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An Investigation on the Effect of Department and Years Spent in Program on Pre-Service Teachers' Mathematics Teaching Efficacy Beliefs

Bölüm ve Programda Geçen Yıl Süresinin Öğretmen Adaylarının Matematik Öğretimine Yönelik Yeterlik İnançlarına Etkisinin İncelenmesi

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Abstract

The purpose of this study is to examine the effect of department and years spent in program on elementary and secondary mathematics pre-service teachers' mathematics teaching efficacy beliefs. The study was conducted with 318 pre-service teachers enrolled in elementary and secondary mathematics teacher education programs in the United States. The Mathematics Teaching Efficacy Belief Instrument (MTEBI, Enochs, Smith, & Huinker, 2000) was used to measure the participants' teaching efficacy beliefs. The results show that there was significant effect of department and years spent in the department on pre-service teachers' personal mathematics teaching efficacy scores. No significant effect of the department and years spent in the department of mathematics teaching outcome expectancy scores was observed. The results were discussed and teaching ideas for teacher educators were suggested.

Keywords: Mathematics Teaching Efficacy, Personal Mathematics Teaching Efficacy, Mathematics Teaching Outcome Expectancy, Pre-service Teacher Education

Öz

Bu çalışmanın amacı, bölüm ve programda geçen yıl süresinin öğretmen adaylarının matematik öğretimine yönelik yeterlik inançlarına etkisinin incelenmesidir. Çalışma ABD'den ilköğretim ve ortaöğretim matematik öğretmenliği programlarına kayıtlı 318 öğretmen adayıyla yapılmıştır. Öğretmen adaylarının yeterlik inançlarını ölçmek için Matematik Öğretimi Yeterlik Ölçeği (MTEBI; Enochs, Smith, & Huinker, 2000) kullanılmıştır. Bulgular göstermektedir ki bölüm ve programda geçen sürenin öğretmen adaylarının kişisel matematik öğretimi yeterlik inancı puanlarına anlamlı bir etkisi vardır. Ayrıca, bölüm ve programda geçen sürenin öğretmen adaylarının matematik öğretiminde sonuç beklenti puanlarına anlamlı etkisi bulunmamıştır. Bulgular tartışılmış ve öğretmen eğitimcileri için öğretimde kullanılacak önerilerde bulunulmuştur.

Anahtar Sözcükler: Matematik öğretim yeterliği, kişisel matematik öğretim yeterliği, matematik öğretiminde sonuç beklentisi, hizmet öncesi öğretmen eğitimi.

Introduction

Self-efficacy refers to a collection of beliefs "to organize and execute the courses of action required to manage prospective situations" (Bandura, 1995: 2). Efficacy expectations have direct effect on the choice of behaviors and settings (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Basically, efficacy beliefs determine what kind of activities people choose, how much effort they spend on those activities and how long they pursue those course of actions (Bandura, 1997). Teachers' sense of efficacy is a strong indicator of teachers' performance in classrooms.

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Research indicates that teachers' efficacy beliefs are positively correlated with students' academic performance (Allinder, 1995; Ross, 1992), students' expectations and perceptions of their performance (Midgley, Feldlaufer & Eccles, 1989), and positive teacher behaviors in classroom (Ghaith & Yaghi, 1997; Tschannen Moran, Woolfolk Hoy, & Hoy, 1998). Teachers with high efficacy beliefs also spend more time with struggling students (Woolfolk, Rosoff & Hoy, 1990) and promote inquiry-based learning strategies (Woolfolk Hoy, Hoy, & Davis, 2009). On the other hand, teachers with lower efficacy beliefs use more prescriptive instructional materials that provide full guidance and the answers to questions (Ramey-Gassert, Shroyer, & Staver, 1996).

