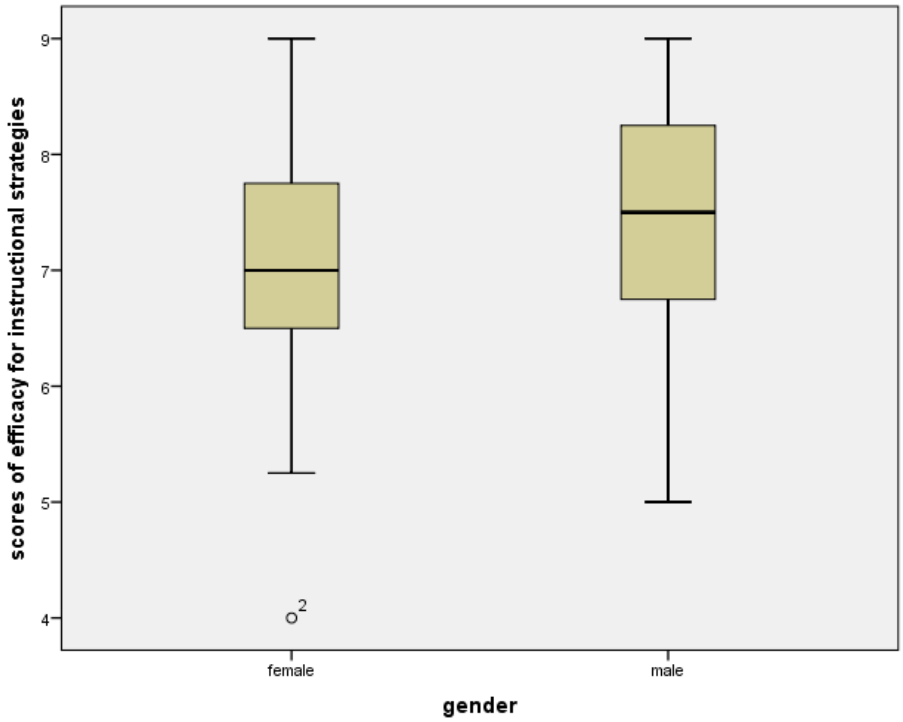


*Figure E.7* Boxplot for the dependent variable *efficacy for instructional strategies* with respect to gender.

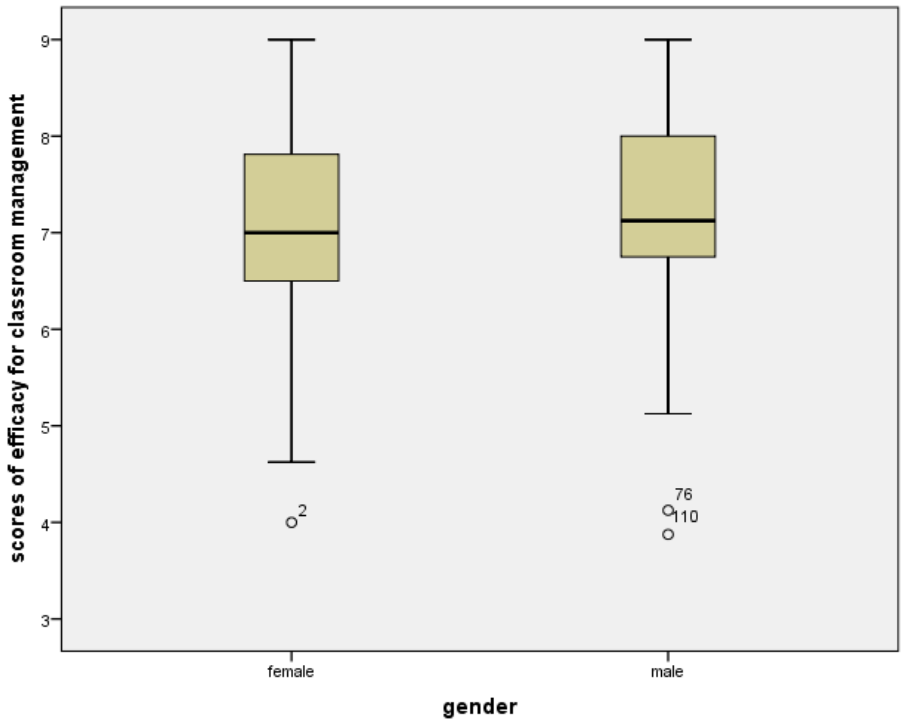


*Figure E.8* Boxplot for the dependent variable *efficacy for classroom management* with respect to gender.

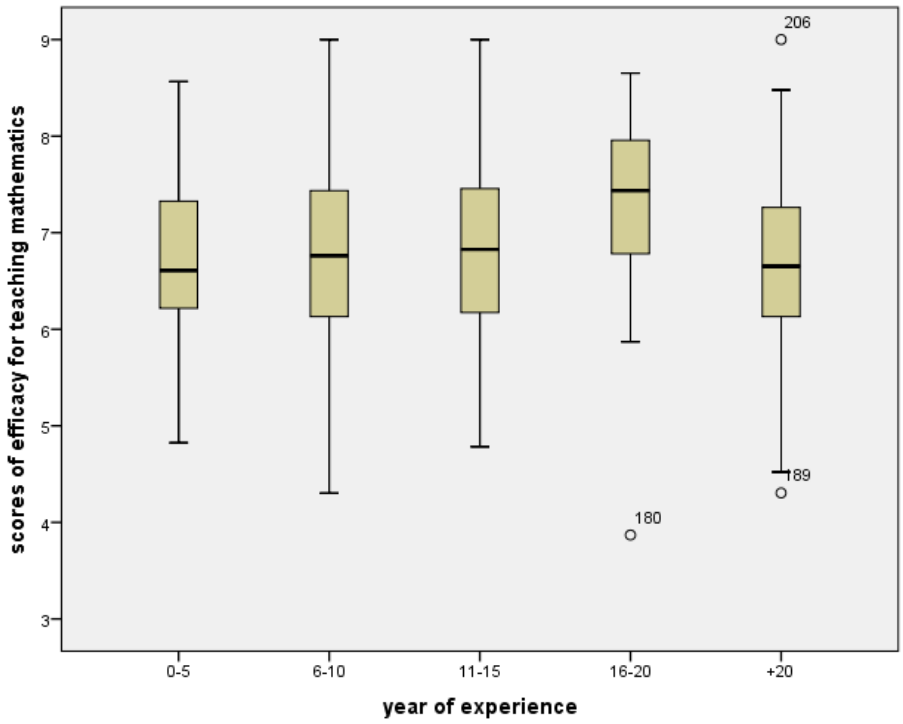


*Figure E.9* Boxplot for the dependent variable *efficacy for teaching mathematics* with respect to year of teaching experience.

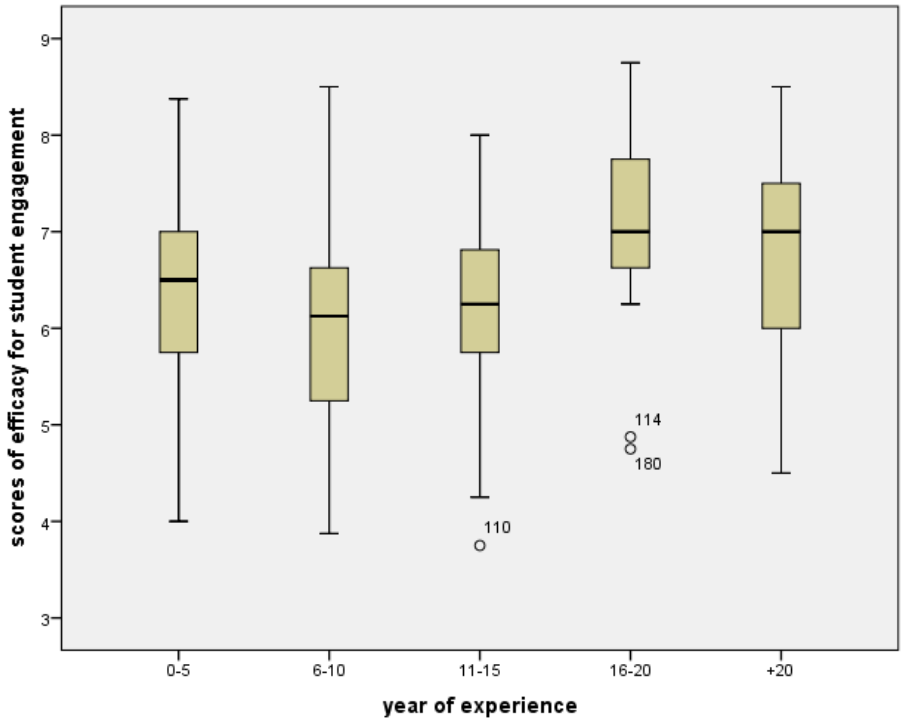


*Figure E.10* Boxplot for the dependent variable *efficacy for student engagement* with respect to year of teaching experience.

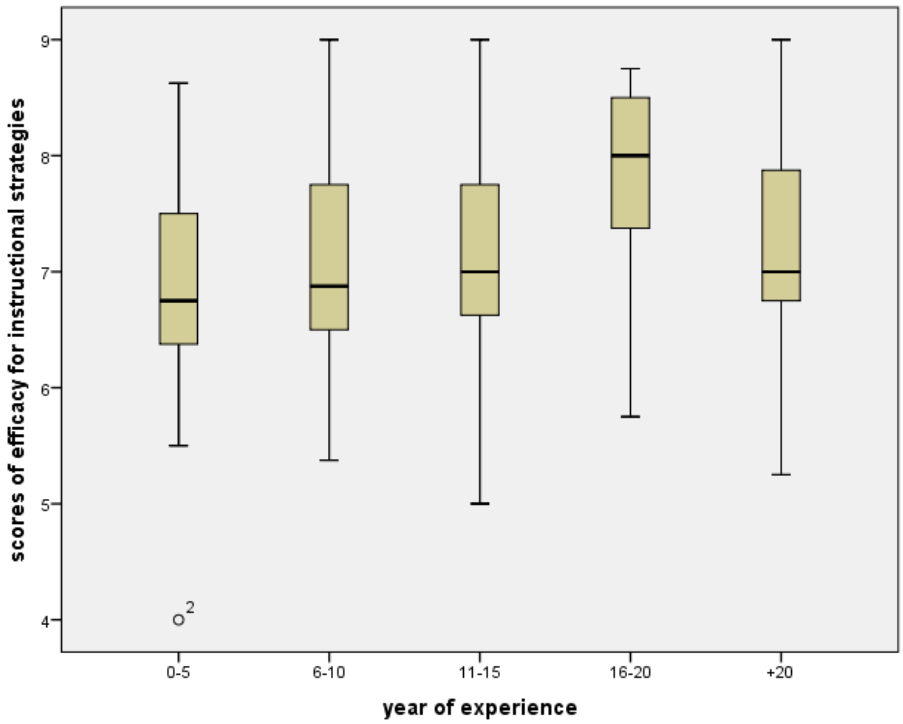


*Figure E.11* Boxplot for the dependent variable *efficacy for instructional strategies* with respect to year of teaching experience.

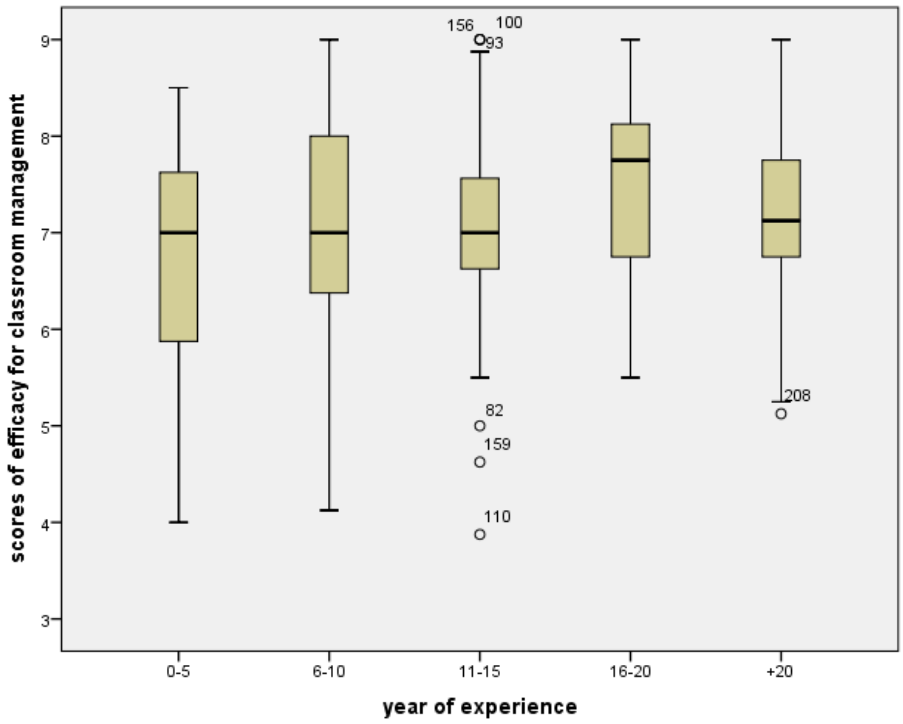


*Figure E.12* Boxplot for the dependent variable *efficacy for classroom management* with respect to year of teaching experience.