The concept of "teaching efficacy" has been used by education researchers since 1970's (Woolfolk & Hoy, 1990). While earlier researchers defined teaching efficacy as "the extent to which the teacher believes he or she has the capacity to affect student performance" (McLaughlin & Marsh, 1978: 84), more recently Tschannen-Moran and Woolfolk Hoy define it as "a judgment 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" (2001: 783). As a result, teachers' sense of efficacy refers to their beliefs about their capacity to impact student performance (Ashton, 1984). Bandura's ideas have highly influenced our current understanding of teaching efficacy (Bandura, 1977). His conception of efficacy beliefs as a composition of self-efficacy and outcome expectancy beliefs is reflected in teaching efficacy research. Efficacy expectancy beliefs are adapted as personal teaching efficacy beliefs and outcome expectancy beliefs are adapted as teaching outcome expectancies, general teaching efficacy or teaching efficacy beliefs (Enochs, Smith, & Huinker, 2000; Hoy & Woolfolk, 1990; Woolfolk Hoy, Hoy, & Davis, 2009).

This article focuses on pre-service mathematics teachers' mathematics teaching efficacy beliefs which have been a critical variable in understanding how mathematics teachers implement instructional programs in classrooms (Smith, 1996). Having high teaching efficacy beliefs is essentially important in implementing educational reform policies, including curriculum and instructional changes (Ross, 1995; Wheatley, 2002). Such beliefs also critically influence teachers' decisions regarding the changes in instructional practices in mathematics teaching (Guskey, 1988). More importantly, it is a strategic variable to study teacher behavior as teaching efficacy beliefs are the major tools for behavioral change (Bandura, 1997).

Teaching efficacy beliefs are complex and dynamic sets of constructs (Woolfolk & Hoy, 1990). For example, pre-service teachers, in general, show high levels of teaching efficacy in early years of teacher education programs; but, their sense of efficacy in teaching go down in the final years when they begin field-related courses and student teaching (Erdem & Demirel, 2007; Woolfolk, 2001). In a recent study, Lamote and Engels (2010) measured teaching efficacy beliefs of first, second- and third-year pre-service teachers. The results indicate that first-year pre-service teachers who spend most of their time on theory-based coursework report higher levels of teaching efficacy beliefs in classroom management than second- and third-year pre-service teachers who have field-related experiences. Thus, their sense of efficacy beliefs in classroom management decrease as pre-service teachers gain classroom teaching experiences; on the other hand, their teaching efficacy scores increase considerably from first year to the third year; but, first-year pre-service teachers show relatively higher levels of teaching efficacy beliefs. As a result, Lamote and Engels (2010) confirm previous reports that as pre-service teachers move from one level to another their efficacy beliefs in teaching changes (Erdem & Demirel, 2007; Woolfolk, 2001). Yet, in another study, Işıksal and Çakıroğlu (2005) found out that there was no significant effect of the number of years spent in teacher education program on pre-service teachers' mathematics teaching efficacy beliefs. In particular, there was no significant difference among second-year, third-year and fourth-year pre-service teachers' mathematics teaching efficacy scores. Hence, the literature indicates that the number of years spent in a teacher education program is a variable that can influence pre-service mathematics teachers' sense of teaching efficacy; however, the findings are inconsistent and do not provide a clear direction for educators. It is essential to conducted further research to better understand how teachers' sense of efficacy change to explore the effects of

teacher education programs on pre-service teachers' beliefs. As a result, this research is a worthy attempt to explore to what extent elementary and secondary mathematics education pre-service teachers' mathematics teaching efficacy beliefs change in the teacher education program.

Research on teaching efficacy beliefs also indicates that the school level of teaching is another important factor that influences teachers' sense of efficacy (Taimalu & Oim, 2005; Tschannen-Moran & Woolfolk Hoy, 2007). Although several research findings mainly indicate that kindergarten and elementary school teachers have higher sense of teaching efficacy than middle and high school teachers (Evans & Tribble 1986; Greenwood, Olejnik, & Parkay, 1990; Taimalu & Oim, 2005; Tchannen-Moran & Woolfolk Hoy, 2007), some others have found that teachers of large secondary schools show higher teaching efficacy beliefs than teachers of elementary schools (Lee, Dedick, & Smith, 1991). Regarding mathematics teaching, there is little research analyzing the effect of school level in this context. However, a cursory analysis of the topic shows that the school level of teaching can be regarded as a significant variable in mathematics teaching efficacy beliefs: Both elementary and secondary school teachers teach mathematics; but, their mathematical preparations are different. Although elementary teachers teach highly important mathematical concepts, including number sense and geometry, their mathematical backgrounds are not as strong as teachers of mathematics in secondary schools. Thus, exploring elementary and secondary pre-service teachers' mathematics teaching efficacy beliefs can be a valuable contribution to understand the concept and can lead us to explore the nature of mathematics teaching efficacy beliefs further.