## Appendix F: TÜRKÇE ÖZET

# ORTAOKUL MATEMATİK ÖĞRETMENLERİNİN 5. SINIFLARA ÖĞRETİM YAPABİLMEYE YÖNELİK ÖZ-YETERLİK ALGILARI

## GİRİŞ

Öz-yeterlik, Sosyal Bilişsel Kuram'ın kurucusu Albert Bandura tarafından "bireyin belli bir performansı göstermek için gerekli eylemleri organize edip, başarılı olarak yapma kapasitesine duyduğu inanç" olarak tanımlanmıştır (Bandura, 1997). Öz-yeterlik gözlenebilir ya da hissedilebilir bir yetenek değil, "Ne yapabilirim?" sorusunun cevabına yönelik bir içsel inanıştır (Snyder & Lopez, 2002). Sosyal bilişsel kuram çerçevesinden bakıldığında bireyin öz-yeterlik algısı onun zorluklarla mücadeledeki ve duygularla baş edebilmedeki çabasını, istikrarını ve seçimlerini etkilemektedir (Pajares, 1997).

Öz-yeterliğin genel tanımıyla tutarlı olarak öğretmen öz-yeterliği Tschannen-Moran, Woolfolk-Hoy ve Hoy (1998) tarafından öğretmenin öğrenci performansını etkilemede sahip olduğu kapasiteye olan inancı olarak tanımlanmaktadır. Öz-yeterlik ile ilgili yapılan çalışmalar, öğretmenlerin öz-yeterlik algısının öğretimsel sınıf aktivitelerini etkilediğini ve öz-yeterlik algısı yüksek olan öğretmenlerin öğretme isteğinin daha yüksek olduğunu ve kendilerini öğretmeye adadıklarını göstermiştir (Bıkmaz, 2004). Buna ek olarak, öğretmenler matematik eğitiminde başarının en önemli faktörü olarak görülmektedirler (Battista, 1994). Öte yandan, matematik öğretiminde etkili öğretimsel stratejiler sergilemek öğretmenin öz-yeterliğine bağlıdır (Enoch, 1995).

2012 yılında 5+3+4'ten 4+4+4'e geçiş olarak bilinen ve zorunlu ve kesintisiz olan 8 yıllık eğitim süresinin zorunlu ve kesintili 12 yıla çıkarılması değişikliğine gidilmiştir. Bu değişiklikle birlikte 5. sınıflar ortaokul bünyesine dahil edilmiştir. Bu değişiklik uygulanabilirliği açısından pek çok tartışmayı beraberinde getirmiştir. Örneğin okula başlama yaşı, okul öncesi eğitimin gölgelenmesi, eğitimin kesintisiz

halden kesintili hale geçmesinin özellikle kırsal kesimlerde öğrenci kaybına yol açacağı, ve henüz somut işlemler döneminde olan 5. sınıf öğrencilerinin soyut işlem becerisi gerektiren ortaokul bünyesine dahil edilmesi değişikliğin en çok tartışılan boyutları olmuştur. Değişikliğin asıl uygulayıcısı olan öğretmenlerin bu konuda ne düşündükleri ve yaşadıkları sorunlar kapsamında nitel çalışmalar yapılmıştır. Ancak konuyla ilgili nicel çalışmaların sayısı oldukça azdır. Bu sebeple bu çalışmada, ortaokul matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik algıları araştırılmıştır.

**Araştırmanın Amacı**

Bu çalışmanın amacı, ortaokul matematik öğretmenlerinin matematik öğretimine yönelik öz-yeterlik algılarını mezun olunan fakülte, cinsiyet ve mesleki deneyim süresi değişkenlerine bağlı olarak incelemektir. Çalışmanın bir diğer amacı, ortaokul matematik öğretmenlerinin 5. sınıflara matematik öğretimine yönelik öz-yeterlik algıları ile genel olarak öğretmeye yönelik öz-yeterlik algıları arasındaki ilişkiyi incelemektir.

**Araştırma Soruları**

**Araştırma Sorusu 1:** Ortaokul matematik öğretmenlerinin 5. Sınıflara matematik öğretimine yönelik ve genel olarak öğretmeye yönelik öz-yeterlik algıları mezun olunan fakülte, cinsiyet ve mesleki deneyim süresi değişkenleri açısından farklılık göstermekte midir?

Alt Araştırma Sorusu 1: Eğitim fakültesinden ve diğer fakültelerden mezun olan matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik puanları ile sınıf yönetimi, öğretim stratejileri ve öğrenci katılımı boyutları açısından ele alınan genel olarak öğretmeye yönelik öz-yeterlik puanları arasında istatistiksel olarak anlamlı bir fark var mıdır?

Alt Araştırma Sorusu 2: Erkek ve kadın ortaokul matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik puanları ile sınıf yönetimi, öğretim stratejileri ve öğrenci katılımı boyutları açısından ele alınan genel olarak öğretmeye yönelik öz-yeterlik puanları arasında istatistiksel olarak anlamlı bir fark var mıdır?

Alt Araştırma Sorusu 3: Mesleğinde 0-5, 6-10, 11-15, 16-20 ve daha fazla yıl deneyime sahip ortaokul matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik puanları ile sınıf yönetimi, öğretim stratejileri ve öğrenci katılımı

boyutları açısından ele alınan genel olarak öğretmeye yönelik öz-yeterlik puanları arasında istatistiksel olarak anlamlı bir fark var mıdır?

**Araştırma Sorusu 2:** Ortaokul matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik algıları ile genel olarak öğretmeye yönelik öz-yeterlik algıları arasında ilişki var mıdır?

**Araştırmanın Önemi**

Türkiye'deki eğitim sisteminde yapılan ve 4+4+4 olarak bilinen değişiklikle 5. sınıfların ortaokul bünyesine dahil edilmesi hem 5. sınıf öğrencileri hem de ortaokul branş öğretmenleri için yeni bir durumdur. Ortaokul öğretmenlerinin 5. sınıflara ders vermek için hazır olup olmadığı ve ya hizmet içi eğitimin gerekip gerekmediği konusu bu araştırma ile aydınlatılacaktır. Ayrıca, mesleki deneyim süresine bağlı olarak ortaokul öğretmenlerinin genel olarak öğretmeye yönelik öz-yeterlik algıları ile 5.sınıflara öğretim yapmaya yönelik algıları karşılaştırılacak böylece öğretmenlerin 5. sınıflara ders verme konusunda ne kadar hazır ve yeterli hissettiklerine dair bir çıkarıma varılacaktır.