Given the previous research findings and significance of the topic, the purpose of this study is to investigate the effect of department and years spent in teacher education program on pre-service teachers' mathematics teaching efficacy scores in the United States. Thus, it is aimed to answer the following research questions:

1. Is there a significant effect of the department of pre-service teachers on their mathematics teaching efficacy scores?

2. Is there a significant effect of the number of years spent in the program on pre-service teachers' mathematics teaching efficacy scores?

Method

Participants

The data were collected from 318 pre-service teachers enrolled in elementary and secondary mathematics teacher education programs in the United States. The sample consisted of 151 (47.5%) junior and 167 (52.5%) senior students, and most of the participants were female, 285 (89.6%). The ethnic composition of the sample is as follows: 305 (95.9%) were Caucasian; 6 (1.9%) Asian; 5 (1.6%) African American; 1 (0.3%) Hispanic; and 1 (0.3%) identified "other". Regarding the department the participants enrolled, 234 (73.6%) of them were elementary education majors and 84 (26.4%) of them were secondary mathematics education majors. The data was collected as part of a larger scale research agenda with a purpose of investigating pre-service teachers' beliefs and motivational characteristics.

The data was collected from two colleges in the US. One of the schools is in the Northeast region and the other one is the Southeast part of the country. The former one is located in a small college town with about 6000 students, mostly undergraduate. The second college is located in a mid-sized city. It is a large private research university with over 30000 students. Thus, while one of the schools represents teacher education programs in small-size teaching colleges, the other one represents the programs in large research universities. Although US teacher education programs show a wide range of differences, there are some main commonalities across all institutions, including the universities where this study was conducted. The sample in this study shows such common elements of US teacher education programs. Mainly, in both universities, elementary

and secondary education majors receive a four-year college degree with a teaching certificate. The elementary education majors are specialized in teaching all topics from 1st through 6th grades; however, the secondary education majors generally are educated to teach a single secondary school subject, such as mathematics and English. In this study, secondary mathematics education majors work toward a teaching license to mathematics from 6th through 12th grade; hence, they are licensed to teach both middle and high school mathematics. In the first two years, both elementary and secondary education majors take similar courses, including liberal arts, physical sciences, intro level mathematics, and basic education courses with no field experience. Beginning with the third year, they follow different routes with equal amount of field and student teaching experiences. While elementary education majors take only one mathematics teaching methods courses; but, no other mathematics-related courses, the secondary mathematics education majors take at least 7 or 8 mathematics courses and a mathematics teaching methods course. As a result, mathematical preparations of elementary and secondary education majors are considerably different. Additionally, the data were collected from two highly different universities with similar teacher education program characteristics.

Instrument

The data was collected by utilizing Mathematics Teaching Efficacy Belief Instrument (MTEBI; Enochs, Smith, & Huinker, 2000). The MTEBI includes two subscales, personal mathematics teaching efficacy (PMTE) and mathematics teaching outcome expectancy (MTOE). While the purpose of the PMTE was to measure to what extent the participants have confidence in their own teaching skills (e.g. "I know how to teach mathematics concepts effectively."), the purpose of the MTOE was to measure to what extent they believe that teachers' effort will influence student learning (e.g. "The teacher is generally responsible for the mathematics achievement of students in mathematics."). There were 13 items in the PMTE and 8 items in the MTOE, where each item has five response categories: strongly agree, agree, uncertain, disagree and strongly disagree. Items are scored as follows: strongly agree = 5; agree = 4; undecided = 3; disagree = 2 and strongly disagree = 1. Hence, the PMTE scores range from 13 to 65 and the MTOE scores range from 8 to 40. The analysis of the internal reliability of MTEBI yielded Cronbach's alpha coefficient of 0.68 for the PMTE, 0.70 for the MTOE. Two researchers from the US originally developed the MTEBI to mainly assess US pre-service teachers' mathematics teaching efficacy beliefs; so, the instrument was suitable for the sample of the present study.

Results

Due to the low correlation between the PMTE and the MTOE scores, the variables were treated separately in the further analysis. Descriptive statistics of personal mathematics teaching efficacy regarding year in program and the department is given in Table 1.

Table 1.

Personal Mathematics Teaching Efficacy Scores Regarding the Grade Level and Department

Grade Level	Department	Mean	Std. Dev.	N
Junior	Elementary	39.2	4.2	121
	Secondary	37.4	3.0	30
	Total	38.8	4.1	151
Senior	Elementary	37.4	3.4	113
	Secondary	37.2	3.3	54
	Total	37.4	3.3	167
Total	Elementary	38.4	3.9	234
	Secondary	37.3	3.2	84
	Total	38.1	3.8	318

Based on the descriptive statistics given above, it could be deduced that junior and senior elementary pre-service teachers' personal mathematics teaching efficacy scores were higher than the secondary mathematics pre-service teachers' scores. Descriptive statistics of mathematics teaching outcome expectancy scores regarding the grade level and the department is given in Table 2.

Similar to the personal mathematics teaching efficacy scores, elementary school teachers' mathematics teaching outcome expectancy scores were higher than the secondary pre-service teachers' scores. In terms of grade level, results revealed that although senior elementary school teachers' outcome expectancy scores were higher than the secondary pre-service teachers, the situation is reversed for the junior pre-service teachers.

Table 2.

Mathematics Teaching Outcome Expectancy Scores Regarding the Grade Level and Department

Grade Level	Department	Mean	Std. Dev.	N
Junior	Elementary	27.1	3.9	121
	Secondary	27.3	4.0	30
	Total	27.1	3.9	151
Senior	Elementary	27.7	3.7	113
	Secondary	25.9	6.2	54
	Total	27.1	4.7	167
Total	Elementary	27.4	3.8	234
	Secondary	26.4	5.6	84
	Total	27.1	4.3	318

In addition to the descriptive statistics, Two-Way Analysis of Variance (Two-Way ANOVA) was performed in order to investigate the effect of department and years spent in teacher education program on US pre-service teachers' mathematics teaching efficacy scores regarding the personal mathematics teaching efficacy and mathematics teaching outcome expectancy. The results revealed that there was statistically significant main effect for department [$F(1, 314) = 4.3$, $p = .04$] and for years spent in teacher education program [$F(1, 314) = 4.18$, $p = .04$] regarding the personal mathematics teaching efficacy scores. However, the interaction effect [$F(1, 314) = 2.94$, $p = .09$] did not reach statistical significance. In other words, results revealed a significant effect for department and grade level but no significant difference in the effect of department on personal mathematics teaching efficacy for junior and seniors. In addition to statistical significance the effect sizes were small where eta squared was calculated as .013, .014, and .01 for the grade level, department, and interaction respectively. In Figure 1, we could discuss the relationship between department and grade level with respect to the personal mathematics teaching efficacy score.