## ALAN YAZINI

Öz-yeterlik literatürde bireyin belli bir performansı göstermesi için gerekli etkinlikleri düzenleyip başarılı bir biçimde gerçekleştirme kapasitesine olan inancı olarak tanımlanmış ve bu inancın bireyin gösterdiği çabanın düzeyini, zorlukları yenme gücünü ve istikrarlılığını etkilediği belirtilmiştir (Bandura, 1997). Öz-yeterlik, bireyin davranışları, çevresi ve kişisel etkenlerin etkileşimi olarak tanımlanan sosyal bilişsel kuramın bir ürünüdür. Sosyal bilişsel kurama göre Bandura, insan güdülerinin iki tür beklenti tarafından belirlendiğini öne sürmüştür. Bunlardan ilki olan kişisel yeterlik beklentisi kişinin belirli bir işi başarabileceğine dair beklentisidir. İkincisi ise bireyin belirli bir davranışın ya da çalışmanın belli sonuçlar doğuracağına dair inancı olan sonuç beklentisidir (Bandura, 1986).

Öz-yeterlik derecesi bireyin düşüncelerini, duygularını, davranışlarını ve motivasyonunu etkilemekte ve bu etkinin dört temel kaynağı bulunmaktadır. Bunlar performans başarıları (yapılan işler ve ulaşılan hedefler), dolaylı yaşantılar (başkalarının deneyimleri), sözel ikna ve duygusal durumdur. Bunlar içerisinde en

etkili olanı bireyin bizzat kendisinin yaşadığı deneyimler olan performans başarılarıdır (Bandura, 1986; 1997)

Literatürde yer alan çalışmalar öğretmenlerin öz-yeterlik seviyesinin öğrenci başarısında, öğrenciyi motive etmede, sınıf yönetiminde, öğrencinin öğrenmesine karşı hissedilen sorumlulukta ve iş tatmininde etkili olduğunu göstermektedir. Bunlara ek olarak, öz-yeterlik algısı yüksek olan öğretmenlerin yeniliklere açık, farklı öğretim metotları uygulayan, risk alabilen, öğrenci merkezli ve keşfetmeye dayalı ders tasarlayan, öğrencileri başarısızlık anında eleştirmeyen aksine onları motive eden ve çalışması güç olan öğrencilere daha fazla zaman ayıran kişiler olduğu belirtilmiştir. Bunun aksine, öz-yeterlik algısı düşük olan öğretmenlerin geleneksel yöntemlerle ders anlatan, öğretmen merkezli, başarısızlık anında motivasyonu azalan, çalışması güç öğrencilere çok fazla zaman ayırmayan, derslerde yeni yöntemler denemeyi risk olarak gören öğretmenler olduğu belirtilmiştir.

Alan yazındaki araştırmalar incelendiğinde genellikle nitel çalışmalara rastlanmıştır. Bu çalışma literatürdeki nitel yöntemlerle yapılan çalışmalara nicel yöntemlerle elde edilen bulgular eşliğinde katkı sağlayacaktır.

## YÖNTEM

Bu çalışmada ortaokul matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik algıları ile genel olarak öğretime yönelik öz-yeterlik algıları konusunda tarama araştırması yapılmıştır. Araştırma için gereken veri, 2014-2015 eğitim-öğretim yılı 2. döneminde Ankara ilinde merkez okullardan seçilen 50 okulda çalışan en az bir kez 5. sınıflara matematik dersi vermiş olan 208 ortaokul matematik öğretmeninden toplanmıştır. Bu araştırmada belirlenen bağımsız değişkenler mezun olunan fakülte, cinsiyet ve mesleki deneyim yılıdır. Ortaokul matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik algı puanları ve öğretim stratejilerine yönelik öz-yeterlik, öğrenci katılımına yönelik öz-yeterlik ve sınıf yönetimine yönelik öz-yeterlik boyutları açısından ele alınan genel olarak öğretmeye yönelik öz-yeterlik algı puanları ise bu çalışmadaki bağımlı değişkenlerdir.

Çalışmaya katılan 208 (%100) ortaokul matematik öğretmeninden kadın öğretmenlerin sayısı 147 (%70.7) ve erkek öğretmenlerin sayısı 61 (%29.3), eğitim

fakültesinden mezun öğretmenlerin sayısı 150 (%72.1) ve eğitim fakültesi dışında bir fakülteden mezun olan öğretmenlerin sayısı 58 (%27.9)'dir. Çalışmaya katılan öğretmenler mesleki deneyim sürelerine bağlı olarak 0-5 (%15.4), 6-10 (%24.0), 11-15 (%26.4), 16-20 (%10.1) ve 20'den daha fazla (24.0) yıl olmak üzere beş ayrı grupta değerlendirilmişlerdir. Ayrıca çalışmaya katılan öğretmenlerin 173'ü (%83.2) lisans mezunudur ve 160'ı (%76.9) 2014-2015 eğitim öğretim yılından önce 5. sınıflara ders vermiştir.

**Veri Toplama Araçları**

Çalışmada iki ayrı veri toplama aracı kullanılmıştır. Bunlardan birincisi Tschannen-Moran & Hoy (2001) tarafından geliştirilip, Çapa, Çakıroğlu ve Sarıkaya (2005) tarafından Türkçe'ye uyarlanan Öğretmen Öz-Yeterlik Algıları Ölçeğinin Türkçe Versiyonu isimli ölçektir. Bu ölçek aracılığıyla elde edilen verilerle ortaokul matematik öğretmenlerinin genel olarak öğretmeye yönelik yeterlik algıları öğrenci katılımına yönelik yeterlik, öğretim stratejilerine yönelik yeterlik ve sınıf yönetimine yönelik yeterlik boyutları açısından değerlendirilmiştir. Bu ölçek yetersiz (1) seçeneğinden çok yeterli (9) seçeneğine kadar derecelendirilen 9 seviyeli Likert tipi bir ölçektir. Çalışmadaki veriler değerlendirilirken Statistical Package for the Social Sciences (SPSS) Sürüm 20 kullanılmıştır. Ölçeğin her boyutu için bireyin ortalama puanı hesaplanırken katılımcının ilgili boyuttaki sorulara verdiği cevaplara karşılık gelen puanlar toplanmış ve madde sayısına bölünmüştür. Ölçeğin geçerliğini doğrulamak için Çapa, Çakıroğlu ve Sarıkaya tarafından 628 öğretmenle doğrulayıcı faktör analizi yapılmıştır. Ölçeğin üç boyutu için ayrı ayrı değerlendirilen katsayı alfa değerleri öğrenci katılımına yönelik yeterlik için .82, öğretim stratejilerine yönelik yeterlik için .86 ve sınıf yönetimine yönelik yeterlik için .84 olarak belirlenmiştir. Ölçeğin bütünü için bakılan güvenirlik değeri ise .93 çıkmıştır. Bu çalışmada ise, Cronbach alfa değeri ölçeğin bütünü için .95 çıkarken, öğrenci katılımına yönelik yeterlik için .87, öğretim stratejilerine yönelik yeterlik için .86 ve sınıf yönetimine yönelik yeterlik için .89 çıkmıştır.