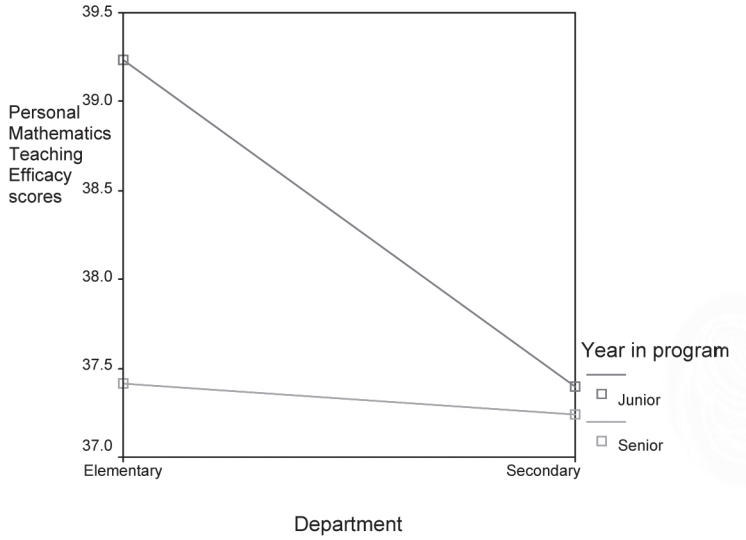

Figure 1. The relationship between department and grade level on personal mathematics teaching efficacy

It can be seen in the graph that both elementary and secondary junior pre-service teachers had higher personal mathematics teaching efficacy scores compared to their senior partners. In addition, it could be deduced that elementary pre-service teachers had higher personal mathematics teaching efficacy scores compared to secondary pre-service teachers.

In addition to the personal mathematics teaching efficacy scores, results revealed that there was no statistically significant main effect for department [F(1, 314) = 1.84, p= .18] and for years spent in teacher education program [F(1, 314) = 0.48, p= .49] regarding mathematics teaching outcome expectancy. In addition, the interaction effect [F(1, 314) = 3.0, p= .08] did not reach statistical significance. In other words, results revealed no significant effect for department and grade level and there is no significant difference in the effect of department on mathematics teaching outcome expectancy for junior and seniors. In addition to statistical significance the effect sizes was small where eta squared was calculated as .002, .006, and .01 for the grade level, department, and interaction respectively. In Figure 1, we could discuss the relationship between department and grade level on mathematics teaching outcome expectancy.

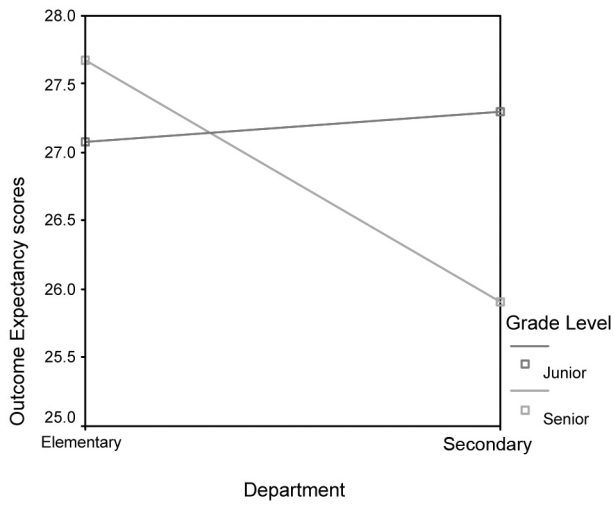

Figure 2. The relationship between department and grade level on mathematics teaching outcome expectancy.

It can also be seen in the graph that senior elementary pre-service teachers had higher mathematics teaching outcome expectancy scores compared to junior elementary pre-service teachers. On the other hand, junior secondary pre-service teachers had higher mathematics teaching outcome expectancy scores with respect to their senior partners. In addition, similar to above, elementary pre-service teachers had higher outcome expectancy scores compared to secondary pre-service teachers.

Discussion

The results of this study indicate that there was a significant effect of department and years in the department on pre-service teachers' personal mathematics teaching efficacy scores in mathematics teaching, without any significant interaction effect. On the other hand, no significant effect of the department and years in the department on mathematics teaching outcome expectancy scores was observed; for that matter, there was no significant interaction effect on outcome expectancy scores.

The findings regarding the personal mathematics teaching efficacy scores are in parallel with a number of previous studies. In this study, number of years spent in the department was found to have an effect on personal mathematics teaching efficacy scores. In particular, junior students' scores were significantly higher than senior students' scores. Similarly, other researchers have found out that pre-service teachers' teaching efficacy beliefs go down as they progress in the teacher education program (Erdem & Demirel, 2007; Lamote & Engels, 2010; Woolfolk, 2001). In the final year of teacher education programs, pre-service teachers have relatively more teaching experiences than in earlier periods of their time in the programs. The field experiences allow pre-service teachers to experience all aspects of teaching, including complexities and realities of teaching. As a result, the exposure into the field might have lowered the pre-service teachers' personal mathematics teaching efficacy scores. On the other hand, some other studies found out that pre-service teachers' personal teaching efficacy scores increased after student teaching or field experiences (Housego, 1992; Hoy & Woolfolk, 1990; Li & Zhang, 2000). There is empirical evidence showing that field and student teaching experiences are highly influential on pre-service teachers' beliefs about teaching (Hoy & Woolfolk, 1990; Li & Zhang, 2000). The nature of the field experience and the characteristics of the field schools may shape pre-service teachers in different ways (Hoy & Woolfolk, 1990). Additionally, the cooperating teachers' attitudes and level of cooperation may influence pre-service teachers' teaching efficacy beliefs (Li & Zhang, 2000). Also, pre-service teachers' beliefs about their cooperating teachers predicted pre-service teachers' sense of efficacy (Knoblauch & Woolfolk Hoy, 2008). As Bandura suggested, previous experiences are the most powerful source of efficacy beliefs (Bandura, 1997). If pre-service teachers have successful and satisfying experiences, their teaching efficacy expectancies may increase; otherwise, we may see a downward turn in their beliefs due to their previous experiences.

In this study, it was found out that while junior pre-service teachers' personal mathematics teaching efficacy beliefs were significantly higher than senior pre-service teachers' beliefs, the mathematics teaching outcome expectancy beliefs did not differ significantly. The average outcome expectancy scores were the same for both groups of participants. This particular finding is consistent with previous research (Hoy & Woolfolk, 1990; Işıksal & Çakıroğlu, 2005; Li & Zhang, 2000). In all three studies, pre-service teachers' teaching outcome expectancies stayed the same or dropped after exposure to field experiences or student teaching. Teaching outcome expectations reflect the level of general beliefs that teachers possess about the power of teaching and control of the learning environment regardless of external factors such as family background, IQ or school conditions (Gibson & Dembo, 1984). In other words, teachers with high outcome expectations would predict that effective teachers can influence learning of even unmotivated

students (Berman et al., 1977). Given the fact that the pre-service teachers' outcome expectancy scores did not change significantly, it is seen that the junior and senior-level pre-service teachers' beliefs about the effect of teaching on student learning were very close to each other. Both groups of students had an average of 27.1 out of the 40-point MTOE scale; hence, there is a considerable room for improvement of their beliefs about the power of teaching, teaching outcome expectancy. For instance, teacher education programs should offer courses and learning opportunities for pre-service teachers where they can see best practices of classroom instruction. They should be able to see that teachers can have a major role in student learning. The use of classroom cases, inviting guest speakers or having successful field experiences may allow pre-service teachers to see that all students can learn under the guidance of effective teachers. It is likely that unsuccessful field experiences might have prevented the senior students to develop beliefs about positive effects of teaching on student learning (Li & Zhang, 2000). This conclusion is consistent with Bandura's (1997) claim that past performance or mastery performances are major predictors of efficacy beliefs. While successful performances are associated with higher efficacy beliefs, unsuccessful performances lower efficacy beliefs. Being placed in supportive and protective field schools will also increase pre-service teachers' efficacy beliefs (Woolfolk Hoy, 2000). Therefore, teacher education faculty members, field supervisors and cooperating teachers should work together to increase the quality of field experiences so that senior-level pre-service teachers can improve their mathematics teaching outcome expectations as well as personal mathematics teaching efficacy beliefs.

In this study, most of the participants (73.6%; 234 out of 318) of them were elementary education majors and 84 (26.4%) of them were secondary mathematics education majors. As reported above, while there was a significant difference between the personal mathematics teaching efficacy scores of elementary and secondary education pre-service teachers, favoring elementary education majors, no statistical difference was observed in mathematics teaching outcome expectancy scores. The elementary pre-service teachers' significantly higher levels of personal mathematics teaching efficacy beliefs can be attributed to the relatively basic level of elementary school mathematics. It is possible that secondary mathematics teachers who take several college level mathematics courses might be frustrated with the high demand of those courses and teaching mathematics to high school students. We can expect that when the elementary teachers begin their first year of teaching their confidence level may slide down considerably as they see challenges and demands of teaching mathematics even in elementary schools. Regarding mathematics teaching outcome expectancy scores, the elementary and secondary mathematics pre-service teachers did not differ significantly. Both groups of pre-service teachers have similar levels of beliefs about the power of teaching. Perhaps they share common concerns regarding the outcome of teaching. They may all feel that making an impact on student learning is not an easy task as they find managing student behaviors difficult. For novice or beginning teachers, classroom management and student motivation are two important constructs related to their efficacy beliefs. Beginning teachers find these two areas as their greatest concerns (Woolfolk & Hoy, 1990). Hence, it is possible that pre-service teachers' common problems in classroom management may have lowered their outcome expectancy scores. As a result, it would be wise to help them improve their classroom management and student motivation skills. Teacher education programs may need to put extra effort on these two important issues for beginning and pre-service teachers. For example, teacher educators can use video cases to allow pre-service teachers see how experienced teachers manage student behaviors and organize the classroom environment to promote student learning. Additionally, various motivation strategies can be introduced to pre-service teachers so that they can feel more comfortable in increasing student motivation.

There is empirical evidence showing that teachers teaching at different school levels have different levels of efficacy beliefs, including personal teaching efficacy and outcome expectations

(Anderson et al.; 1988, Evans & Tribble, 1986; Greenwood et al., 1990; Lee et al., 1991; Tschannen-Moran & Woolfolk Hoy, 2007). In particular, researchers have found out that kindergarten and elementary school teachers, in general, have higher personal teaching efficacy beliefs than middle and secondary schools teachers (Evans & Tribble 1986, Greenwood et al., 1990, Taimalu & Oim, 2005; Tchannen-Moran & Woolfolk Hoy, 2007). On the other hand, an earlier study (Lee et al., 1991) reported that teachers of large secondary schools show higher personal teaching efficacy beliefs than teachers of elementary schools. Thus, including the present study, research results do not clearly indicate whether there is a consistent difference between elementary and secondary teachers' personal teaching efficacy beliefs. Also, these studies mainly investigated in-service or practicing teachers' teaching efficacy beliefs; so future research is needed to investigate the effect of school level of teaching on efficacy beliefs for teaching.

Teaching efficacy beliefs have been assessed by several different measures based relatively different theoretical frameworks, including the Rand measure, Guskey measure, Gibson and Dembo's teacher efficacy scale, the Webb scale and Bandura's teacher efficacy scale (Woolfolk Hoy, Hoy, & Davis, 2009). In this study, the Mathematics Teaching Efficacy Belief Instrument (MTEBI; Enochs, Smith, & Huinker, 2000) was used to measure pre-service teachers' efficacy beliefs for teaching. There are a number of problems with the reliability and validity of each instrument (Tschannen-Moran & Woolfolk Hoy, 2001). For example, although the MTEBI, the instrument used in this study, was a valid and reliable assessment of pre-service mathematics teachers' personal mathematics teaching efficacy and mathematics teaching outcome expectancy beliefs, there needs to be extra validity studies to collect evidence for predictive validity. There is evidence showing that these measures are only moderately correlated (Tschannen-Moran & Woolfolk Hoy, 2001). As a result, the findings of this study may be limited to the scale used. It is suggested that similar studies measuring the same construct with different instruments will increase the quality of the interpretations of the findings. Additionally, the readers should be cautioned that the effect sizes were considerably low for all variables so the statistical significances should be carefully interpreted and further studies yielding moderate effect sizes are needed for stronger interpretations. As a final suggestion, future research studies may investigate how to improve pre-service teachers' teaching efficacy beliefs as a continuation of current research efforts.

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