Çalışmada kullanılan bir diğer veri toplama aracı ise ortaokul matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik algılarını tespit etmek amacıyla araştırmacı tarafından hazırlanan Matematik Öğretmenlerinin Öz-Yeterlik Algıları isimli ölçektir. Bu ölçek, kesinlikle katılmıyorum (1) seçeneğinden başlayarak kesinlikle katılıyorum (9) seçeneğine kadar devam eden 9 seviyeli Likert

tipi bir ölçektir. Ölçeğin maddeleri hazırlanırken ortaokul matematik öğretmenleriyle yaptığı görüşmeler sonrası onlardan konu ile aldığı görüşler, 5. sınıf branş öğretmenlerinin yaşadığı sorunlarla ilgili araştırdığı çalışmalar ve yeni eğitim sistemi ile ilgili yapılan eleştiriler dikkate alınmıştır. Ölçek toplamda 23 maddeden oluşmaktadır. Gerçek uygulama öncesi 50 katılımcıyla yapılan güvenirlik testi sonuçlarına göre güvenirlik katsayısı .830 çıkmıştır. 208 öğretmenin katılımıyla yapılan güvenirlik analizi sonucunda ise katsayı .89 çıkmıştır. Bu ölçek için 211 kişi ile yapılan keşfedici faktör analizi sonucuna göre ise, Kaiser-Mayer-Olkin (KMO) testi değeri .89 çıkmıştır ve bu değer Kaiser (1970,1974) tarafından tavsiye edilen .6 değerinin üstündedir. Ek olarak bir ölçeğin faktör analizine uygunluğunu ölçmek için bakılan Bartletts' Test of Sphericity değeri (p=.000) anlamlı çıkmış ve ölçeğin faktör analizine uygunluğunu göstermiştir. Büyüköztürk'e göre (2002) bir ölçeğin faktör sayısını belirlenirken öz değer değerlerine, varyanslara ve yamaç-girinti grafiğine bakılır. Temel bileşenler analizi sonuçlarına göre de öz değerlerin 1'den fazla olduğu 5 faktör görülmüştür. Ancak yamaç-girinti grafiğine göre faktör sayısı iki olarak görülmüştür. Ancak varyans değerlerine bakıldığında birinci faktörün varyansın % 33.77'sini açıkladığı görülmüştür. Ayrıca bileşenler matrisine göre 23 maddeden 20'sinin değeri .400'ün üzerinde değer aldığı görülmüştür. Bu sebeple bu çalışmada ölçek tek faktöre sabitlenmiştir. Ortaokul matematik öğretmenlerinin 5. Sınıflara öğretim yapabilmeye yönelik öz-yeterlik algılarını gösteren ortalama puanları hesaplanırken, 23 madde için işaretledikleri seçeneklere karşılık gelen puanlar toplanmış ve toplam madde sayısına bölünerek hesaplanmıştır. Bu ölçekte yer alan olumsuz anlamlı maddelere karşılık gelen puanlar hesaplanırken yüksek puandan düşük puana doğru tekrar düzenleme yapılmıştır.

**Veri Toplama Süreci**

Veri toplama süreci ilk olarak Orta Doğu Teknik Üniversitesi İnsan Araştırmaları Etik Kurulu'ndan ve Ankara İl Milli Eğitim Müdürlüğü'nden uygulama izni alma ile başlamıştır. Gerekli izinler alındıktan sonar araştırmacı Ankara ili merkezindeki çeşitli ilçelerde yer alan okulları araştırmış ve okulları seçerken farklı bölgelerden okullar olmasına dikkat etmiştir. Araştırmacı 2014-2015 eğitim-öğretim yılı 2. döneminde pazartesi günleri veri toplayacağı okullara gitmiş ve ilgili idareci ile görüştükten sonar öğretmenlerden gönüllü olanlara ölçeği doldurtmuştur. Ölçeğin doldurulması ortalama 10-15 dakika sürmüştür. Çalışma için

gerekli veriyi toplayabilmek için araştırmacı bir kaç özel okula da gitmiştir ancak özel okullardan gereken izni alamadığı için çalışma devlet okullarıyla sınırlı kalmıştır.

**Veri Analizi**

Bu çalışmada bir değişkenin ne kadarının var olduğunu gösteren ölçek uygulandığı için nicel yöntemler kullanılmıştır. Nicel yöntemler için gerekli olan istatistiksel analizler yapılırken SPSS sürüm 20 kullanılmıştır. Araştırmadaki bağımlı değişken sayısı 4 olduğu için verilerin analizi birden fazla bağımlı değişkenin olduğu durumlarda kullanılan tek yönlü çok değişkenli varyans analizi ve korelasyon analizi ile gerçekleştirilmiştir. Öncelikle sıklık, ortalama, standart sapma gibi betimsel istatistikler hesaplanmış daha sonra tek-yönlü MANOVA analizi yapılmıştır.

**Çalışmanın Geçerliği**

Çalışmanın iç geçerliğini tehdit edebilecek unsurlar deneklerin seçimi, denek kaybı etkisi, veri toplama aracı ve location olarak belirtilmiştir (Fraenkel ve Wallen, 2006). Bu tehditler denek seçiminde deneklerin benzer özelliklere sahip olmalarına dikkat edilmesi, veri toplama uygulamasının zaten kısa sürmesi ve herhangi bir tehlike içermemesi nedeniyle denek kaybının yaşanmaması, verinin her zaman aynı kişi tarafından toplanması, araştırmacının hiçbir şekilde katılımcıyı etkilememesi ve kullanılan ölçeğin katılımcıya sorulardan farklı anlamlar çıkaracak nitelikte olmaması şeklindeki hususlara dikkat edilerek engellenmeye çalışılmıştır.

Dış geçerlik açısından bakıldığında çalışmaya katılan öğretmenlerin Ankara ilinde devlet okulunda çalışmaları, çalıştıkları okulların hemen hemen benzer fiziksel ortama ve koşullara sahip olması, öğretmenlerin çoğunun lisans derecesine sahip olması ve 5. sınıflara ders veriyor olmaları çalışmanın bulunulan çevreye genellenebilirliğini göstermektedir. Ancak bu çalışma sadece devlet okullarında çalışan öğretmenlerle sınırlıdır. Bu sebeple çalışmanın sonuçları Ankara ilindeki tüm ortaokul matematik öğretmenleri için genellenemez.

**Sınırlılıklar**

Bu çalışmanın sonuçları ortaokul matematik öğretmenlerinin araştırmada kullanılan ölçek soruları ve bu sorulara verdikleri cevaplarla sınırlıdır. Ayrıca özel okullar araştırmaya dahil edilemediği için devlet okulları ile sınırlıdır. Ayrıca çalışma Ankara ilinde merkez ilçelerdeki bazı okullarda çalışan öğretmenlerle sınırlıdır.

# BULGULAR

Bu araştırmada ortaokul matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik algıları ve genel olarak öğretmeye yönelik öz-yeterlik algıları mezun olunan fakülte, cinsiyet ve mesleki deneyim süresi değişkenleri açısından incelenmiştir. Ayrıca ortaokul matematik öğretmenlerinin 5. Sınıflara öğretim yapabilmeye yönelik öz-yeterlik algıları ile genel olarak öğretmeye yönelik öz-yeterlik algıları arasındaki ilişki incelenmiştir.

## Mezun Olunan Fakülte Değişkeni Açısından Ortaya Çıkan Bulgular

### Betimsel İstatistikler

Eğitim fakültelerinden mezun olan ve diğer fakültelerden mezun olan ortaokul matematik öğretmenlerinin öz-yeterlik algıları tek-yönlü MANOVA analizi ile uygulanarak karşılaştırılmıştır. Bunun sonucunda eğitim fakültesi mezunlarının 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik puan ortalamasının 6.75 (SS=.978), diğer fakültelerden mezun olan öğretmenlerin puan ortalamasının 6.91 (SS=1.149) olduğu görülmüştür. Eğitim fakültesi mezunlarının öğrenci katılımına yönelik öz-yeterlik algılarının puan ortalamasının 6.35 (SS=1.041), öğretim stratejilerine yönelik öz-yeterlik algılarının 7.08 (SS=.944), sınıf yönetimine yönelik öz-yeterlik algılarının puan ortalamasının 7.07 (SS=1.069) olduğu, diğer fakültelerden mezun öğretmenlerin öğrenci katılımına yönelik öz-yeterlik algılarının puan ortalamasının 6.75 (SS=1.033), öğretim stratejilerine yönelik öz-yeterlik algılarının puan ortalamasının 7.38 (SS=.944) ve sınıf yönetimine yönelik öz-yeterlik algılarının puan ortalamasının 7.33 (SS=1.050) olduğu görülmüştür.

### Çıkarımsal İstatistikler

"Eğitim fakültesinden ve diğer fakültelerden mezun olan matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik puanları ile sınıf yönetimi, öğretim stratejileri ve öğrenci katılımı boyutları açısından ele alınan genel olarak öğretmeye yönelik öz-yeterlik puanları arasında istatistiksel olarak anlamlı bir fark var mıdır?" sorusunu araştırmak için uygulanacak tek-yönlü varyans analiz öncesinde varsayım kontrolleri yapılmıştır. Bunlar örneklem büyüklüğü, verilerin normal dağılımı, aykırı değerler, doğrusallık, çoklu doğrusallık ve varyans kovaryans matrislerinin homojenliğidir. Veri analizinde puanların skewness and kurtosis değerleri incelendiğinde hepsinin -2 ve 2 aralığında olduğu, histogramlar

incelendiğinde ise puanların normal dağılım gösterdiği görülmüştür. Puanların serpme çizimleri incelendiğinde ise, mezun olunan fakülteye bağlı olarak bağımlı değişkenlerin doğrusal olduğu görülmüştür. Bağımlı değişkenlerin arasındaki korelasyonun .8'den büyük ve .10'dan küçük olduğu belirlenmiştir. Box's M Test değeri ise dört bağımlı değişken için varyans matrislerinin homojen olduğunu göstermiştir. Tüm varsayımların kontrolü yapıldıktan sonra tek-yönlü çok değişkenli varyans analizi yapılmış ve analiz sonucunda eğitim fakültesinden ve diğer fakültelerden mezun olan ortaokul matematik öğretmenlerinin 5.sınıflara öğretim yapabilmeye ve genel olarak öğretmeye yönelik öz-yeterlik algıları arasında anlamlı bir fark bulunmamıştır: F(4,206)= 1.70, p=,151; Wilk's Lambda= .97; partial eta squared= .03. Başka bir deyişle, eğitim fakültesi mezunu ve diğer fakültelerden mezun olan ortaokul matematik öğretmenlerinin 5. sınıflara ve genel olarak öğretmeye yönelik öz-yeterlik algıları benzerdir.

**Cinsiyet Değişkeni Açısından Ortaya Çıkan Bulgular**

**Betimsel İstatistikler**

Bu çalışmada kadın ve erkek ortaokul matematik öğretmenlerinin öz-yeterlik algıları tek-yönlü MANOVA analizi ile uygulanarak karşılaştırılmıştır. Bunun sonucunda kadın öğretmenlerin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik puan ortalamasının 6.78 (SS=1.045), erkek öğretmenlerin puan ortalamasının 6.83 (SS=.995) olduğu görülmüştür. Kadın öğretmenlerin öğrenci katılımına yönelik öz-yeterlik algılarının puan ortalamasının 6.37 (SS=1.013), öğretim stratejilerine yönelik öz-yeterlik algılarının 7.08 (SS=.931), sınıf yönetimine yönelik öz-yeterlik algılarının puan ortalamasının 7.10 (SS=1.063) olduğu, erkek öğretmenlerin öğrenci katılımına yönelik öz-yeterlik algılarının puan ortalamasının 6.71 (SS=1.112), öğretim stratejilerine yönelik öz-yeterlik algılarının puan ortalamasının 7.36 (SS=.980) ve sınıf yönetimine yönelik öz-yeterlik algılarının puan ortalamasının 7.25 (SS=1.081) olduğu görülmüştür.

**Çıkarımsal İstatistikler**

"Erkek ve kadın ortaokul matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik puanları ile sınıf yönetimi, öğretim stratejileri ve öğrenci katılımı boyutları açısından ele alınan genel olarak öğretmeye yönelik öz-yeterlik puanları arasında istatistiksel olarak anlamlı bir fark var mıdır?" sorusunu araştırmak için uygulanacak tek-yönlü varyans analiz öncesinde varsayım kontrolleri

yapılmıştır. Bunlar örneklem büyüklüğü, verilerin normal dağılımı, aykırı değerler, doğrusallık, çoklu doğrusallık ve varyans kovaryans matrislerinin homojenliğidir. Veri analizinde puanların skewness and kurtosis değerleri incelendiğinde hepsinin -2 ve 2 aralığında olduğu, histogramlar incelendiğinde ise puanların normal dağılım gösterdiği görülmüştür. Puanların serpme çizimleri incelendiğinde ise, cinsiyete bağlı olarak bağımlı değişkenlerin doğrusal olduğu görülmüştür. Bağımlı değişkenlerin arasındaki korelasyonun .8'den büyük ve .10'dan küçük olduğu belirlenmiştir. Box's M Test değeri ise dört bağımlı değişken için varyans matrislerinin homojen olduğunu göstermiştir. Varsayım kontrolü yapıldıktan sonra tek-yönlü çok değişkenli varyans analizi yapılmış ve analiz sonucunda kadın ve erkek ortaokul matematik öğretmenlerinin 5.sınıflara öğretim yapabilmeye ve genel olarak öğretmeye yönelik öz-yeterlik algıları arasında anlamlı bir fark bulunmamıştır: F(4,206)= 1.96, p=,102; Wilk's Lambda= .96; partial eta squared= .37. Bir başka deyişle, kadın ve erkek ortaokul matematik öğretmenlerinin 5. sınıflara ve genel olarak öğretmeye yönelik öz-yeterlik algıları benzerdir. Erkek ve kadın öğretmenlerin öz-yeterlik puanları arasında anlamlı bir fark çıkmadığı için follow-up analizi yapmaya gerek kalmamıştır.

**Mesleki Deneyim Süresi Değişkeni Açısından Ortaya Çıkan Bulgular**

**Betimsel İstatistikler**

Bu çalışmada öğretmenlikteki mesleki deneyim sürelerine bağlı olarak 0-5, 6-10, 11-15, 16-20 ve 20 yıldan fazla olmak üzere beş farklı şekilde gruplandırılan ortaokul matematik öğretmenlerinin öz-yeterlik algıları tek-yönlü MANOVA analizi ile uygulanarak karşılaştırılmıştır. Bunun sonucunda öğretmenlerin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik puan ortalamasının öğretmenlikte 0-5 yıl deneyime sahip öğretmenler için 6.68 (SS=.888), 6-10 yıl deneyime sahip öğretmenler için 6.77 (SS=1.086), 11-15 yıl deneyime sahip öğretmenler için 6.85 (SS=1.083), 16-20 yıl deneyime sahip öğretmenler için 7.14 (SS=1.111) ve 20 yıldan fazla deneyime sahip öğretmenler için 6.69 (SS=.957) olduğu görülmüştür. Bunlara ek olarak, genel olarak öğretmeye yönelik öz-yeterlik boyutlarından olan öğrenci katılımına yönelik öz-yeterlik puanlarının 7.09 (SS=1.040) ortalama değeriyle en yüksek öğretmenlikte 16-20 yıl deneyime sahip öğretmenlerde, en düşük olarak da 6.11 (SS=1.132) ortalama değeriyle öğretmenlikte 6-10 yıl deneyime sahip öğretmenlere ait olduğu görülmüştür. Öğretim stratejileri boyutu açısından

bakıldığında en yüksek ortalamanın 7.76 (SS=.958) değerle öğretmenlikte 16-20 yıl deneyime sahip, en düşük ortalamanın ise, 6.83 (SS=.916) değerle öğretmenlikte 0-5 yıl deneyime sahip öğretmenlere ait olduğu görülmüştür. Sınıf yönetimine yönelik öz-yeterlik algısı değişkenine göre ise, öğretmenlikte 16-20 yıl deneyime sahip öğretmenlerin puan ortalamasının 7.46 (SS=1.004) değeri ile en yüksek, öğretmenlikte 0-5 yıl deneyime sahip öğretmenlerin puan ortalamasının ise 6.76 (SS=1.147) değeri ile en düşük olduğu görülmüştür. Betimsel istatistiklere göre dört boyut açısından da öğretmenlikte 16-20 yıl deneyimine sahip öğretmenlerin öz-yeterlik puan ortalamaları diğer öğretmenlerden yüksektir.

**Çıkarımsal İstatistikler**

"Mesleğinde 0-5, 6-10, 11-15, 16-20 ve daha fazla yıl deneyime sahip ortaokul matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik puanları ile sınıf yönetimi, öğretim stratejileri ve öğrenci katılımı boyutları açısından ele alınan genel olarak öğretmeye yönelik öz-yeterlik puanları arasında istatistiksel olarak anlamlı bir fark var mıdır?" sorusunu araştırmak için uygulanacak tek-yönlü varyans analiz öncesinde varsayım kontrolleri yapılmıştır. Bunlar örneklem büyüklüğü, verilerin normal dağılımı, aykırı değerler, doğrusallık, çoklu doğrusallık ve varyans kovaryans matrislerinin homojenliğidir. Veri analizinde puanların skewness and kurtosis değerleri incelendiğinde 1 değer dışında diğer değerlerin -2 ve 2 aralığında olduğu, histogramlar incelendiğinde ise puanların normal dağılım gösterdiği görülmüştür. Puanların serpme çizimleri incelendiğinde ise, mesleki deneyim süresine bağlı olarak bağımlı değişkenlerin doğrusal olduğu görülmüştür. Bağımlı değişkenlerin arasındaki korelasyonun .8'den büyük ve .10'dan küçük olduğu belirlenmiştir. Box's M Test değeri ise dört bağımlı değişken için varyans matrislerinin homojen olduğunu göstermiştir. Varsayım kontrolü yapıldıktan sonra tek-yönlü çok değişkenli varyans analizi yapılmış ve analiz sonucunda kadın ve erkek ortaokul matematik öğretmenlerinin 5.sınıflara öğretim yapabilmeye ve genel olarak öğretmeye yönelik öz-yeterlik algıları arasında anlamlı bir fark bulunmuştur: F(4,206)= 3.79, p=,000; Wilk's Lambda= .75; partial eta squared= .07. Bir başka deyişle, kadın ve erkek ortaokul matematik öğretmenlerinin 5. sınıflara ve genel olarak öğretmeye yönelik öz-yeterlik algıları farklılık göstermektedir. Mesleki deneyim sürelerine bağlı olarak gruplandırılan öğretmenlerin öz-yeterlik puanları arasında anlamlı bir fark çıktığı farklılığın hangi değişkenler açısından ortaya

çıktığını belirlemek için follow-up analizi yapılmıştır. Bu analiz sonucunda, farklılığın F(4,206)=5.96, p=.000, partial eta squared=.11 değerleri ile öğrenci katılımına yönelik öz-yeterlik boyunda ve F(4,206)=3.55, p=.008, partial eta squared=.07 değerleri ile öğretim stratejilerine yönelik öz-yeterlik boyutunda ortaya çıktığı görülmüştür. Öğrenci katılımına yönelik öz-yeterlik puan ortalamalarının öğretmenlikte 16-20 yıl deneyime sahip öğretmenler için 7.09 (SS=1.040, % 95 GA [6.66-5.52] değerleri ile diğer öğretmenlere göre daha yüksek olduğu ortaya çıkmıştır. Aynı şekilde öğretim stratejilerine yönelik öz-yeterlik puan ortalamalarının da öğretmenlikte 16-20 yıl deneyime sahip öğretmenlerde 7.76 (SS=.958, %95 GA [7.36-8.16] değerleri ile diğer öğretmenlere göre daha yüksek olduğu ortaya çıkmıştır.

**MTSES ve TTSES Puanları Arasındaki İlişki Açısından Ortaya Çıkan Sonuçlar**

**Betimsel İstatistikler**

Bu çalışmada ortaokul matematik öğretmenlerinin 5.sınıflara öğretim yapabilmeye yönelik özyeterlik algıları ile genel olarak öz-yeterlik algıları arasında anlamlı bir ilişkinin olup olmadığı korelasyon analizi ile incelenmiştir. Bunun sonucunda öğretmenlerin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik algılarının puan ortalamasının 6.80 (SS=1.028), genel olarak öğretmeye yönelik öz-yeterlik algılarının puan ortalamasının 6.92 (SS=.993) olduğu görülmüştür.

**Çıkarımsal İstatistikler**

"Ortaokul matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik algıları ile genel olarak öğretmeye yönelik öz-yeterlik algıları arasında ilişki var mıdır?" sorusunu araştırmak için uygulanacak korelasyon analizi öncesinde varsayım kontrolleri yapılmıştır. Bunlar, verilerin normal dağılımı, aykırı değerler, doğrusallık, ve eşdeğişkenliktir. Veri analizinde puanların skewness and kurtosis değerleri incelendiğinde 1 değer dışında diğer değerlerin -2 ve 2 aralığında olduğu, histogramlar incelendiğinde ise puanların normal dağılım gösterdiği görülmüştür. Puanların serpme çizimleri incelendiğinde ise, MTSES ve TTSES puanlarının doğrusal olduğu görülmüştür. Korelasyon analizi sonucunda ise, ortaokul matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik algıları ile genel olarak öğretmeye yönelik öz-yeterlik algıları arasında güçlü ve pozitif bir ilişki [r=.62, n=208, p<.005] saptanmıştır.

# TARTIŞMA VE ÖNERİLER

Yapılan araştırma sonucunda ortaokul matematik öğretmenlerinin 5. sınıflara öğretim yapabilmeye yönelik öz-yeterlik algıları ile genel olarak öğretmeye yönelik öz-yeterlik algıları arasında mezun olunan fakülte ve cinsiyet değişkenleri açısından istatistiksel olarak anlamlı bir fark bulunmamıştır. Buna karşılık, öğretmenlikte mesleki deneyim süresi değişkeni açısından öğretmenlerin öğrenci katılımına yönelik öz-yeterlik algıları ile öğretim stratejilerine yönelik öz-yeterlik algıları arasında istatistiksel olarak anlamlı bir fark çıkmıştır. Bu bulgu Fives ve Buehl (2010), Hoy ve Burke-Spero (2005) ve Wolters ve Daugherty (2007)'nin bulguları ile paraleldir.

Öte yandan, mesleki deneyim süresi açısından ortaokul matematik öğretmenlerinin 5. Sınıflara öğretim yapabilmeye yönelik öz-yeterlik algıları arasında anlamlı bir fark çıkmamıştır. Bunun sebebi branş öğretmenlerinin 5. sınıflara ders verme konusunda kendilerini hala hazır ve yeterli hissetmemeleri olabilir. Çünkü çalışmanın bulgularından birisi de öğretmenlerin genel olarak öğretmeye yönelik öz-yeterlik algıları ile 5. sınıflara öğretim yapmaya yönelik öz-yeterlik algıları arasında pozitif ve güçlü bir ilişki olduğuydu. Bu ilişkiye karşılık, deneyimli öğretmenlerin genel olarak öğretmeye yönelik öz-yeterlik algıları daha az deneyimli öğretmenlere göre yüksek çıkarken, bu deneyimleri 5. sınıf öğrencilerine öğretim yapmaya yönelik öz-yeterlik algılarında olumlu bir etkiye sahip olamamıştır. Bu sebeple, bu bulgudan yola çıkarak ortaokul matematik öğretmenlere 5. sınıflara öğretim yapabilmeye yönelik hizmet içi eğitim verilmesi gerektiği sonucuna varılabilir. Ayrıca eğitim fakültesi mezunu olmak öğretmenlerin öğretmeye yönelik öz-yeterlik algıları açısından bir katkı sağlamamıştır. Bu noktada, öğretmen yetiştiren kurumlar olarak eğitim fakültelerinde uygulama derslerinin daha gerçekçi ve sınıf ortamında yapılması, matematik derslerinin sadece ilk yıllarda değil üniversite eğitimi boyunca her yıl verilmesi, sahada çalışan öğretmenlere kendilerini geliştirebilecekleri ve hizmet içi eğitimlere katılımların artırılarak öğretmenlerin sahip oldukları yeteneklerin körelmesini önlemek amacıyla bu becerilerini kullanabilecekleri fırsatların artırılması gerektiği öne sürülebilir.

Bu çalışma için seçilen örneklem sayısı yeterli olsa da, örneklem seçimi yapılırken uygunluğa göre önceden belirleme yapılarak seçildiği için bulgular sadece mevcut çevre içinde genellenebilmektedir. Hatta veriler sadece devlet okullarında

çalışan ortaokul matematik öğretmenlerinden toplandığı için de genellenebilirlik kısıtlanmaktadır. Ayrıca araştırmanın sonuçları bu araştırmada kullanılan ölçekteki sorularla sınırlıdır. Bu sebeplerle, bu araştırma Ankara ili dışında, özel/vakıf okullarında çalışan öğretmenlerle ve daha geniş kapsamlı ve rastgele örneklem seçilerek başka çalışmalarla yapılabilir.

## Appendix G: TEZ FOTOKOPİSİ İZİN FORMU

**ENSTİTÜ**

Fen Bilimleri Enstitüsü ☐

Sosyal Bilimler Enstitüsü ☒

Uygulamalı Matematik Enstitüsü ☐

Enformatik Enstitüsü ☐

Deniz Bilimleri Enstitüsü ☐

**YAZARIN**

Soyadı : Şener

Adı : Esra

Bölümü : İlköğretim Fen ve Matematik Eğitimi

**TEZİN ADI** (İngilizce) : Middle School Mathematics Teaachers' Sense of Self-Efficacy For Teaching Mathematics to Fifth Grade Students

**TEZİN TÜRÜ** : Yüksek Lisans ☒ Doktora ☐

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. ☐
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. ☐
3. Tezimden bir (1) yıl süreyle fotokopi alınamaz. ☒

**TEZİN KÜTÜPHANEYE TESLİM TARİHİ**: