TEACHERS' PERCEIVED EFFICACY BELIEFS AND PERCEPTIONS REGARDING THE IMPLEMENTATION OF THE 2004 PRIMARY MATHEMATICS CURRICULUM

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Approval of the Graduate School of Social Sciences

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ABSTRACT

TEACHERS' PERCEIVED EFFICACY BELIEFS AND PERCEPTIONS REGARDING THE IMPLEMENTATION OF 2004 PRIMARY MATHEMATICS CURRICULUM

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The purpose of this study was to investigate primary school and mathematics teachers' efficacy beliefs and perceptions in the context of the new primary mathematics curriculum and identify differences, if any, in teachers' efficacy beliefs and perceptions based on their area of certification, gender, experience and number of students in classroom.

The sample consisted of 805 teachers, 696 of whom were primary and 105 of whom were mathematics teachers working in elementary schools located in Mersin, Eskişehir, Bolu, Ankara and İstanbul. The questionnaire administered to participants was adapted by the researcher throughout the study. Results of exploratory factor analysis suggested six dimensions: Utility and Impact of the Curriculum, Impact of the Curriculum regarding Efficacy Beliefs, Efficacy Beliefs regarding the New Curriculum, Utilization of Curriculum, Utilization of Special Techniques, and Teachers' Sense of Efficacy.

The results of the MANOVA analysis indicated that teachers' area of certification and experience had a significant role on the collective dependent

variables, while number of students and gender did not. Analysis further revealed that primary teachers had significantly stronger efficacy beliefs about the new curriculum than mathematics teachers. Moreover, teachers with 11-15 and 21 and more years of experience were significantly found to perceive a higher utilization of special techniques than teachers with 10 years or less experience. In a similar sense, teachers with 16-20 years of experience were found to have a significant higher perceived utilization of special techniques than teachers with 5 years or less experience.

Keywords: Teachers' Efficacy Beliefs, Teachers' Perceptions about the Curriculum, New Elementary Mathematics Curriculum

ÖZ

ÖĞRETMENLERİN 2004 İLKÖĞRETİM MATEMATİK ÖĞRETİM PROGRAMININ UYGULANMASINA İLİŞKİN ÖZ YÖNELİK YETERLİK İNANIŞLARI VE ALGILARI

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Bu çalışmanın temel amacı sınıf öğretmenleri ve ilköğretim ikinci kademe matematik öğretmenlerinin 2004 matematik öğretim programının uygulanma süreci hakkındaki algılarını ve öz yeterlik inanışlarını incelemektir. Çalışma kapsamında öğretmenlerin programa yönelik genel algıları ve öz yeterlik inanışlarının öğretmenlerin branşına, cinsiyetine, kıdemine ve sınıf mevcuduna göre farklılık gösterip göstermediği incelenmiştir.

Çalışmanın örneklemini Mersin, Eskişehir, Bolu, Ankara ve İstanbul'da bulunan ve rastgele seçilen 57 okulda çalışan 805 öğretmen oluşturmaktadır. Öğretmenlerin 696'sı sınıf, 109'u matematik öğretmenidir. Çalışma kapsamında başka bir ölçekten Türkçeye uyarlanarak geliştirilen bir ölçek kullanılmıştır. Yapılan faktör analizi sonucunda ölçeğin boyutları şu şekilde belirlenmiştir: Öğretim programının kullanılabilirliği ve etkisi hakkındaki inanışlar, Öz yeterlik algıları doğrultusunda programın etkisine yönelik inanışlar, Öğretim programını uygulayabilmeye yönelik öz yeterlik inanışları, Öğretim programının uygulanışı hakkındaki algılar, Farklı yöntem

ve metotları uygulama düzeyi hakkındaki algılar ve Öğretmenlik mesleğine yönelik genel öz yeterlik algıları.

Çoklu varyans analizi sonuçlarına göre öğretmenlerin branşı ve kıdemi programa yönelik inanış ve öz yeterlik algılarında istatistiksel olarak anlamlı bir fark yaratmaktadır. Devamında yer alan tekli varyans analizleri, sınıf öğretmenlerinin matematik öğretmenlerine göre programa yönelik daha yüksek yeterlik algılarına sahip olduklarını göstermektedir. Aynı zamanda, 11–15 yıl deneyim aralığında bulunan ve 21 yıldan daha çok deneyime sahip olan öğretmenlerin, 10 yıldan daha az deneyime sahip olan öğretmenlere göre derslerinde bazı teknik ve yöntemleri istatistiksel anlamlı olarak daha sık kullandıkları görülmektedir. Benzer sonuç 16–20 yıl aralığında deneyime sahip olan öğretmenlerle 5 yıldan daha az deneyime sahip olan öğretmenler için de geçerlidir.

Anahtar Kelimeler: Öğretmenlerin Öz Yeterlik İnanışları, Programa Yönelik Algıları, Yeni İlköğretim Matematik Programı

To My Father, Mother and Sister

Who have always shown their trust in me

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LIST OF ABBREVIATIONS

ABBREVIATIONS

EFA: Exploratory Factor Analysis

KMO: Kaiser-Meyer-Olkin Measure of Sampling Adequacy

MANOVA: Multivariate Analysis of Variance

MNE: Ministry of National Education

TTKB: The Authority of Turkish Board of Education

Df: Degree of freedom

f: Frequency

N: Sample size

p: Significance level

M: Mean

SD: Standard deviation

UI: Utility and Impact of the Curriculum

IRE: Impact of the Curriculum Regarding Efficacy Beliefs

EB: Efficacy Beliefs Regarding the New Curriculum

UC: Utilization of Curriculum

UT: Utilization of Special Techniques

TSE: Teachers' Sense of Efficacy

CHAPTER I

INTRODUCTION

"The mediocre teacher tells. The good teacher explains. The superior teacher demonstrates. The great teacher inspires."

William Arthur Ward

The quote above clearly indicates how important "teaching" is. In fact, it asserts the great importance of how the teacher acts rather than what the teacher just simply says or tells. The teacher is also considered to be a significant element in the border between teaching and the curriculum. Hence, no matter what the curriculum suggests, it is the teacher who makes the ultimate decisions about what is going on in the classroom. In this sense, any curriculum change should pay attention to what teachers know and believe.

Also, it is important to consider how teachers' beliefs and perceptions about the change in curriculum affect their practices. The purpose of this study was to investigate teachers' efficacy beliefs about the implementation procedures in the context of the new national mathematics curriculum in Turkey. The 2004 curriculum began to be officially implemented in the 2005-2006 academic year throughout Turkish schools and teachers played an important role in this process since they are the stakeholders whose understanding of the curriculum has direct consequences in student learning.

In fact, teachers' potential to learn and adapt to innovations can lead to students' learning and acquaintance with the innovations in classrooms. In that sense, teachers are seen as both the means and ends of reform movements (Cohen & Hill, 2001). In fact, teachers' sense of efficacy and reforms in curriculum has many common points (Smith, 1996). However, the changes teachers apply to their practices and adaptation to innovations require that they have a high sense of efficacy which is one type of belief teachers possess and is defined as "teachers' beliefs in their ability to actualize the desired outcomes" (Wheatley, 2005, p. 748).

Nevertheless, while both the implementation of reform in mathematics education and teacher efficacy beliefs have been studied in depth over the years, there have been very few research studies completed on the possible connection between the two. The current study aimed to make a contribution to teacher efficacy research in the context of a major curriculum change initiated in Turkey in 2005-2006 academic year.

1.1. Purpose of the Study

The main purpose of this study was to examine primary school and mathematics teachers' beliefs and perceptions about the new curriculum and to have a general understanding of their sense of efficacy beliefs. Another purpose of the study was to identify differences, if any, in teachers' beliefs and perceptions based on their area of certification, gender, experience and number of students in the classroom. Moreover, since there is no previously developed instrument attempting to measure teachers' efficacy beliefs and perceptions regarding the new curriculum, one of the major aims of the study was to develop a scale by adapting it from another instrument developed in the USA for a similar purpose.

1.2. Research Questions and Hypotheses

The specific research questions addressed in this study were:

1. What is the portrait of teachers with respect to the following variables: Utility and Impact of the new curriculum (UI), Impact of the curriculum regarding Efficacy beliefs (IRE), Efficacy beliefs regarding the new curriculum (EB), Utilization of Curriculum (UC), Utilization of Special Techniques (UT) and Teachers' Sense of Efficacy beliefs (TSE)?

2. Is there a statistically significant difference between teachers' perceptions and beliefs regarding the curriculum and general efficacy beliefs in respect to teachers' area of certification (primary or mathematics teacher)?

3. Is there a statistically significant difference between female and male teachers' perceptions and beliefs regarding the curriculum and general efficacy beliefs?

4. Is there a statistically significant difference between teachers' perceptions and beliefs regarding the curriculum and general efficacy beliefs in respect to their years of experience (5 years or less, 6-10, 11-15, 16-20 and 20 years or more)?

5. Is there a statistically significant difference between teachers' perceptions and beliefs regarding the curriculum and general efficacy beliefs in respect to the number of students in the classroom (19 or less, 20-29, 30-39 and 40 or more students)?

Hypotheses in the study were formulated as follows:

1. There is no statistically significant mean difference between teachers' perceptions and beliefs regarding the curriculum and general efficacy beliefs by area of certification (primary or mathematics teacher).

2. There is no statistically significant mean difference between female and male teachers' perceptions and beliefs regarding the curriculum and general efficacy beliefs.

3. There is no statistically significant mean difference between teachers' perceptions and beliefs regarding the curriculum and general efficacy beliefs in respect to teachers' years of experience (5 years or less, 6-10, 11-15, 16-20 and 20 years or more).

4. There is no statistically significant mean difference between teachers' perceptions and beliefs regarding the curriculum and general efficacy beliefs in respect to the number of students in the classroom (19 or less, 20-29, 30-39 and 40 or more students).

1.3. Significance of the Study

Teacher efficacy beliefs have been found to have various relationships with different characteristics and practices of teachers as well as students. Indeed, there are many studies in the literature attempting to explain this construct. However, there are no studies about teachers' efficacy beliefs regarding the new curriculum in Turkey. Thus, the current study contributes to the literature in the context of the curricular change held in Turkey. This was done by analyzing teachers' beliefs,

especially their efficacy beliefs, regarding the new mathematics curriculum that has been implemented since 2005.

Teachers' sense of efficacy has been described as "context and situation specific" (Bandura, 1986). Thus, many scales have been developed to serve different purposes, and some of them have been extensively used in different cultures. Moreover, Enochs and Riggs (1990) stated that "Specificity is especially necessary when studying elementary science teaching beliefs and behavior, since elementary teachers teach all subjects and may not be equally effective in teaching all of them" (p.3). Therefore, for the specific purpose of the study, a questionnaire was adapted and utilized throughout the study to assess teachers' efficacy beliefs and perceptions regarding the implementation of the new curriculum.

To sum up, this study aimed to contribute to the literature by analyzing primary and mathematics teachers' efficacy beliefs and perceptions regarding the new elementary mathematics curriculum by adapting and validating a suitable instrument.

1.4. Assumptions

The study is based on the following assumptions:

1. The sample reflects the target population.

2. The survey developed is qualified enough to serve the purpose of the study.

3. The teachers who participated in the study responded to the items sincerely and impartially reflected their opinions.

1.5. Limitations

1. The study is limited in that data were collected only from the primary and mathematics teachers who were working in the schools in the academic year of 2007-2008 in the regions of the Ankara, İstanbul, Mersin, Eskişehir and Bolu cities.

2. This study is limited with the teachers' selected characteristics.

3. The findings of this study do not reflect what actually happens in the classroom. They are limited to the perceptions of teachers about the implementation of the new curriculum.

1.6. Definitions of Important Terms

Primary School Teacher: Teachers who teach between 1st and 5th grades are referred to as primary teachers in the study.

Mathematics Teacher: Teachers who teach mathematics in the upper primary level, between 6th and 8th grades, are referred to as mathematics teachers in the study.

New Elementary Mathematics Curriculum: Curriculum is all planned learning for which the school is responsible. New mathematics curriculum refers to the mathematics curriculum that has been conducted since 2005 in the elementary grades in Turkey.

Teacher Efficacy: Teachers' beliefs in themselves to actualize the desired outcome and their beliefs in their potential abilities to realize these outcomes (Wheatley, 2005, p. 748).

CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter describes the underlying theory that comprises the conceptual framework for this study, as well as previous studies that form the empirical framework of this study. The review of literature consists of five sections. In the first section, the construct of self-efficacy is introduced. Second, teachers' self-efficacy beliefs are presented in a detailed historical review. In the third section, teachers' self-efficacy beliefs are handled especially within the curricular changes and reform process and in the fourth section, teachers' adaptation processes to the curricular changes are presented throughout the reform processes in other countries. In the fifth and the last section, the primary curricular change held in Turkey is emphasized with the focus of teachers.

2.1. The Construct of Self-efficacy

One of the beliefs teachers possess is their sense of efficacy. In this section various definitions of self-efficacy will be presented. Secondly, the sources of self-efficacy will be indicated. Thirdly, the difference of efficacy from other self constructs will be maintained.

To begin with, there are a couple of definitions of self-efficacy – " a cornerstone of social cognitive theory" (Pajares, 1992, p. 308). Firstly, Bandura (1986) defined self-efficacy as "People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p.391). Alternatively, Gist and Mitchell (1992) defined it as "a person's estimate of his or her capacity to orchestrate performance on a specific task" (p.183).

Self-efficacy is important for human-beings; therefore, it is also important to understand how efficacy beliefs are formed. According to Bandura (1977), there are four sources of efficacy: "beliefs about self-efficacy arise from the individual history of achievement [mastery experiences]…from observations of what others are able to

accomplish [vicarious experiences]…attempts of others to mold feelings of self-efficacy through persuasion [verbal persuasion] and from consideration of one's own physiological state [psychological arousal]" (p. 785). In other words, mastery experiences, vicarious experiences (modeling), social/verbal persuasion and psychological/emotional arousal are the four roots of efficacy. Gist and Mitchell (1992) also asserted that while experiences of one-self have a direct effect on one's self-efficacy, the other sources have indirect effects and although all of the sources are influential, self-efficacy is generally "the assimilation and integration of multiple performance determinants" (p. 188).

Other self constructs are generally confused with self-efficacy. One of them is self-esteem. However, self-esteem is told to be evaluative of one-self while self-efficacy is not (Gist & Mitchell, 1992). In the same manner, self-efficacy is stated to to differ from other constructs as "(a) Self-efficacy implies an internal attribution (I am the cause of the action) (b) it is prospective, referring to future behaviors, and (c) it is an operative construct, which means that this cognition is very proximal to the critical behavior-and thus a good predictor of actual behavior" (Schwarzer & Schmitz, 2004, p.230). Anita Woolfolk, on the other hand, stated in her interview with Shaughnessy (2004) that, "Self-efficacy is the most useful self-schema for education because it relates to choices and actions that affect learning such as goal setting, persistence, resilience, effort and strategy" (p. 172).

The aim of this study is to analyze *teachers'* self-efficacy. *Teachers*' sense of efficacy is defined as "their belief in their ability to have a positive effect on student learning" (Ashton, 1985, p. 142). Moreover, it affects teachers' effort put into the daily duties of their work. Indeed, Bandura (1997) indicated that "Teachers' perceived efficacy rests much more than the ability to transmit subject matter" (p.243) .The concept is presented in a detailed review in the next section.

2.2. Teachers' Sense of Efficacy

Teachers' sense of efficacy has been defined as "context and situation specific" (Bandura, 1986). Thus, many scales have been developed to serve different purposes, and some of them have been extensively used in different cultures. This section gives historical information about the several measurements utilized in

teacher efficacy research and it aims to describe the relationships of efficacy with the other characteristics of teachers with a brief summary provided at the end.

History related to the various measurements utilized in teacher efficacy research stretches approximately 40 years back. Sense of efficacy first emerged from Rotter's locus of control theory (1966) and then continued with social cognitive theory of Bandura (1977). First, the instruments that developed according to the Rotter's theory were the Rand Measurement, Responsibility for Student Achievement (Guskey, 1988), Teacher Locus of Control (Rose & Medway, 1981) and the Webb Efficacy Scale (Ashton, Webb, & Doda, 1983). All of these instruments have variations in their construction and use.

To begin with, in the Rand Measurement, there were two 5-point Likert type items which were administered to teachers. These two items were: (a) "When it comes right down to it, a teacher really can't do much because a student's motivation and performance depends on his or her home environment." (b) "If I really try hard, I can get through to even the most difficult or unmotivated students." These two items were grouped as the ones outside of the teacher's control which is mentioned as *external* to teachers and the other one was related to teacher activities and behaviors which are under the control of teachers. The controllable behaviors were termed as *internal* to teachers (Tschannen-Moran, Hoy & Hoy, 1998). It was later asserted that the two Rand items were "by no means perfect measures of efficacy" as there had been false results according to observations and interviews done with teachers (Ashton et al., 1982, p.135).

Secondly, Guskey developed a 30-item instrument in 1981 called Responsibility for Student Achievement (RSA). RSA was composed of two subscales. One of the subscales was related to the teachers' self-responsibility of efficacy regarding classroom successes (R+) and the other to classroom failures (R-). These subscales are treated independently since a .21 non significant correlation was found between perceived responsibility for positive and negative classroom events (Guskey, 1988). Moreover, the items had 2 choices. A sample item was: "If a student does well in your class, would it probably be (a) because that student had natural ability to do well or (b) because of the encouragement you offered" (Guskey, 1981 cited in Tschannen-Moran, Hoy & Hoy, 1998).

In the same year, Rose and Medway (1981) developed a measurement tool for teacher efficacy called teacher locus of control (TLC) which consisted of 28 forced-choice items. This scale aimed to measure elementary teachers' perceptions of control about classroom actions. The scale included several items which corresponded to difficulties (I-) or facilities (I+) about classroom events. The higher the scores, the more the teachers are considered to feel responsible for classroom events or to possess higher internality. In the final phase of the scale development, it was administered to 89 4th grade teachers. At the end of the study, the researchers claimed that the TLC was a more reliable and valid instrument than the Rotter's internal-external scale for measuring teachers' beliefs about their control on classroom situations. They found that teachers who had higher internal rates had fewer disciplinary problems in their classrooms and more self-directed students based on the classroom observations the researchers made. Moreover TLC was mostly related to the implementation of innovative educational practices such as the utilization of classroom materials, making activities and using grouping of students in the middle elementary grades. A sample item was: "1.When the grades of your students improve it is more likely a. because you find ways to motivate the students. b. because the students were trying harder to do well" (Rose & Medway, 1981, p. 189).

Finally, the Webb Efficacy Scale was a 7-item forced-choice instrument. A sample item was: "1. A. teacher should not be expected to reach every child; some students are not going to make academic progress. B. Every child is reachable. It is a teachers' obligation to see to it that every child makes academic progress" (Ashton et al., 1982, p.33).The teacher chooses A or B depending on which choice s/he agrees with the most strongly.

The other roots of teacher efficacy instruments were grounded from the social cognitive theory of Bandura firstly in 1977. Bandura noted that efficacy has two dimensions which are self-efficacy and outcome expectancy. Based on this argument, researchers investigated new tools to measure this construct. Gibson & Dembo (1984) were the first researchers to attempt to resolve this issue.

Gibson and Dembo (1984) developed a 30-item 6-point Likert scale ranging from "strongly disagree" to "strongly agree" called the teacher efficacy scale (TES).

The aim of the TES was to measure "global (non-context specific) self-efficacy" (Kieffer & Henson, 2000). The instrument revealed a two-factor structure which is interpreted by the researchers as self-efficacy and outcome expectancy grounded from the social cognitive theory of Bandura. The first factor was termed as personal teaching efficacy. It aims at determining whether teachers' had reached the desired outcomes described as self-efficacy while the other one – general teacher efficacy, reflects outcome expectancy, explaining how much the teacher can control the environment. When the Rand efficacy items were included in the study, Rand item 1 generally loaded on the GTE (General Teacher Efficacy) factor while Rand item 2 usually loaded on the PTE (Personal Teaching Efficacy) factor. However, several of the 30 items loaded on both of the factors making the factor structure unstable. Thereby, the scale was considered to be problematic as an obscure meaning of the factors aroused. Moreover, the researchers concluded that teacher efficacy is a multi-dimensional construct. A sample item from the PTE factor was: "When a student does better than usual, many times it is because I exerted a little extra effort." A sample item from GTE factor is: "A teacher is very limited in what he/she can achieve because a student's home environment is a large influence on his/her achievement" (Gibson &Dembo, 1984, p. 573).

In particular, Tschannen-Moran et al., (1998) criticized the association of self-efficacy and outcome expectancy dimensions of Bandura (1977) with the PTE and GTE subscales. TES was found to fit reasonably well to the model in the confirmatory factor analysis (CFA) for 252 undergraduate students (Kieffer & Henson, 2000). Nevertheless, the usage of GTE subscale to measure teacher efficacy has been found debatable (Henson, Kogan & Vacha-Haase, 2001) and TES was claimed to have several psychometric weaknesses (Roberts & Henson, 2001) although it was accepted as a "standard" instrument for teacher efficacy (Ross, 1994, p.382). In addition, Deemer & Minke (1999) altered the wording of items in TES in order to prevent participants' responses from being influenced and they asserted that TES was unidimensional.

The above scales were not the only scales constructed. Self-efficacy is defined as *situation-specific* construct rather than a *broad* construct; therefore Science Teaching Efficacy Belief Instrument (STEBI) was developed to meet this

demand. Enochs and Riggs (1990) claimed that elementary science education can be developed only if elementary teachers are voluntarily devoted to the curriculum and they admitted that "Specificity is especially necessary when studying elementary science teaching beliefs and behavior, since elementary teachers teach all subjects and may not be equally effective in teaching all of them" (p.3). Therefore, they developed a scale called Science Teaching Efficacy Belief Instrument-B (STEBI-B) for pre-service elementary teachers by modifying the scale by rewording the items to the future tense in STEBI-A developed by Riggs in 1988 for in-service teachers. The scale was a 5-point, Likert type scale; including 25 items in which 13 were positively worded and 12 negatively. The scale was administered to 212 pre-service teachers and revised so that the final version contained only 23 items. These 13 items were distributed among two sub-scales:13 items were under the personal science teaching efficacy factor and 10 were under the science teaching outcome expectancy factor having reliability coefficients .90 and .76 respectively. A sample item was for example: "Even if I try hard, I will not teach science as well as I will most subjects" (p.5). According to Henson et al., (2001), since STEBI was developed from the TES, the reliability results scores of the STEBI were similar to the TES.

Wenner (2001) compared pre-service and in-service teachers in terms of their perceived efficacy to affect student learning and motivation using the STEBI instrument and reworded "science" with "mathematics" in the items. He analyzed results in terms of two factors. The first factor included 11 items which corresponded to "confidence" levels, and the other factor included 9 items which corresponded to the "accountability" levels. In the confidence factor, experience lead to greater efficacy. However, the pre-service teachers welcomed the students' questions more, they had greater confidence in explaining mathematics concepts and they were at parity in finding better ways to teach mathematics with in-service teachers. In the accountability factor, on the other hand, prospective teachers generally held themselves more responsible for the students' failure or success. For example, they held the belief that their teaching would overcome students' inadequate background in mathematics. In conclusion, Wenner (2001) supported the idea that experience leads to greater efficacy in teachers.

Ashton, Buhr and Crocker (1984) thought that social desirability was an important factor in the self-referenced vignettes of self-efficacy. In other words, they claimed that teachers valued their sense-of efficacy according to other teachers as a norm-referenced construct such as "Am I more or less effective than other teachers?" rather than the question of "How effective am I?" (Ashton et al., p.31). Moreover, they claimed that teaching efficacy and personal efficacy together form the personal teaching efficacy as shown in Figure 2.1 which is the purpose of their study.

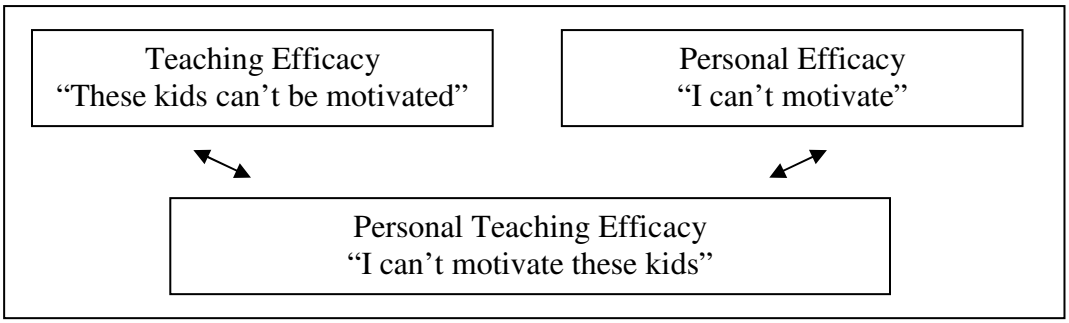

Figure 2.1: "Teachers' Sense of Efficacy"
(Source: Ashton, et. al., 1984)

The researchers developed an instrument consisting of 50 vignettes with different tasks of teachers such as motivation, assessment, discipline, and working with parents. The teachers were requested to respond to the items first by indicating if they felt (1) ineffective, (4) moderately effective to (7) extremely effective (self-referenced) for the 50 vignettes. Moreover, they gave responses to the same items by comparing themselves with other teachers such as (1) much less effective than most teachers, (4) through about as effective as other teachers, and (7) much more effective than other teachers (norm-referenced). The results showed no significant differences between self-and norm-referenced measures. Nevertheless, while the norm-referenced measure did correlate significantly with the efficacy score measured by the Rand items, the self-referenced measure did not. Also, the correlation of self-referenced items with the Marlowe-Crowne score was significant while the correlation of norm-referenced scores was not significant, being zero. Researchers concluded that teachers perceive their efficacy according to other teachers, and responded to the items in terms of the comparison of their performance related to

their colleagues. A sample item is: “You spent hours planning a unit on a very difficult topic. Soon after you begin the lesson, it becomes apparent that the students have no idea what you are talking about. How effective would you be in identifying the problem and adapting the lesson so that the students can understand your presentation” (Ashton et al., 1982, p. 36)?

On the other hand, Guskey & Passaro (1994) investigated the teacher efficacy construct in a different sense. They claimed that the extension of Bandura’s conception of efficacy and outcome expectancies to personal and teaching efficacy in the studies of Woolfolk and Hoy (1990) and Gibson and Dembo (1984) are not explicit. Moreover, they claimed that the items in the previous scales were biased because of using “I can” in the positive items, having an internal focus and using “Teacher cannot” in negative items, having an external focus. Therefore, they adapted the Gibson & Dembo (1984) scale in order to obtain equal distribution in wording as shown in the Figure 2.2.

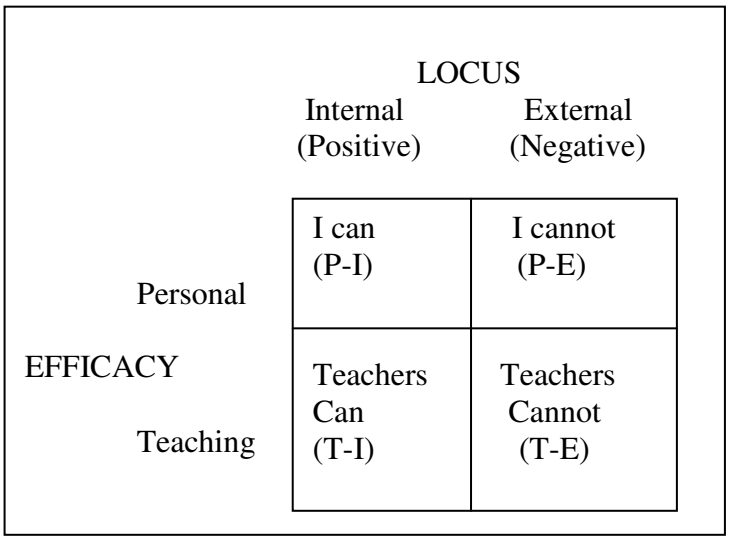

Figure 2.2: Efficacy constructs dimensions
(Source: Guskey & Passaro, 1994)

The final scale of Guskey and Passaro consisted of 21 6-point Likert scale items ranging from “strongly disagree” to “strongly agree” and was administered to 342 elementary prospective and experienced teachers. Two factors emerged in the factor analysis. Researchers maintained that the results did not indicate a personal

versus teaching efficacy distinction but an internal-external distinction similar to locus-of-control (Guskey &Passaro, 1994). Nevertheless, after that, they noted "the distinction is not the same as locus of control, because these two factors operate fairly independently (Guskey, 1998).

Enochs, Smith and Huinker (2000) designed a study to test the validity of the MTEBI (Mathematics Teaching Efficacy Belief Instrument) with 324 pre-service teachers. The MTEBI is comprised of two subscales which are personal mathematics teaching efficacy (PMTE) and mathematics teaching outcome expectancy (MTOE) which consisted of 23 items. However, two of the items were omitted because of having less correlation with the total scale. Reliability analysis revealed .88 for the PMTE scale and .77 for the MTOE scale. These results ensured the construct validity of the scale. In fact, as well as the STEBI Instrument (Enochs & Riggs, 1990), the MTEBI was found to be a valid and reliable instrument for areas of research related to mathematics teaching specifically.

Kieffer and Henson (2000) developed a new teacher efficacy instrument called Sources of Self-Efficacy Inventory (SOSI) which consists of four subscales regarding the four sources of self-efficacy (Bandura, 1977) that aimed to measure teachers' efficacy beliefs. The scale was administered to 252 undergraduate students taking an educational psychology course that particular semester. However, the results of the EFA (Exploratory Factor Analysis) did not support the four subscales.

Bandura (n.d.) developed his own teacher self-efficacy scale. The scale consisted of 30 items and seven subscales which are efficacy to influence decision making, efficacy to influence school resources instructional self-efficacy, disciplinary self-efficacy, efficacy to enlist parent involvement, efficacy to enlist community involvement and lastly efficacy to create a positive school climate. The response format changed from 1(nothing), 3 (very little), 5 (some influence), 7 (quite a bit), 9 (a great deal). Bandura thought that teacher self-efficacy should be multidimensional since there are various tasks teachers participate in within their profession (Bandura, 2006). A sample item is: "How much can you influence the decisions that are made in the school?" from the sub-dimension of efficacy to influence decision making.

Another scale was developed by Tschannen-Moran and Woolfolk Hoy (2001). They stated that the level of specifity in an instrument depends on the purpose of the researcher. As a result, the newly constructed instrument called Ohio State Teacher Self-Efficacy (OSTES) was developed to measure teacher self-efficacy after three testing procedures with both prospective and in-service teachers. The results of factor analysis yielded three factor structures which are efficacy for instructional strategies, efficacy for classroom management and efficacy for student engagement with reliability coefficients of .86, .86 and .81 respectively. Two versions were formed consisting of 24 items in the long format and 12 items in the short format validating the equivalence to each other which have 9-point Likert scale similar to the instrument developed by Bandura. Both versions were also suggested to be used in unidimensional framework. Moreover, the total scores obtained from the OSTES correlated strongly (r= .64) with the personal teaching efficacy scores of Gibson and Dembo's (1984) instrument. Furthermore, GTE and other efficacy measures showed a slight correlation, once more indicating its lack of validity to measure efficacy. The OSTES tried to assess a broader context in teacher efficacy by presenting the teachers' daily work with the requested needs in their job. They added that "The OSTES is a promising tool for capturing this powerful construct and putting it to constructive use" (Tschannen-Moran & Woolfolk Hoy, 2001, p. 803).

Various studies have been carried out on the OSTES. Firstly, Roberts and Henson (2001) questioned whether teacher efficacy was unidimensional or multidimensional. They evaluated the construct validity of the OSTES with a sample of 183 in-service teachers. In conclusion, a two-factor solution was found (Efficacy for Student Engagement and Efficacy for Instructional Strategies) by means of CFA and the three- factor solution was not supported. Indeed, based on EFA, parallel analysis did not support the existence of the third factor, Efficacy in Classroom Management. The results revealed a one-factor solution rather than three. However, two-factor solution offers the best fit indices to the data. They further added that by different samples, a one-factor solution may yield a strong fit as in the multidimensional model.Labone (2004), on the other hand, noted that for the item "How much can you assist families in helping their children to do well in school?" in OSTES that it is important for teachers to feel a strong sense of efficacy in promoting

relationships with a wide range of people as teachers and students come from very different backgrounds, and engagement of families in school relations becomes very difficult.

Capa, Cakiroglu and Sarikaya (2005) adapted the Teacher Efficacy Scale (Tschannen-Moran& Woolfolk Hoy, 2001) into the Turkish language which was also used in the current study for data collection. The adapted nine-point scale had been administered to 628 pre-service teachers studying in the education faculty of six distinct universities. For the construct validation of the scale, confirmatory factor analysis and Rasch analysis was done. A model having three factors emerged and the data was observed to fit the hypothesized model examining the indicative values and all factors were significantly correlated with each other with correlations of .75, .74 and .66. The internal consistency reliabilities of the total scale were .93 and for the three subscale .82 for Student Engagement (SE), .86 for Instructional Strategies (IS) and .84 for Classroom Management (CM). Therefore, the Turkish version of the Teachers' Sense of Efficacy Scale (TTSES) was confirmed to be a valid and reliable instrument for Turkish prospective teachers. The researchers suggested that the scale may also be used with in-service teachers from different area of specializations and from different settings.

The literature indicates one study that has employed the TTSES in Turkey. Cerit (2007) investigated 226 primary school teachers' sense of efficacy beliefs who were working in Bolu by employing the long version of the TTSES adapted to Turkish language by Capa, Cakiroglu and Sarikaya (2005) in 5 point Likert-type. The total reliability coefficient of the scale was found as .91. He claimed that primary teachers teach the students all subjects from 1^{st} to 5^{th} grade; therefore, their sense of efficacy to accomplish student learning is important. Moreover, he examined the effect of gender, education level and experience on the teachers' efficacy beliefs. The results indicated that teachers' had the lowest mean scores in the student engagement (SE) dimension of the scale. Moreover, while gender and education level were found to have no effect on teachers' efficacy beliefs, experience was found to have significant effect. Finally, teachers' sense of efficacy was observed to decrease while the experience increased.

Besides the English and Turkish version of TSES, Cheung (2006) conducted a study with 725 primary school teachers by using the Chinese version of the short form of TSES. The Cronbach coefficient produced was 0.93 and the factor structure of the scale emerged differently with male (N=115) and female teachers (N=610) that one-factor was extracted in total; however when groups were considered separately; two-factors emerged with male teachers namely efficacy for students' enhancement and discipline. The level of teachers' general efficacy was found as 6.93 and interpreted as high. Moreover, results showed that females had significantly higher efficacy beliefs than males. In addition, general teacher efficacy was found to weakly correlate with teaching experience and educational level was found not to have a significant effect on the general efficacy of Hong Kong primary teachers.

Research done on the conceptual strand of teacher efficacy

Soodak and Podell (1996) investigated the structure of teacher efficacy and questioned the role of outside influences on teachers' beliefs. TES and new items related to outside influences were administered to 310 teachers in a six-point Likert scale. Three uncorrelated factors emerged with reliability coefficients of .80, .73 and .70. These are named as Personal Efficacy (PE), Outcome Efficacy (OE) and Teaching Efficacy (TE). In particular, the researchers believed that PE refers to "teachers' beliefs about their teaching skills" while OE corresponds to their beliefs about the "effectiveness of implementing those skills" (p.409). TE, on the other hand, refers to "teachers' beliefs in their ability to overcome outside influences" such as students' emotional status. They validated the multidimensional model.

Wheatley (2005) questioned in his study whether teacher efficacy really supports democratic teacher education or not. By democratic education, he meant all the student-centered approaches such as "constructivist" teaching and progressive education (p.748). He argued that teacher efficacy research should depend more on interpretation rather than merely being numerical and etiquette of having high or low efficacy beliefs. Moreover, he claimed that although there are so many scales in this area; there is still debate about the meaning and assessment of teacher efficacy. Furthermore, according to Wheatley there are key gaps in teacher efficacy measures. In order to grasp new methods, teachers' efficacy beliefs about learning these

methods are important. Teachers' concerns can include ideas such as "It doesn't work", "It works but I can't do it" or "I can't do it, and it doesn't work anyway, so why learn it" (Wheatley, 2005, p.750). According to Wheatley, an important type of outcome expectancy is teachers' beliefs about the outcomes of using the new curricula or methods *with which they have no skill before.* Moreover, he claimed that teachers generally have *multiple* outcome expectancies such as parent reactions, student motivation or student behaviors, and noise regarding the use of a new method or technique. Therefore, these outcome expectancies can influence teachers' motivation about the usage of the new method. He concluded that if teacher efficacy researchers handle this construct as complex as it is, then it is inevitable for teachers and teacher educators to benefit from them for democratic education.

Goddard and Goddard (2001) stated that the variance in teacher efficacy can be explained by collective teacher efficacy. Skaalvik and Skaalvik (2007) also found teacher efficacy and collective efficacy very related and interpreted this as an effect of vicarious experiences.

Chan (2008) claimed that teacher self-efficacy measures should be domain-specific since the complexity of teachers' job increases after recent reform efforts. He determined six domains which are: "Teaching high able learners, classroom management, guidance and counseling, student engagement, teaching to accommodate diversity and teaching for enriched learning" (Chan, 2008, p. 1060). The classroom management domain was found to be the most difficult area for pre-service and novice teachers.

Correlates of Teachers' Sense of Efficacy

The construct of teacher efficacy has been searched over the years and it is claimed to be the only variable that correlates to both student and teacher characteristics significantly (Tschannen-Moran, Hoy & Hoy, 1998). In this section, relevant studies are presented separately about the relationship of teachers' sense of efficacy beliefs with most widely explored teacher characteristics of experience, gender, age, grade level they teach, teaching area of specialization, job satisfaction, and education level; and students' characteristics such as achievement and affective gains.

Experience: Efficacy is generally found to be malleable in the pre-service years and stable when experience increases. Experience has been reported to correlate positively with personal teaching efficacy (Hoy & Woolfolk, 1993) and negatively with general teaching efficacy (Hoy & Woolfolk, 1993; Ghaith &Yaghi, 1997). Ghaith and Shaaban (1999) pointed out that after 15 years of experience, teachers' concerns decrease in all self, task and impact stages. Moreover, teachers felt more confident about the effectiveness of their efforts in pre-service years (Hoy & Woolfolk, 1990). In fact, Dembo and Gibson (1985) found that teachers are more confident in themselves in the first few years of teaching. Woolfolk Hoy and Spero (2005) indicated an increase in the efficacy beliefs of pre-service teachers while observing a decrease in the first year of teaching.

Gender: Evans and Tribble (1986) found that females have higher total teaching efficacy than males. Nevertheless, there are some studies which indicate no relationship between gender and teacher efficacy (Hoy & Woolfolk, 1993; Ghaith & Shaaban, 1999). In fact, gender has not predicted teacher efficacy as a significant criterion variable (Ross et. al., 1999). Additionally, Brennan and Robison (1995) found no significant difference between male and female university teachers but indicated that male teachers were under the influence of external factors such as student characteristics in effecting their students' to change.

Age: Chester and Beaudin (1996) found that novice teachers who are older than their colleagues reflected more positive changes in their efficacy beliefs while this was not the case for experienced teachers newly hired in urban schools. In addition, availability of resources only affected teachers at young ages not depending on whether teachers were experienced or novice.

Grade Level: Level of teaching was found unrelated to teaching concerns for elementary and middle school teachers (Ghaith & Shaaban, 1999). Experienced teachers felt significantly more efficacious when they taught the youngest children. However, there was no difference in the level of teaching for novice teachers (Tschannen-Moran & Hoy, 2007). Ross (1994) noted declines in teacher efficacy as taught grade levels increased. Nevertheless, Capa (2005) found that elementary school teachers were more efficacious about student engagement than secondary school teachers in their first-year of teaching.

Teaching Area of Specialization: It was found that only the teachers' area of specialization predicted teacher efficacy significantly and secondary school teachers were found to have more confidence in teaching within their subject (Ross et al., 1999).

Job Satisfaction: Hoy and Woolfolk (1993) asserted that job satisfaction is important for teachers' emotional well-being; but feeling well is not enough for teachers to feel capable of motivating their most difficult students. Tschannen-Moran and Hoy (2007) assessed the teachers' mastery experiences which are told to be the most influential in efficacy beliefs by the item: "Rate your satisfaction with your professional development this year", 9-point and 1(nonexistent) to 9(excellent). This was found to be moderately related to Teacher Sense of Efficacy for both novice (experience of 3 years and less) and career (experience of 4 years or more) teachers. Moreover, career teachers rated their satisfaction highly related to the support they get from the administrators, parents and colleagues. In the same study, the support of colleagues made significant contributions to the self-efficacy beliefs of novice teachers.

Teachers' Education Level: Hoy & Woolfolk (1993) found that educational level of teachers was the only personal variable that predicted personal teaching efficacy uniquely. Similarly, Friedman (2003) found that educational background of teachers have significant effects on their efficacy.

Collaboration with Colleagues in Schools: Henson (2001) found collaboration among colleagues related to general teaching efficacy (GTE) but not with personal teaching efficacy (PTE) in the experimental design conducted for one academic year. He interpreted this result as, the more teachers collaborate with their colleagues, the more they believe in their abilities to overcome difficulties and affect learning in a positive manner.

Support from Administration, Colleagues, and Parents– The availability of resources in the School: Conflict with parents was found to relate negatively to teachers' self-efficacy beliefs which emphasized the importance of collaborating and informing parents academically (Skaalvik & Skaalvik, 2007). Tschannen-Moran and Hoy (2007) found that the availability of resources in the school only significantly added to the novice teachers' sense of efficacy rather than career teachers. Yost

(2006) found that teachers who have high efficacy beliefs do not leave the job when the school environment was not supportive; but transfer to other schools. Capa (2005) on the other hand, found that the sense of efficacy beliefs of first-year teachers was positively correlated with principal support while revealing an insignificant correlation with colleague and mentor support.

Pre-service and In-service Training: Cakiroglu (2000) investigated the effect of a one-semester methods course on teachers' sense of efficacy beliefs related to reform efforts. He found that after the course, teachers' personal teaching efficacy beliefs increased significantly and he indicated that it might also be a result of pre-service teachers' field experiences and observing the effects of reform-oriented practices on the students. Swars (2005) also investigated 4 elementary pre-service teachers' perceptions in teaching mathematics at different levels of mathematics teacher efficacy by using the MTEBI and making interviews. The results revealed that the pre-service teacher who reported a lower sense of efficacy reported negative experiences in the school. In contrast, the other pre-service teacher in the same situation who had a higher efficacy viewed this as "an asset for effective teaching of mathematics" (Swars, 2005, p. 144). In addition, use of manipulation was only utilized by the pre-service teacher who had the highest degree of mathematics teacher efficacy which was indicated to be a part of the reform vision in mathematics education.

Carleton, Fitch and Krockover (2008) examined the effect of a one year long in-service teacher education program on teachers' efficacy and attitudes by aiming to provide teachers experiences about four sources of efficacy. The teachers were administered to the Science Teaching Efficacy Belief Instrument adapted from Friedman and Kass, (2002) and Attitudes towards Teaching and Teaching Science instruments. The results indicated an increase in participants' level of science teacher efficacy beliefs during the program and a significant increase is demonstrated in their attitudes. Three barriers were determined to have caused a decline in teachers' efficacy beliefs through the year: "course teaching load, requirement to cover a large amount of content and class size" (Carleton, Fitch & Krockover, 2008, p.58).

Student achievement and affect: Students' level of ability was found to correlate with teachers' sense of efficacy (Lee, Dedrick & Smith, 1991). Midgley,

Feldlaufer and Eccles (1999) stated that teachers' sense of efficacy plays an important role in students' achievement, In fact, a significant difference in students' perceptions of mathematics between having low-efficacy teachers and high-efficacy teachers especially in the transition from middle to high school was identified. Moreover, Ashton, et al. (1983) indicated significant relationships between teacher efficacy, student-teacher interaction and student achievement. However, Heneman III, Kimball and Milanowski (2006) found via TSES did not have a significant effect on student achievement when school characteristics and teacher experience were controlled.

Student Management: Teachers' are found more efficacious when they had more control over the classroom practices (Lee, Dedrick & Smith, 1991). Moreover, Woolfolk, Rosoff and Hoy (1990) found that teachers' sense of efficacy play an important role in managing and motivating students and researchers stated a well-managed class may help teachers to feel more efficacious. Gibson & Dembo (1984) concluded that high-efficacy teachers direct students independently and instruct within small group activities while keeping student on-task. Finally, Ashton et al. (1983) found that teachers' sense of efficacy was negatively related with their strong control of students.

In conclusion, "Teachers' self-efficacy is a little idea with big impact" (Tschannen-Moran & Hoy, 2007, p.954). Teacher efficacy beliefs have been found to have various relationships with different characteristics and practices of teachers and students. The studies up to now, tried to define this construct by utilizing different measures which resulted in various significant results. This study, however, aims to define teacher efficacy in the context of curricular change held in Turkey which has not been searched before. Therefore, it is expected to make a contribution to the literature by analyzing teachers' beliefs especially their efficacy beliefs regarding the new mathematics curriculum that has been implemented since 2005.

2.3. Teachers' Sense of Efficacy and Curriculum Reform Process

Teachers' sense of efficacy is a construct which has attracted a great deal of attention in the last 25 years (Cakiroglu, 2008). This construct has generally been measured quantitatively. Teacher efficacy has also been named as teacher self-efficacy or teachers' sense of efficacy by various researchers. Teacher efficacy was

defined as the teachers' beliefs in themselves to actualize the desired outcome and their beliefs in their potential abilities to realize these outcomes (Wheatley, 2005, p. 748). Since the current study deals with teacher efficacy in the context of a major curriculum change in Turkey, this chapter will pay attention to the literature related to curriculum changes and teachers' role. In fact, the curriculum changes may have many impacts on teachers and as it is a two-way interaction, teachers may also have impact on the process of the curriculum implementation. In the current study, teachers' sense of efficacy is claimed to be a variable which affects teachers' adaptation to the curriculum changes and reform processes. In fact, teachers' sense of efficacy and reforms in curriculum has many common points (Smith, 1996). There are only a few studies conducted on the connection between the two; therefore, they will be presented in detail in this section.

The earliest study conducted on teacher self-efficacy was by Berman and McLaughlin (1978). This research was about federal programs supporting the change in the USA. Among many teacher characteristics, teachers' sense of efficacy appeared as the most powerful variable in the implementation and continuation of secondary school projects while teachers' experience was negatively related.

Guskey (1988), on the other hand, investigated the relationship between selected teacher characteristics and attitudes toward instructional innovation. In light of this purpose, 120 elementary and secondary school teachers were chosen to participate in a one-day staff development program. The program focused on mastery learning. The questionnaires administered was a revised revision of Responsibility for Student Achievement (RSA) (Guskey, 1988), two efficacy Rand items, and scales measuring teaching affect, teaching self-concept, and added items related to the congruence, cost, difficulty and importance of utilizing the new reform methods. Results showed no significant difference or relationship in terms of gender, grade level and experience of teachers. The more efficacious teachers found mastery learning—the instructional innovation being investigated—as more congruent with their practices, less difficult to implement and more important. Moreover, teachers who possessed a high level of efficacy were found to be more receptive in the implementation of the instructional innovation.

Battista (1994) examined the effects of teachers' beliefs on the educational reforms. He claimed that teachers' beliefs generally are not compatible to the underlying dimensions of curriculum reform movements despite being referred to as the key persons of the reform. In fact, Battista (1994) asserted that teachers are "products of an old curriculum" (p.5). He observed that this results in teachers to confuse the philosophy of current curriculum and implement an inappropriate curriculum (Battista, 1994). He indicated that it is a "dream" to expect elementary school teachers to teach all subjects equally. Thus, Battista (1994) suggested that teachers need to be specialized only in mathematics and science in order to be congruent with curriculum reform practices. Battista (1994) added that efforts made by teacher educators and school districts can help teachers view the reform practices they feel comfortable with.

De Mesquita and Drake (1994) investigated the sense of efficacy of 133 primary school teachers towards a nongraded state mandated educational reform. They administered a survey which consisted of three parts (a) educational background and experience (b) teachers' attitudes and (c) self-efficacy ratings on 21 specific program attributes. According to the researchers, there may be two possibilities for teachers not to implement the reforms. First, they may have doubts about their ability to implement the curriculum which is considered as personal teaching efficacy. Second, they may think they are able to implement it but they have doubts about the outcome of the implementation which is considered as "general efficacy of the reforms" (De Mesquita & Drake, p. 292). The results obtained indicated that teachers generally accepted the reforms; attitudes were positively related with teachers' efficacy ratings and lower-sense of efficacy resulted when teachers' experience increased.

Smith (1996) argued that the teachers' current practices are not familiar with curricular changes and he claimed that teachers' efficacy beliefs were not related to new demands of the reform progress in curriculum. He stated that teachers have confidence in themselves in the "teaching by telling model." That is, they are confident in merely stating the facts and demonstrating the procedures to the students. This model simplifies the classroom routines so that students listen to the teacher carefully when she or he is lecturing and students ask questions to memorize

better. Homework is assigned at the end of the lesson and in the next lesson a similar scenario is experienced. Students indicate that they have "understood" when they are able to repeat the same procedure in the next hour. Evaluation is also easier in the "telling model," in that, paper-and-pencil standardized tests are utilized. Hence, teachers used to "teaching by telling" find it hard to adjust to curriculum reforms that require different teaching methods. In fact, according to Smith (1996), four possibilities emerge when teachers encounter any sign of reform movement during their profession, these are: "(1) succession of change (2) implementing the change but failing (3) continue to "tell" under the cover of reform (4) ignoring the reform totally" (Smith, 1996, p. 395). Therefore, there is a need for the formation of new sources for the development of teachers' self-efficacy to adapt to the new demands requested in the curriculum, and he cautiously added that the non-existence of these sources may have a negative effect on the implementation of the new curricula. He claimed that teachers may make "paste-on adjustments" in their teaching by incorporating group work activities, and utilizing manipulative, technological tools while leaving the core beliefs intact about "telling". Lack of support from the school culture including students, parents, administrators and colleagues may also result in limitations in applying the reform process. Thus, the problem which has to be overcome is how the teachers can see themselves more efficacious in the sense of reform practices. In other words, teachers need to *conceptualize* their sense-of-efficacy beliefs by mostly observing the effect of these new practices on their students and to continue the steadiness of the progress by finding new supports for efficacy such as professional communities.

Ghaith and Yaghi (1997) investigated the relationship between teachers' experience, self-efficacy and attitude toward the implementation of instructional innovations by considering the dimensions of cost, congruence, difficulty and importance of utilizing the new reform methods. He prepared a four-day professional development program focusing on the cooperative learning method for 25 (16 middle and 9 high school) teachers. Teachers were administered three questionnaires after the program. Teacher Efficacy Scale (TES) (Gibson & Dembo, 1984) was used for measuring teachers' sense of efficacy, RSA (Guskey, 1988) was used for measuring attitudes toward instructional innovation and 4 items was added for measuring the

four dimensions listed above. The results showed that experience was negatively correlated with attitudes toward instructional innovation, positively correlated with personal teaching efficacy, and not correlated with general teaching efficacy. Moreover, high efficacious teachers were found to give importance to the new methods and found them congruent to their practices more than low efficacious teachers.

Tschannen-Moran, Woolfolk Hoy and Hoy (1998) made an extensive review of the teacher efficacy construct. They stated that change in teachers' habits initially causes a decrease in their efficacy beliefs. Only after teachers implemented the innovation for some time and saw its effectiveness, did they feel more efficacious about innovation. Also, the researchers concluded that microteaching and role playing experiences can provide teachers with valuable tools of efficacy through mastery experiences which is determined as the most powerful influence of self-efficacy.

Ross, Cousins, Gadalla and Hannay (1999) expressed the importance of teacher efficacy for school reformers by stating that "it [teacher efficacy] predicts which teachers and sites are likely to support instructional reform" (Ross, et al., 1999, p.3). They underlined the importance of curriculum integration and interdisciplinary courses in the reform process. They investigated the relations of within teacher characteristics (teachers' area of teaching specialization, course track and course grade) and between teacher characteristics (gender, career, school experience) with teacher efficacy. A self-report questionnaire that was developed by the researchers was administered to 359 teachers. Results indicated that only the teachers' area of specialization was a significant predictor of teacher efficacy. That is, when teachers were assigned to teach outside of their area of specialization, their expectancies about their ability to teach reduced. Nevertheless, their study was generalized only to secondary school teachers who possessed higher efficacy about teaching within their subject. Thus, the generalization of this result to elementary school teachers who teach all subjects is not possible.

McKinney, Sexton and Meyerson (1999) investigated the validity of Efficacy-Based Change Model (EBCM) through a semester-long professional development program which is shown in Figure 2.3.

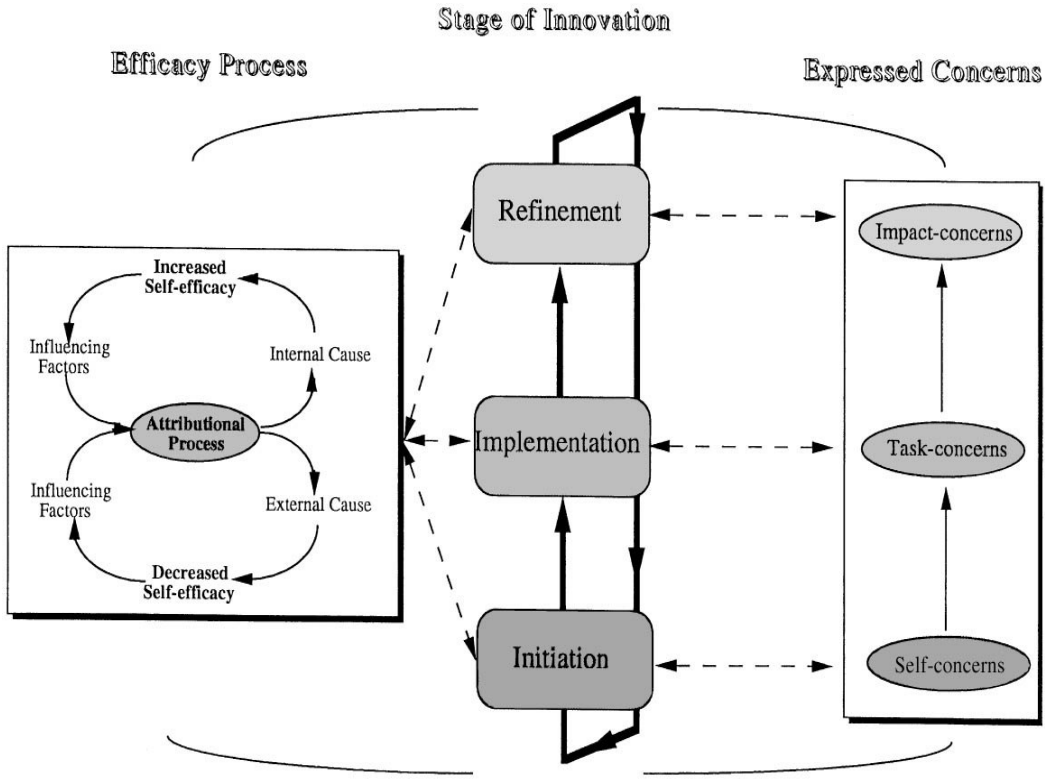

Figure 2.3: "The efficacy-based change model"
(Source: McKinney, Sexton, & Meyerson, 1999)

The researchers examined the beliefs of teachers who were in the process of implementing an innovation on "whole language". The model shows the steps of how teachers' efficacy and concerns are influenced when they start to implement the innovation. The concerns follow a path from self-what the innovation entails for teachers- to task-what the innovation means for the daily performance of a task-, and lastly to impact-concerns in which teachers turn their attention toward the students and colleagues about the innovation rather than themselves (van den Berg, Sleegers, Geijsel & Vandenberghe, 2000). Questionnaires developed according to the model were administered to the teachers as pre and post tests, and 101 teacher responses were collected. It was found that teachers who had lower efficacy beliefs possessed concerns at initial stage and vice versa. The initial efficacy beliefs of teachers were explained highly by their expectation that the innovation could be successful (possibility of implementation) and by the value they give to the innovation (importance of the innovation). They claimed that their data supported the

importance of efficacy beliefs in the change process. Finally, it was found that impact concerns were only predicted by self-efficacy beliefs of teachers.

Likewise, Charambous, Philippou and Kyriakides (2004) investigated teachers' concerns towards reform related to mathematics education in Cyprus. According to Concerns Based Adoption Model (CBAM) (McKinney, Sexton & Meyerson, 1999) teachers have little awareness about the innovation at the beginning (self-concerns), then this increases to other levels in the direction of task and impact concerns. Furthermore, the researchers found that after 5 years of implementation, teachers have still self concerns about the reform and they thought that they needed further information about it. In other words, teachers could not move to the other levels of CBAM. Nevertheless, teachers having higher efficacy beliefs were found to have fewer worries about the reform and criticized it less. The researchers also added a new dimension to the model which yielded interesting results. This dimension indicated that the more teachers felt efficacious in using certain methods, the more they were against the reform by criticizing and expecting more problems in the implementation.

In the same manner, Christou, Eliophotou-Menon and Philippou (2004) investigated teachers' concerns regarding a new mathematics curriculum utilizing the CBAM. The model consists of three stages which are self, task and impact concerns in a developmental manner. A questionnaire was administered to 655 teachers. Results showed that teachers' concerns mainly grouped in the "task-concerns stage" of the efficacy-based model as illustrated in figure 1.Nevertheless, the teachers were assumed to reach the impact-concerns stage in the future. Particularly, researchers concluded from the mean statistics that teachers felt capable in terms of implementing the new mathematics curriculum and they did not have concerns about their abilities to adapt the new mathematics textbooks (Christou, Eliophotou-Menon & Philippou, 2004). In addition, beginning teachers seemed to easily adapt to the new curriculum demands and new textbooks while the experienced teachers were found to be more focused on the outcomes of the innovations such as the effectiveness of innovations on their students.

A study which examined the effect of in-service teacher training on teacher efficacy was done by Sottile, Carter and Murphy (2002). They prepared a class called

"Integrated Science and Math Methods" which lasted 8 weeks. They searched what influences self-efficacy on school culture, science and math achievement and what are the relationships between them. A survey was prepared including school culture, achievement and self-efficacy questions which was pre and post test administered. Questionnaire results indicated that the teachers' self- efficacy and achievement scores increased significantly at the end of the course. Teachers asserted that they felt adept at incorporating cooperative groups to enhance learning and they felt competent when answering students' questions about math and science, while keeping students motivated to the subject. In all, the researchers claimed that when teachers are in the process of seeing the effect of change, the possibility of implementing those methods in their classes increase.

Another in-service training conducted by Rimm-Kaufman and Sawyer (2004) found that primary-grade teachers who implemented Responsive Classroom approach have higher self-efficacy beliefs than their counterparts and the teachers reported classroom practices which were similar to this approach.

In addition, the scholars mentioned above reported the positive role of teachers' efficacy beliefs in the implementation of innovations in curriculum. On the other hand, some other researchers such as Wheatley (2002) thought that high efficacy beliefs may also diminish teachers' reactions to the changes in curriculum. He asserted that efficacy doubts of teachers may enhance their projection positively to the reform process by encouraging them to learn about the new reforms. According to him, only if teachers have doubts and uncertainty in their thinking, are they open to learning and change. He added that "uncertainty is a key aspect of progressive or democratic education… [and] is part of the broader context of any educational reform" (Wheatley, 2002, p. 13).

2.4. Curricular Change in Mathematics Education and Teachers

This section reports studies conducted about teachers' attitudes and beliefs in the adaptation process to new curriculums in other countries. Moreover, teachers' needs and constraints were emphasized within these studies.

Curriculum change has been asserted to be difficult by many. In fact, Ponder and Doyle (1977) indicated that proposing new curriculum is easier than

accomplishing curriculum implementation and they pointed out that "Practicality ethic is a key link in the knowledge utilization chain in schools" (p.3). "Practicality", indeed is one of the main concepts that classroom teachers tend to underline about classroom practices. Furthermore, researchers claimed that for effective change in schools, three mechanisms should operate well which are instrumentality, congruence and cost that are the interrelated dimensions of "ethic of practicality." Instrumentality is defined as communicating the innovation clearly in a relevant terminology, and *the enactment in the setting* is claimed to be a major factor in determining the instrumentality of a change. Moreover, teachers were claimed to ask for "how-to-do-it" workshops instead of workshops that emphasize inspirational and theoretical rationale and outcomes of the innovation (p.21). Congruence dimension, on the other hand, is defined as the extent to which a proposed change is compatible with the teachers' existing practices and the perception of the role. Cost dimension includes time, effort, the amount of investment and financial support given for the change to occur.

Despite the claim that change in curriculum is difficult, the researcher Michael Fullan has conducted many studies that he claimed would promote curriculum change in schools. To begin with, Fullan (1993) pointed out four themes about building change capacity in teachers which are "personal-vision building, inquiry, mastery and collaboration" (p.12). According to Fullan (1993), teachers, also referred to as "career-long learners", should stimulate students as continuous learners. Nevertheless, Fullan (2000a) in another study indicated that to accomplish a successful change in elementary school takes three years. Moreover, he states three stories of reform as "inside story"-how changes take place in school dynamics-, "inside-outside story"-what schools do when outside sources force them and "outside-in story"-how external sources organize themselves to be effective in accomplishing large-scale reforms (p.581). He argued that change is possible only when the three stories are strongly connected to each other and concluded that the large-scale reform, when focus of reform is on the entire system, may fail because of extreme fragmentation and overloading. Fullan (2000b) further stated that even though innovations may seem to be adopted on the surface by changing the language and structures, the practice of teaching had not changed at all, and hence, he reminds

that the aim is not only "to establish large-scale reform but also to *sustain* it" (p. 20). Moreover, he added that reform will not occur in large scale if the key stakeholders- teachers, administrators and parents- think that "they are implementing someone else's reform agenda" and teachers were guided to "positive politics" of their own reform agenda by the state policy (p. 25).

According to Clarke, Clarke and Sullivan (1996), there are some constraints which affect the process of curriculum change. For instance, constructivist view of learning was seen as a conflict for standardized tests which was claimed to have an effect on curriculum and curriculum change for years in the United States. Furthermore, there is the assumption that including a few teachers in the curriculum development process will lead to the other teachers to accept and implement the changes. This is a mistake that has been done for 30 years in the curriculum change process. The other issues that they pointed out are the low number of qualified math teachers per students in secondary schools and the lack of "basic" equipment in schools which are assumed to exist while developing the curriculum. Finally, they concluded that "Any model of curriculum development should recognize and value the experience of teachers" (p. 1221) which was called as the wisdom of practice.

Labaree (1999), in a similar sense, indicated that curriculum reforms had little impact on the teaching and learning process in American classrooms. He stated that teachers may claim to implement the reform and elaborate on it; however this is no guarantee that they are making dramatic changes in their practices. Moreover, he claimed to observe slight changes in the level of received curriculum, the most desired in curriculum changes and underlined the constraints over this issue such as teachers' having more autonomy than other employees in performing the functions and schools' incorporating the new initiatives while resisting real change that lead to "chronic-steady work-" and "cyclical-here-we-go-again-" nature of curriculum reform.

Bay, Reys and Reys (1999) investigated the most critical elements to support the implementation of middle school standards-based mathematics curricula in the U.S. They reflected some important points as administrative support, opportunities for teachers to familiarize themselves with the standards, sampling a part of the curricula, providing time for teachers to make daily planning, interaction with

curriculum experts, collaboration with colleagues, incorporating alternative assessment methods, communicating with parents, helping students adjust to the new curriculum and planning for transition from middle to high school in terms of success in learning mathematics. In all, the researchers finally added that "The road for curriculum change is not always straight and smooth, and successful implementation requires stamina" (p. 506).

Roberts (1974) stressed the role of teachers between curriculum conceptualization and curriculum-in-use while adapting the conceptualizations to conditions (Roberts cited in Olson, 1977). Olson (1977) indicated that concentration on curriculum developments is given overwhelmingly to new curriculum materials; rather than teacher education. Moreover, he stated that rather than employing "remote-control approach" for teachers' role in curriculum development, "adaptive approach" should be emphasized which entails teachers to the newly introduced changes rather than "prescribed outcomes" and the first step was determined as "helping teachers effectively analyze their own situation" which may give floor to assess the gap between where teachers are and what the new theoretical approaches will be (p. 64).

Manouchehri and Goodman (2001) investigated the implementation of four standards-based curricular materials of 66 middle school mathematics teachers from 12 school districts in the United States for two years. All of the curriculums were prepared in light of the constructivism approach. Teachers received 2-day in-service training before classroom observations and interviews. Initially, researchers observed a gap between teachers' claimed and actual instructional practices. Moreover, teachers utilized group work without enhancing students' collaboration and monitoring group work. The more experienced teachers who had traditional practices were observed to question the value and relevance of the curriculum while the beginning teachers were committed to using standards-based curriculum. The beginning teachers observed the influence of the curriculum on students' enthusiasm and interpreted it as the positive impact of the curriculum. Nevertheless, the results revealed that nearly all teachers had time constraints in utilizing materials and teachers' knowledge about mathematics content, innovative practices and their

personal theories about how the teaching and learning of mathematics influenced the implementation and the value given to the curriculums.

Chissick (2002) also examined the implementation of change during a project run in 13 middle and high schools in Israel. One staff member was assigned to each school as "facilitator" for one day in a week for three years. The study benefitted from observation and questionnaire data. The results indicated a significant change in the cooperative culture of schools. Moreover, increases in classroom practices occurred in the employment of open-ended tasks and student-centered instruction except for utilization of technology. However, the researcher could not find a relationship between teachers' self-esteem and their preparedness to change in implementing new teaching practices.

Drake and Sherin (2006), in a similar sense, investigated two female 8-10 years experienced elementary teachers' *models of curriculum use* consisting of how they read, evaluate and adapt processes which described how they used a reform-oriented mathematics curriculum. They found teachers experiences such as their early memories of learning mathematics, their perceptions of themselves as mathematics learners and their mathematical interactions with family members (their role of identity) to affect the teachers' adaptations when using the curriculum. They underlined that adaptation is a two-way process: teachers not only adapt the curriculum to their practices, and adapt their practices to the curriculum. Moreover, researchers argued that teacher change does not occur in the existence of new curriculum materials in the classroom; but from the interaction of teachers with curriculum materials around specific subject matter and pedagogical content. In conclusion, researchers found that teachers make adaptations before-during and after the lesson by omitting the activities in the curriculum, adding an activity to a lesson, using other materials than suggested in the curriculum and making conceptual adaptation by changing the intended purpose of the activity. Researchers concluded in this adaptation process that "teachers' professional identities were strongly influenced by their personal contexts" (p.178) and suggested that when teachers' become more aware of their mathematics stories, it may have an impact on their practices.

In addition to teacher change in instructional processes, research has focused on the change in teachers' assessment practices. This is also an important area to study as assessment is completely integrated into curriculum reform. To begin with, Saxe, Gearhart, Franke, Howard and Crockett (1999) investigated teachers' change in assessment practices regarding educational reform in mathematics education. By means of interviews and surveys, teachers' utilization of three various forms of assessment - exercise-traditional assessment practice, open-ended problems and rubrics-alternative assessment practice - was assessed. The researchers divided assessments into two parts in light of their purpose: *eliciting performance* (e.g., exercises and open-ended problems), and *evaluating performance* (e.g., rubrics). Moreover, they referred to the ability of the practices employed during the implementation of assessments as assessment *skills*. The results showed that teachers have a potential to use both the new form of assessment with an "old" function and an "old" form of assessment with a new function of stimulating students' "higher-order thinking" (p.95). Moreover, teachers' *concerns for efficiency* were found to counteract with the quality of used assessments in terms of rapidness and the frequency in rubric scoring. To illustrate, for the frequency of utilization of assessments, 75 % of the teachers reported to use the exercises at least two or three times a week while most of them reported to utilize the open-ended problems at a moderate level and rubrics in the range between rare and relatively frequently. Furthermore, the reported changes in assessment practices indicated that the use of exercises showed a stable line while the use of open-ended problems and rubrics was found to rise. Finally, researchers indicated that the large class sizes as well as heavy teaching loads should be taken into consideration within the developmental manners of teachers' using particular assessment forms and they concluded with the maxim that "change takes time" (p. 102).

Beliefs in general are stated to be the best indicators of teachers' actions. According to Ernest (1989), the general belief system of a mathematics teacher varied according to the:

- view or conception of the nature of mathematics,
- model or view of the nature of mathematics teaching
- model or view of the process of learning mathematics.

There are various studies in the literature which aim to assess the effects of teachers' beliefs on their actions. One of them was conducted by Brosnan (1994). She examined four teachers' beliefs and practices during the implementation of NCTM Standards. The researcher stated that since current teachers are products of "transmission of knowledge" view, there is a high need for worthwhile change in the practice of teaching mathematics. A school with grades 6 and 7 was selected for the study. This school had been participating in a restructuring program for four years. The concluded classroom changes were reported as declines in teaching for procedures, assigning drill work and increase in utilizing student-centered activities, small group work, alternative assessment, manipulatives and calculators. However, it is important to note that the teachers in the study were dissatisfied with their current teaching practices by observing positive student outcomes on the new ideas before participating in the study and they were encouraged to use the standards during the study. Nevertheless, they were supported by their colleagues, administrators, participation in in-service trainings and the availability of resources such as textbooks and manipulatives during the implementation.

In a similar sense, Haney, Lumpe, Czerniak and Egan (2002) examined six primary teachers' context and capability beliefs and their impact on actions while implementing change. Ten classroom observations were conducted for one year and evaluated based on a classroom observation protocol. In addition to the observations, pre and post observation interviews were conducted. Then teachers were administered two instruments. One of these instruments which is about teachers' context beliefs about teaching science (CBATS) were developed by the researchers and the other one which was about teachers' self-efficacy beliefs was from the STEBI instrument. In conclusion, researchers found that beliefs are strong predictors of teachers' classroom actions except for one teacher. In addition, they detected a strong relationship between teachers' beliefs-measured by self-report and their practices in the classroom.

In another study, Wilson and Cooney (2002) stated that "understanding teachers' beliefs is vital to reform" (p.128). Moreover, attention to general teaching practices is stated to be able to attract peripheral beliefs rather than making connections to more central ones. Also, Yero (2002) stated that "When people

believe something is true, they perceive information supporting the belief" that it is not easy to change teachers' beliefs (p. 3). Wilson and Cooney (2002) found that elementary teachers' practices focused more on the teaching-learning process of providing variable instructional strategies such as problem solving and inquiry while secondary school mathematics teachers' practices focused mostly on the mathematical content.

Smith (2000) argued that a tension occurs between ensuring student success and the teacher's belief about students' needing complex problem solving situations. She conducted a case study by collecting data from observation, interviews, surveys and videotapes with one experienced twenty-six year old teacher for one year. The researcher constructed a model which provided the cognitive conflict in teacher learning when she experienced new ideas and views about teaching and learning. Finally, the researcher assumed that the teacher's feeling of failure throughout the change process may have emanated from finding "no way of measuring her success as a teacher within the new paradigm of teaching" (p. 374).

Goya (2006), on the other hand, pointed out the need for "skilled" mathematics teachers at the primary levels in order for reforms to work. She added that unless this critical need is met, students can not be expected to develop their reasoning and problem-solving skills. Also Lloyd (1999) emphasized that first-hand experiences about innovative practices are needed for teachers to attempt to use them in their classrooms.

There are also studies conducted to investigate the effect of curriculum materials on teachers' change process. For instance, Ball and Cohen (1996) indicated that curriculum materials are tools for representation of the content; however, adoption to new materials was not generally the focus of professional development. Moreover, he concluded that if curriculums had been developed by considering "the enacted curriculum", curriculum materials could assist teachers' learning and practice as had been intended.

Remillard (2000) investigated the contribution of a reform-oriented textbook on two thirty year experienced fourth-grade teachers' learning during their first year of utilization by examining teachers' "curriculum processes". Classroom observation and interviews become the main sources for the data. She found that the learning

took place mostly when teachers made curricular decisions for their students working on the tasks. In other words, teachers were observed to have learned when they made adaptations to the mathematical concepts, representations and tasks in a set of topics in respect to their students. Finally, the researcher concludes that the textbooks have an indirect effect rather than direct on shaping the enacted curriculum and the adoption of reform-oriented textbooks must occur by supporting teachers as curriculum developers rather than mere implementers.

Remillard (1999) in her study with the same two teachers presented "a model of teachers' curriculum enactment in mathematics teaching" by adopting a reform-oriented textbook (p. 317). The model consisted of three arenas: design, construction and curriculum mapping as shown in Figure 2.4. The observations of the researcher revealed that the context of teaching is formed by the interaction of teachers' beliefs with the elements of the textbook. Moreover, she asserted that the textbook's communication with teachers "by speaking *through* them, rather than *to* them" increases the likelihood of teachers' reading the texts and referring to the guidance it presents about the instructional tasks for the implementation. Furthermore, teachers were stated to be responsible for the improvisational activities in the construction arena since the textbook had limited ability in predicting students' responses to the tasks.

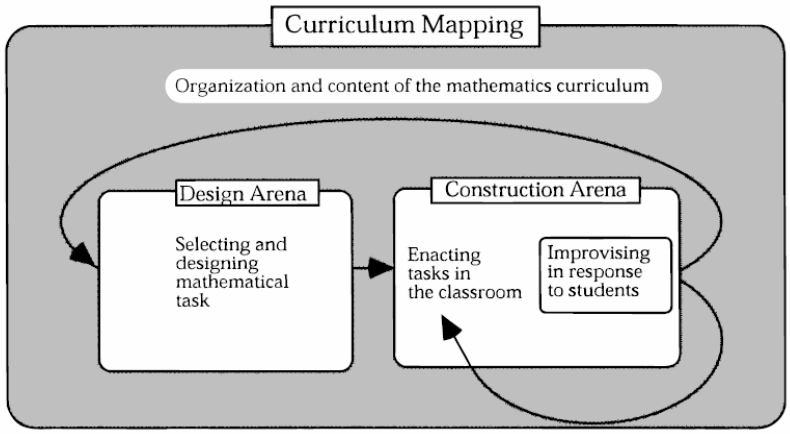

Figure 2.4: "Overview of the Three Arenas and the Relationships among them" (Source: Remillard, 1999)

Finally, there are studies conducted about the curriculum reform process and teachers in other countries such as Russia and China. For instance, Zajda (2005) examined the educational reform and transformation in Russia. He stated that "a

politician's life is too short to witness the outcomes of education reforms" (p. 406). Moreover, the researcher indicated that schools do not have sufficient financial support and their classrooms lacked various instructional equipment such as a computer, copier machine or slide projector. Furthermore, education reformists stated that standards are better than the traditional system to improve academic achievement of students in Russia. However, Zajda (2005) provided the reasons for the failure of large-scale reforms. He stated that the goals were not made explicit to the stakeholders, they were not aware about what was expected from them, the training for skills were not provided, resources were limited and the teachers' beliefs and experiences tended to "colour" their perceptions about the reform (p.421). Furthermore, he indicated that the curriculum content was given much more importance than the teaching and teachers throughout the reform process. The other constraints were stated as absence of a valid examination system in that the approach of the current system was claimed to emphasize "teaching to test" (p. 425) and insufficient in-service teacher trainings.

Newton (2007) pointed out the differences in the U.S. and China education systems in terms of curriculum and the work of teachers. She indicated that in U.S. culture, the ability to do math rather than the effort put forward becomes important while it is not the case in China. Moreover, she stated that in China, even in elementary grades, courses are taught by teachers who are specialized in that subject-matter. Furthermore, she indicated that teachers in secondary schools teach only 40% of their daily time while they can spend any remaining time preparing instructional tools, collaborating with colleagues and grading; however, this is not the case claimed in American schools since teachers spend their time in schools mostly on teaching. Furthermore, the researcher argued the need for a better accountability system such as utilizing constructed-response items with emphasis on understanding rather than using only paper-pencil tests which rests often on multiple-choice items in the U.S. Indeed, she indicated that the curriculum teachers account emphasize on conceptual understanding and problem solving as well as computational skills and in China, accountability system mostly stresses on assessments that ask students to present their problem solving abilities.

The studies related to teachers' beliefs about the new curriculum and their adaptation process were summarized in this section. In continuation of the literature, primary school and mathematics teachers' attitudes and constraints in the adaptation process to the new mathematics curriculum conducted in Turkey is handled in the following and last section.

2.5. Recent Changes in the New Elementary Mathematics Curriculum in Turkey

The current curriculum change effort in Turkey was initiated in 2003 by Ministry of National Education (MNE). The curriculum changes covered five subject areas which are mathematics, science, social science, life science and Turkish. They are commonly based on four components: (a) Social, (b) Individual, (c) Economical and (d) Historical and Cultural fundamentals (Koc, Isiksal & Bulut, 2007). The mathematics curriculum was developed by a commission under the Board of Education consisting of academicians from mathematics education, specialists from curriculum development, measurement and evaluation departments and teachers. In the academic year of 2004-2005, the primary school curriculum was piloted in 120 schools and 9 cities throughout Turkey which were: İstanbul, Ankara, İzmir, Kocaeli, Van, Hatay, Samsun and Bolu. In the academic year of 2005-2006, the curriculum began to be implemented through grades 1-5 in all of the elementary schools in Turkey. In the academic year of 2006-2007, 6^{th} grade curricula started to be implemented after the pilot study had been completed, and each successive year, the next grade initiated the implementation of the new curriculum. By the end of academic year of 2008-2009, all of the grades between 1^{st} and 8^{th} will have implemented the new mathematics curriculum.

The new curriculum aimed at equipping students with basic skills such as (a) communication, (b) problem solving, (c) reasoning, and (d) making connections both in disciplinary and interdisciplinary knowledge and skills. Moreover, the curriculum adopted the principle of "Every child can learn mathematics". In addition to this principle, it was highlighted that:

1) Teaching should start with concrete experiences.
2) Meaningful learning should be aimed.

3) Students should communicate with mathematical knowledge.
4) Making connections should be emphasized.
5) Students' motivation should be considered.
6) Instructional technology should be utilized effectively.
7) Enhancing learning through cooperative learning should be attempted.
8) The teaching- learning process should be organized according to appropriate steps within the instruction (MEB, 2005, p.18-21).

It was clear that the aim of the new curriculum was not just to revise the topics being taught, but to shift classroom experience from a traditional classroom atmosphere to a dynamic classroom environment. At this point, teachers undertake great responsibilities. In order to provide the continuation of the curriculum, teachers should envision their perspectives accordingly; they should refresh their knowledge and skills in their subject-area and use their time efficiently through the classes (Erdoğan, Mısırlı, & Temli, 2007).

Much research has been conducted about curriculum reform. Bikmaz (2006), for example, underlined the issues which could cause teacher misunderstandings throughout the implementation. These were emphasized as follows: "Taking into account the individual differences during teaching learning stage is not possible only by a differentiation in methods. Active learning is not only to carry out activities" (Bikmaz, 2006, p.98). Indeed, the researcher claimed that the new curriculum focused more on change. However, the focus should have been on how the change could be carried out. Moreover, she asserted that teachers needed to possess a strong command of the subject-matter despite common belief of the opposite. She added that traditional assessment methods might be utilized in addition to other methods and the teacher ought to be prepared and organized before the lesson. Finally, she suggested strong in-service training utilizing a learner-centered approach with teachers, the conductors of the curriculum, rather than just lecturing planned jointly by universities.

Tertemiz (2003), on the other hand, highlighted the importance of a standards-based mathematics curriculum. She stressed that mathematics standards are useful in terms of society, individuality and as a discipline of subject-matter. She stated that the standards are useful in promoting students' conceptual understanding

and questioning rather than requiring them to memorize and perform drills. Therefore, by means of the standardized curriculum, students become problem-solvers, give meaning to complex activities around their environment and trust their abilities.

Bulut (2004) maintained that the common point of the curriculums of the USA, Canada, Ireland and France is putting the students at the center of the curriculum; make them active in the teaching-learning process and highlight the enjoyable and aesthetic side of mathematics. She claimed that the old curriculum could not activate students' higher order skills and caused them to exhibit low performance; therefore, there is a need to make the students the center of the curriculum.

During one pilot year of the new curriculum, studies were conducted to determine teachers' needs and constraints regarding the implementation of the new curriculum and various symposiums were organized to discuss the main issues.

To begin with, Gözütok, Akgün and Karacaoğlu (2005) investigated the teachers' perceptions of their competencies in the curriculum. The results showed that teachers felt very adequate in most of the components of the curriculum except for the measurement and evaluation part and their acquaintance with the curriculum was admitted to be low. In addition, professors observed the teachers in their classroom to gather information about the teachers' competency in the implementation of the new curriculum. Interestingly, it was found that teachers generally rated themselves higher than the observers. The researchers interpreted this result as teachers feeling more adequate than they were or their trying to present it like that. In addition, the researchers indicated that there were many teachers who were non education majors working in public schools. For example, there were teachers who had graduated from the school of economics or veterinary college; and hence, had received no training in pedagogy. However, the researchers pointed out the need for highly qualified teachers who have graduated from education faculties in the implementation of the new curriculum.

Yaşar, Gültekin, Türkkan, Yıldız and Girmen (2005), on the other hand, assessed the primary school teachers' needs about the new curriculum in Eskişehir. Teachers were chosen from an in-service training held by the education faculty

members of the university and which lasted for about ten hours for each course. The results indicated that teachers believed that they needed learning in planning instruction regarding the objectives, content and teaching-learning process of the curriculum at a "high" level, the highest level that could be indicated on the questionnaire. Moreover, they reported that there is a need for training about instructional technology and material development as well as about the measurement and evaluation component of the curriculum. In addition, they hypothesized the problems that they thought could probably occur during implementation such as lack of manipulatives, inability to integrate manipulatives into instruction and lack of support of parents and administrators to the implementation process.

Another study conducted by Özdaş, Tanışlı, Köse and Kılıç (2005) was about teachers' views regarding the new elementary mathematics curriculum based on interviews with them. More than half of the teachers claimed they might have difficulty in conducting the new curriculum. On the other hand, almost all of the teachers expressed positive attitudes towards student-centered curriculum; however they added that they might have problems in maintaining classroom discipline during the implementation. Some teachers also asserted that the new curriculum be offered to the first grades only and that the older grades continue with the previous curriculum model.

Furthermore, Gelbal and Kelecioğlu (2007) examined teachers' competencies in terms of the measurement and evaluation component of the new curriculum in Ankara. Teachers were found to utilize measurement and evaluation methods in which they felt more self confident. These methods were generally the traditional ones. Moreover, the research results indicated that the limited time of the course and the high number of students in classrooms restricted the teachers' use of the new measurement and evaluation methods. To conclude, the researchers suggested that experts in measurement and evaluation be present in all districts of the cities or all of the schools.

Finally, Çınar, Teyfur and Teyfur (2006) investigated the teachers' and administrators' beliefs regarding the constructivist approach of the new curriculum. Teachers were found to be "undecided" about maintaining the discipline of the classroom while conducting the curriculum. Moreover, female teachers were found

to have significantly more acquaintance with the activities designed according to constructivist approach and they expressed more pleasure with them.

In addition to research related to the views of teachers about the new curriculum, some research studies have been conducted on the structure of the curriculum. Firstly, Koc, Isiksal and Bulut (2007) claimed that the content of the new curriculum did not differ significantly from the old one; however, the researchers emphasized that the new curriculum focused on more interdisciplinary connections, the utilization of technology and other instructional tools similar to other reform processes held in the world. Moreover, they underlined that "Curriculum revision is a life-long process" (p. 37).

Babadogan and Olkun (2006) discussed the curricular changes made in Turkey in terms of various types of curriculum development models. They stated that the new mathematics curriculum in Turkey seemed to be subject-centered although it was claimed to be learner-centered. However, they underlined that the methods component of the curriculum puts the learner at the center rather than the teacher. They further added that the changes in the content of the elementary school mathematics curriculum are similar to the US, UK, Singapore, Ireland and Holland. Moreover, the new curriculum was reported to emphasize conceptual knowledge rather than procedural and emphasized the development of skills, and the utilization of manipulative, cooperative learning and alternative assessment methods. The comparison between the old and the new curriculum are given in Table 2.1.

Table 2.1. A Comparison of the Old and the New Curriculum

OLD	NEW
Elementary school mathematics curriculum for grades 1 through 5 contains 1249 behavioral objectives. Textbooks written based on these objectives were very uniform and dull. Both the textbook writers and the teachers are restricted to make very limited decisions.	There are 368 learning outcomes that summarize the knowledge and skills for students to develop. These outcomes can be obtained through different learning activities. So, the textbook writers and teachers are relatively freer to produce or choose activities.
The content for 4th and 7th grade is too dense to follow for students considering their development.	The content is distributed evenly from grade 1 through grade 8.
Teaching methods, techniques and strategies are not student centered.	Teaching-learning activities prepared parallel to learning outcomes require student centered methods, techniques, and strategies.
Content is organized based on how to teach.	Content is organized based on how students learn.
There are few sample activities that require the use of manipulative.	Almost all of the sample activities show how to use manipulative for students' construction of knowledge.
There are overlapping content in other subject areas	There are connections to other subject domains.
There are few examples of realistic mathematics.	Daily use of mathematical knowledge is emphasized.
There are limited number of alternative assessment techniques, extra curricular activities, research, and projects.	Alternative assessment techniques, extra curricular activities, research, and projects are included.
All students are expected to exhibit the same performance, with no local flexibility or individual differences. There is little room for students to choose from the alternatives.	Respect for individual differences, different learning and thinking styles is suggested. There is more room for students to choose from the alternatives.
There is little mention about developing positive attitude in students.	There is more emphasis on how to develop positive attitude towards mathematics and on student motivation.

(Source: Babadogan & Olkun, 2006)

The researchers, on the other hand, pointed out the need for extensive teacher training and underlined that the name should be curricular change rather than reform since the intended outcomes were not observed yet.

Curriculum development is a process rather than an event. Therefore, studies should be conducted to make the improvements better and effective. The studies which were conducted in light of the new curriculum are listed below and they investigated the implementation process of the new curriculum in terms of teachers, administrators and supervisors.

To begin with, Akça (2007) studied the opinions of teachers, administrators, and primary school supervisors about 5th grade elementary mathematics curriculum in the academic year of 2005-2006 in Afyonkarahisar. She administered a 43-item questionnaire to 235 5th grade primary teachers, 20 administrators and 15 primary school supervisors. She found that teachers and supervisors had higher positive

opinions than administrators about the curriculum although these results were not significant. In addition, when she compared teachers' opinions about the new curriculum according to their gender, experience, and education level, she found a significant difference based on experience and education level, but not in gender. Teachers who had 16-20 years of experience had significantly higher positive opinions of the curriculum than the others. Moreover, teachers who graduated from a Teachers' College (öğretmen okulu) offering 2-3 years of instruction were found to have significantly more positive opinions than teachers having bachelor degrees.

Orbeyi (2007), on the other hand, examined the 459 primary-grade teachers' (1^{st} to 5^{th} grades) opinions regarding the objectives, content, learning-teaching process and measurement and evaluation components of the new curriculum in Çanakkale, Edirne, and Eskişehir in the academic year of 2005-2006. She investigated whether there was a difference in the opinions of teachers with respect to their education level, grades instructed, experience, in-service training and the city where the teaching took place. She prepared a questionnaire which consists of the components related to objectives and content of the curriculum in the first part, learning-teaching process in the second part, and evaluation component of the curriculum in the third part. The results revealed that teachers were generally in agreement with the components of the curriculum; however, they "rarely" utilized the manipulative materials which were because of the materials' absence and teachers' old teaching habits. In addition, the results did not differ significantly in terms of teachers' experience and education level in all three components. However, the results in the evaluation component differed significantly in terms of the city that the teachers were working in. For example, teachers in Eskişehir were found to possess higher positive beliefs than the teachers working in Çanakkale. Moreover, teachers differed in the grade levels instructed only in the objectives and content components of the curriculum as follows: Teachers in the 1^{st} grade level had significantly stronger positive beliefs than the 4^{th} grade teachers in terms of the objective component regarding the grade levels instructed and teachers in the 1^{st} and 5^{th} grade level teachers had significantly higher positive beliefs about the content of the curriculum than teachers in the 4^{th} grade. Furthermore, teachers who had participated in in-service training had significantly positive beliefs about the

objectives, content and the measurement and evaluation components of the curriculum than the teachers who had not participated. In addition, all teachers responded to the item "Subject-Matter teachers should educate the primary-grade levels in the mathematics course" as "undecided". Finally, the researcher encouraged further systematic in-service training for the teachers and an increase in collaboration between parents, administrators and teachers, and between the education faculties of universities.

Erdal (2007) investigated the 200 primary-grade teachers' utilization of new assessment methods in the new curriculum and their perceptions about the adequacy in using them in the academic year of 2006-2007 in Afyonkarahisar. He prepared a questionnaire and held follow-up interviews with 4 teachers. The results revealed that teachers did not have a sufficient level of knowledge in the measurement and evaluation component of the curriculum. Moreover, they felt themselves inadequate to use new alternative assessment methods. The results showed that teachers needed more time to use the assessment methods underlined in the curriculum properly and the inexistence of photocopy machine and computer in some schools decreased the frequent use of them. According to the results, the researcher claimed that teachers were under the influence of the old assessment and evaluations methods rather than utilizing the new, but it was also admitted that teachers had seen the advantages of using new techniques on students, such as having opportunities to present their capabilities and guiding students to conduct further research. Finally, she suggested that a booklet be prepared which consists of examples about the alternative assessment methods in the curriculum. This booklet she asserts may provide better guidance to teachers in this area, and by increasing teachers' collaboration, would decrease their work load on the measurement and evaluation component of the curriculum.

Kaban (2006) analyzed the effect of the 3rd, 4th and 5th grade course books on the students' attitudes towards the mathematics course in the academic year of 2005-2006 in Konya. He reached 44 primary-grade teachers and 721 students in 9 schools and administered questionnaires developed by the researcher himself. The results showed that the selected course books had positive effects on the attitudes of the students towards mathematics. However, 24 teachers claimed that the level of the

activities were not suitable for their students while 20 teachers claimed that they were. Moreover, 33 teachers admitted feeling inadequate in implementing the activities in crowded classrooms while 11 teachers thought they did not. In addition, 16 teachers claimed that the course books were sufficient while 28 teachers claimed the opposite and 32 teachers claimed they were using other books rather than the MEB course books. In addition, while half of the teachers wanted to use the same books in the next year, half of them did not. Furthermore, 54% of the students did not want to use the same books next year.

Kartallıoğlu (2005) investigated the perceptions of the primary-grade teachers working in the pilot schools of the new elementary curriculum in Bolu. She conducted interviews with 5 female and 20 male teachers from 3 schools to assess teachers' opinions about the practicability and structure of the curriculum. The teachers were from different grade levels between 1st and 5th grades and only 2 of them were graduates of a faculty of education while 23 were graduates of 2-year Teacher Colleges. 25% of the teachers thought that the curriculum could be implemented when some circumstances were made available, while 75% of the teachers thought it could not because of the high number of class sizes, the examination system in Turkey and the unavailability of materials. Moreover, 52% of the teachers thought that the level of the curriculum is relevant for their students. The 4th and 5th grade teachers generally thought that the curriculum was suitable for under-achieving students, providing them with more self-confidence while it was simple for achieving and higher-achieving students. In addition, teachers admitted that the aim of the curriculum is to develop the students' skills not to increase their knowledge. They stated that parents did not accept the new curriculum and they reacted negatively to teachers' not assigning homework to their children. Nevertheless, the teachers claimed that they perceived the curriculum to be better than the supervisors since they are the conductors of it and maintained that their opinions were not taken before the curriculum had developed. Moreover, teachers admitted that they learned the curriculum with their own effort by studying, analyzing and preparing "worksheets" in order to make students active. The researcher concluded that the teachers who had participated in the study did not understand the philosophy of the curriculum appropriately and suggested further in-

service training. Finally, she suggested the piloting period to be extended to 5 years. Moreover, she purported that the examination system in Turkey be parallel to the new curriculum, and suggested that the degree to which teachers utilized the new assessment methods be examined.

Şahin (2007) investigated 237 1st, 2nd and 3rd grade teachers' perceptions about the new mathematics curriculum in the academic year of 2006-2007 in Denizli. Teachers were "uncertain" on the items such as "I cannot maintain classroom discipline since activities distort students' concentration" and "I have problems in utilizing the course materials" while they reported to agree with items such as "The curriculum entails life-long learning for the students" and "When the curriculum is implemented appropriately, it increases students' achievement." The results also showed that teachers possessing 15-24 years experience had the highest positive perceptions and teachers possessing 5-14 years experience had the least positive perceptions about the curriculum. Moreover, the teachers who were graduates of Educational Institutes and Education Faculties had significantly more positive perceptions about the curriculum than teachers who were graduates of Teacher Colleges. There was no significant difference in terms of the grade levels instructed. Similarly, there was no significant difference related to the teachers' job satisfaction in their perceptions of the curriculum. Finally, in the evaluation component of the curriculum, teachers possessing an M.S. degree had significantly more positive perceptions than the other teachers.

Soycan (2006) examined the 5th grade elementary mathematics curriculum in terms of opinions of teachers and students. She developed and administered questionnaires to 621 students and 51 teachers in Bursa. Teachers and student responses ranged at the "agreement" level in relation to the constructivism approach of the curriculum, while being significantly not different from each other. The researcher found that both teachers and students stated that they were implementing the curriculum according to the constructivism approach based on the teachers' responses to the questionnaires. However, obstacles in the time period of implementation and teachers' degree of utilization from the curriculum guide book were observed. Moreover, there was no difference in terms of experience and education level of teachers.

Toptaş's (2007) study was interesting in that he analyzed the geometry learning area of the 1st grade mathematics curriculum. This study was a case study. He observed one teacher for 4 months and made video recordings during the geometry parts of the lesson. The teacher generally used lecturing and question-answer method and students were not allowed to communicate with one another. As a result, the only communication observed was that between teacher and students. Moreover, he found that the teacher generally did not utilize equipment other than the overhead projector. Additionally, the researcher claimed that the class activities were done under the excessive control of the teacher; therefore, he concluded that the teacher did not implement the 'student-centered' curriculum. Instead, she implemented a curriculum that she had "interpreted" herself. Moreover, students were observed to acquire some of the objectives, while some of them did not by the end of the course. This result was reached based on the lack of activeness of the students in the learning and teaching process.

Gömleksiz and Bulut (2007) investigated the views of primary school teachers on the effectiveness of the implementation of the new mathematics curriculum for grades 1 to 5 in 64 pilot schools in the 2004-2005 academic year in İstanbul, Ankara, İzmir, Kocaeli, Van, Hatay, Samsun and Bolu. They collected data by posting the questionnaires developed by them to the schools. 792 of those questionnaires were returned. The results were then analyzed in terms of city, grade level, class size, gender, experience, and education level of the teachers. The four components of the curriculum analyzed were: "Objectives, content, teaching-learning process and measurement and evaluation". The teachers' opinions related to the learning attainments, content and evaluation components of the curriculum had significantly differed between 1st, 2nd and 5th grade to the advantage of 1st grade teachers. Moreover, they differed in the component of objectives in terms of the city variable. In fact, teachers working in Hatay, Samsun and İzmir were more positive than the teachers working in İstanbul, Ankara and Kocaeli. Nonetheless, while no difference according to experience and education level of the teachers was revealed, there was a significant difference based on class sizes. Teachers having class sizes that were between 21 and 30 had significantly positive beliefs in respect to the objectives than the other teachers who taught 31-40 and 41-50 students in one

classroom. Additionally, male teachers tended to find the new curriculum more effective than female teachers in all the sub-dimensions except teaching-learning process. All teachers indicated that they utilized the new mathematics curriculum "much".

Ulubay (2007) investigated the implementation of the new 6th grade elementary mathematics curriculum by analyzing the responses of teachers to questionnaires developed by the researcher. She administered a questionnaire developed by the researcher to 80 teachers working in the pilot schools in Ankara, İstanbul, Bolu and Kocaeli. Moreover, she examined the effects of city, class size, gender of the teacher and teaching experience on the implementation process. The questionnaire consisted of three parts which were: Learning-Teaching Process, Material Usage and Evaluation Techniques. She found that teachers utilized the new methods and techniques offered by the curriculum at a "high" level and these were not affected by any of the variables listed above. In the Material Usage sub-dimension, teachers reported to be at the "average" level, and teachers differed on this part according to their teaching experience. Teachers who had 21 or more years of experience, for instance, reported to use the materials significantly higher than the teachers with 5 or less years of experience. In the last part, evaluation techniques were also reported to be utilized at an "average" level and there were no significant differences between the teachers in respect to their gender, experience, city and class sizes. Additionally, results revealed that teachers working in İstanbul had significantly better implementation scores than teachers working in other cities and 86% of the teachers found the curriculum practicable and 81% of the teachers thought meaningful and permanent learning would be reached by conducting the new curriculum.

Yılmaz (2006) investigated 200 5th grade primary teachers' general opinions about the new curriculum in terms of teaching-learning experiences gained through mathematics instruction, students' academic development, and the measurement and evaluation component of the curriculum in Sakarya. The results did not reveal any significant difference according to teachers' gender, experience and education level. Moreover, it was reported that some teachers noted difficulties in the process of implementation. These difficulties were listed as lack of sufficient materials,

obstacles in new assessment methods such as performance based assessments and projects, lack of clear explanations in the guide book, teachers' loss of control of the classroom during the activities which are controlled by students and insufficient time for mathematics (3 hours a week). The researcher concluded that the teachers generally could not adapt to the new curriculum; also, it was noted that the obstacles in duration was a result of teachers continuing with their old practices.

Şentürk (2007) evaluated the new elementary school curricula by analyzing the opinions of teachers and supervisors in Amasya. He administered questionnaires to 520 teachers and 23 supervisors. The results showed that, overall, primary-grade teachers "partially agreed" with the curriculum, while supervisors "agreed". Moreover, female teachers were found to have significantly positive opinions regarding the new curriculum than male teachers. In addition, teachers who were between the ages of 20-30 had significantly higher positive beliefs than teachers who were between the ages of 31-40 in the evaluation component of the curriculum. The latter result was also found for the teachers who had 5 or less years of experience. Finally, as for the education level factor, teachers who were graduates of Educational Faculties and Institutes had significantly higher positive beliefs in the implementation part of the curriculum than teachers who were graduates of other faculties rather than education.

Özpolat, Sezer, İşgör and Sezer (2007) also investigated the primary-grade teachers' opinions according to the new curriculum. They administered a questionnaire to 100 randomly selected teachers working in Erzurum and asked one open-ended question about their thoughts of the curriculum. The teachers indicated that in order to implement activities better, the number of students in each class needed to be decreased. Furthermore, they claimed that they could not effectively evaluate the activities done in the classroom, or maintain collaboration between the different branches. However, teachers were found to have positive perceptions regarding the curriculum. Actually, they found it practical and thought that it could enhance students' development. In conclusion, the researchers maintained that teachers generally did not perceive themselves as leaders of the new curriculum. Hence, they suggested material development training sessions for the teachers.

Halat (2007) investigated the views of primary school teachers regarding the new curriculum in Afyonkarahisar. He concluded that teachers had difficulties during the implementation of the new curriculum. However, teachers told that both the inside and outside classroom activities had positive effects on students and themselves. Moreover, they claimed that they found the guide books to be of high quality and shaped their instructional techniques and methods accordingly. Nevertheless, teacher-parent interactions were low and teachers could not access material easily. Finally, the researcher found that gender and place (urban/ non-urban) of the schools did not affect teachers' opinions towards the new curriculum.

In conclusion, various studies have been conducted focusing on teachers' beliefs and perceptions about the curriculum change. In order to achieve the intended changes through implementation of the new curriculum, teachers' practices and beliefs should continue to be analyzed well. This study is expected to make a contribution to the literature by analyzing both primary and mathematics teachers' beliefs especially their efficacy beliefs regarding the new mathematics curriculum conducted in Turkey. The reason for giving attention to teachers' efficacy beliefs in the current study can be explained by citing Sarason (1990 cited in De Mesquita & Drake, 1994). He claims that educational reforms which do not address the teachers' self efficacy beliefs are in the danger of failure.

CHAPTER III

METHOD

This chapter will give basic information about the research design, sample, instrumentation, data collection, procedures and data analysis.

3.1. Research Design

In this study, a survey research design was employed. In this type of research, the researcher is not interested in why the observed distribution occurs, but in what the observed distribution is (Babbie, 1990). Moreover, a cross-sectional survey was utilized with the aim to collect data at one point in time from a sample selected to describe a population (Fraenkel & Wallen, 2006). The purpose of this study was to investigate primary and mathematics teachers' beliefs and perceptions about the implementation of the new curriculum. Another purpose of this study was to explore the relationships between the sub-dimensions of the scale. Furthermore, the study aimed to determine the possible differences in teacher beliefs and perceptions based on their area of certification, experience, gender and number of students in classroom.

The study benefitted from quantitative data, because, as indicated by Tschannen-Moran, Woolfolk Hoy and Hoy (1998), "Quantitative measures typically contribute to our understanding with a snapshot of the efficacy beliefs of a large number of teachers at a particular point in time" (p.242).

3.2. Sample Selection

In the sampling method, schools rather than individuals were randomly selected. All of the schools selected for the study were public schools. The target population of the study was the primary and mathematics teachers working in the schools selected from the cities of Turkey which were Mersin, Eskişehir, Bolu, Ankara and İstanbul. However, the accessible population which the researcher used to generalize the results was the selected districts of the cities. The cities were chosen according to their location in different regions of Turkey and on the basis of their

convenience to the researcher. The schools were randomly selected from these cities. The number of schools and teachers who participated in the study are presented in Table 3.1.

Table 3.1. Number of Schools and Teachers participating in the Study with respect to Locations

Location	Number of Schools	Number of Mathematics Teachers	Number of Primary Teachers	Total (N)
Mersin	11	22	117	139
Eskişehir	11	19	127	146
Bolu	10	19	126	145
Ankara	12	26	181	207
İstanbul	13	23	145	168
Total (N)	57	109	696	805

3.2.1. Demographic Background of the Teachers Participating in the Study

The subjects of this study included 696 primary teachers and 109 mathematics teachers who are teaching at upper primary level. Overall, there were 503 female and 302 male subjects. Teachers were sorted into five groups on the basis of their years of teaching experience. The descriptive values are provided in Table 3.2.

Table 3.2. The Distribution of Teachers (N= 805) by Gender, Teaching Experience, Educational Level, Job Satisfaction and Number of Students in Classroom.

Gender	N	%
Female	503	62.5
Male	302	37.5
Teaching experience		
5 years or less	55	6.8
6-10	118	14.7
11-15	162	20.1
16-20	120	14.9
21 and more years	341	42.4
Educational level		
Teachers' College	62	7.7
Educational Institute	267	33.2
Bachelor's Degree	446	55.4
Master's Degree	24	3.0
Job satisfaction		
Low	14	1.7
Medium	225	28.0
High	557	69.2
Number of students in classroom		
19 students or less	20	2.5
20-29	182	22.6
30-39	423	52.5
40 or more students	180	22.4

Note: Number of missing values is not presented in the table.

3.3. Instrumentation

The data in this study were collected through a survey instrument of which one part was adapted from another instrument called "Teachers Assessment Efficacy Scale (TAES)" (Wolfe, Viger, Jarvinen, & Linksman, 2007) and the other part was

"Turkish Teacher' Sense of Efficacy Scale (TTSES)" (Capa, Cakiroglu, & Sarikaya, 2005) which was originally developed in English by Tschannen-Moran and Hoy (2001). The TAES was a 5-point Likert type agreement scale ranging from 1(strongly disagree) to 5 (strongly agree). It included six parts which are: (1) confidence (i.e., teachers' confidence in using the state standards) (2) impact (i.e., teachers' impressions about the impact of using the standards to benefit classroom instruction) (3) utilization (i.e., teachers' perceived utilization of the standards) (4) utility (i.e., teachers' attitudes concerning the usefulness of the standards (5) experiences (i.e., teachers' reports concerning their familiarity with the standards) (6) students (i.e., teachers' beliefs about including students in the process of development of classroom assessments). The information about the distribution of the items on to the sub-dimensions was obtained from Edward W. Wolfe through electronic mail.

The other instrument, TTSES, had 12 items. Each item was rated on a 9-point scale (1- inadequate, 5-moderately adequate to 9-extremely adequate). Previous research (Capa, Cakiroglu & Sarikaya, 2005) confirmed the scale to have three correlated sub-scales which are: (1) Efficacy for Student Engagement (SE) (2) Efficacy for Instructional Practices (IS) and (3) Efficacy for Classroom Management (CM). The instrument also has a longer version with 24 items; however, in this study, the short form was employed in order to limit the number of total items.

3.3.1. Instrument Development

Within the adaptation process, the TAES was translated in respect to the Turkish school culture. The aim was not to produce two culturally equivalent forms of the scale. Instead, the aim was to obtain equivalence in construct conceptualization between the two languages of the scale. Hence, the conceptual translation method was employed. This method "uses terms or phrases in the target language that capture the implied associations, or connotative meaning, of the text used in the source language instrument" (Braverman & Slater, 1996, p. 94). While some of the culturally aligned items were omitted, some items were added to measure the specific issues in Turkey's curriculum development process. Nevertheless, the sub-dimensions of the original scale were maintained. However,

two sub-dimensions of the original scale "experiences" and "students" were not included in the survey. The first one -experiences- was about teachers' familiarity with the standards and a decision was made to transfer it to the demographic information part of the survey. The second one was about including students in the process of developing classroom assessment. This one was not found to be conceptually valid in the current Turkish educational system; therefore, it was excluded from the survey. Moreover, there were no negatively worded items in the original scale. However, Gable and Wolf (1993) suggest that both positive and negative items should be included in an instrument in order to control the response style. Therefore, some of the items were reworded to include a negative stem by maintaining the corresponded sub-dimension of the item. In addition, the confidence items were rephrased with "can" as Bandura (2006) suggested using "can" to refer to capability while developing efficacy scales because self-efficacy is a perceived capability.

After the adaptation process of the instrument, expert opinion was obtained for the content validation. Fifteen experts, 5 of whom were mathematics teachers, 6 faculty members in mathematics education, 2 faculty members from measurement and evaluation department, 1 lecturer from English language department, and 1 Turkish language lecturer reviewed the items and the underlying dimensions regarding the purpose of the study. After all the experts' views were consulted, some modifications were made accordingly under the supervision of a faculty member in mathematics education.

3.3.2. Instrument Description

The final draft of the instrument consisted of four parts (Appendix B). The first part included 11 items measuring teachers' demographic characteristics such as gender, experience, educational level and area of certification.

The second part included 22 items on a 5-point Likert type agreement scale (1-strongly disagree, 3-undecided, 5-strongly agree) related to the sub-dimensions of (1) efficacy beliefs in terms of the implementation of the new curriculum (e.g. I can prepare measurement and evaluation applications in accordance with the new curriculum) (2) beliefs about the impact of the new curriculum on classroom

instruction (e.g. The courses implemented in the new curriculum motivate the students to learn), and (3) perceptions about the utility or practicability of the new curriculum (e.g. The new curriculum can be employed to determine the knowledge and skills that students need to acquire).

The third part included 24 items on a 5 point Likert type frequency scale (1-never, 3-sometimes, and 5-always) about teachers' perceived utilization of the new curriculum (e.g. I use the new curriculum to prepare problem-solving applications). Twelve items were added to the original sub-scale in order to assess teachers' utilization of special techniques such as cooperative group work and their use of manipulatives during instruction (e.g. I organize cooperative group work activities for my students).

The fourth and the last part included the short form of Turkish teachers' sense of efficacy scale (TTSES) which consisted of 12 9-point scale items (1- inadequate, 5-moderately adequate to 9-extremely adequate) (e.g. How much can you do to control disruptive behaviour in the classroom?).

3.3.3. Pilot Study

The pilot study was conducted with 211 primary and mathematics teachers. Then, reliability analysis, item analysis and exploratory factor analysis (EFA) were employed. Before conducting reliability analysis, the negatively worded items were reversed in order to correspond high values to high agreement in responses. The numbers of these items are 7, 8, 10, 13, 15, 18, 19 and 21. In the results of the reliability analysis, the item-scale correlations of two items was less than .3, indicating that it was measuring some other concept irrelevant to the original scale (Field, 2005). Moreover, the results of item analysis revealed that the same two items had item-scale correlations between .20 and .29 which means that "the item is marginal and needs revision" (Crocker &Algina, 1986, p. 315). Therefore, while one of the items was deleted, the other one was revised by changing the wording since its content domain was considered to be important. The reliability coefficient values were found as .9196 for the first part of the questionnaire (excluding the item mentioned above), .9170 for the second part of the questionnaire and .9205 for the third part of the questionnaire (TTSES). Similarly, the reliability coefficient had been

reported as .93 for TTSES (Capa, Cakiroglu & Sarikaya, 2005). In addition, EFA was conducted; however, since the minimal sample size of 300 was not satisfied (Tabachnick & Fidell, 2007) construct validity could not be confirmed.

3.3.4. Validity and Reliability Issues

3.3.4.1. Reliability Analysis

Reliability is the degree of consistency which the instrument provides with the participants.

In the reliability analysis of the first part of the questionnaire (Items between 1 and 22), all the items had item-total correlations higher than .3, which was expected. Moreover, the scale overall produced a Cronbach alpha coefficient of .895. According to Field (2005), this is a good level of internal consistency since it is around .8.

The second part of the questionnaire (Items between 23 and 46) revealed a reliability coefficient of .9166 which is considered to be high. Indeed, none of the items had item-total correlations of less than .3. The third part of the questionnaire produced a reliability coefficient of .912 which was also considered as highly satisfactory.

Validity, on the other hand, refers to the degree to which a test measures what it intends to measure. Face validity was assured by opinions of experts in the field and in order to provide evidence for construct validity, exploratory factor analysis (EFA) was performed. The purpose was to group the items in sets of underlying factors according to their inter-relationships. As a result, the scale-scores of these extracted factors could be used in further analysis.

3.3.5. Factor Analysis

To assess the factorial structure of the items in the instrument, a factor analysis was performed. There are two methods in factor analysis which are common factor analysis and component analysis. In this study, common factor analysis was employed in order to discriminate the unique variance of each variable from common variance (Costello & Osborne, 2005). Factor analysis was conducted in two stages:

factor extraction and factor rotation. Maximum Likelihood analysis with Direct Oblimin was used for each part of the questionnaire.

Before conducting factor analysis, cases with standardized scores exceeding 3.29 were inspected as being potential outliers (Field, 2005) and 55 cases were excluded from both the factor analysis and the main analysis. Normality was checked by inspecting skewness-kurtosis values. These values were found within the range of ±2. The results of the tests of normality—Kolmogorov-Smirnov and Shapiro-Wilk—indicated significant results violating this assumption; however, it was reported as quite common in large samples (Pallant, 2007); therefore, factor analysis was continued with more caution. Furthermore, according to Tabachnick and Fidell (2007) "It is comforting to have at least 300 cases for factor analysis"; hence, sample size was not a problematic issue in this case. Moreover, the correlation matrix was inspected for the coefficients above .3.

3.3.5.1. Factor Structure of the First part of the Questionnaire (Items between 1 and 22)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's Test of Sphericity were used. KMO value was produced as .912 and Bartlett's Test of Sphericity was found as significant. Kaiser (1974) recommends that KMO statistics greater than .9 are superb which means that the sample size is appropriate for factor analysis (Kaiser, 1974 cited in Field, 2005). Moreover, Bartlett's test of sphericity evaluates whether the correlation matrix is an identity matrix. Since the result was significant, it can be concluded that the data set is appropriate for factor analysis.

Factor Extraction

In various extraction methods, maximum likelihood is chosen as the best method if the data are generally normally-distributed (Costello & Osborne, 2005). Since the data in this study were found to be normally distributed, this technique was utilized. Moreover, direct oblimin which is one of the oblique methods that allow factors to correlate was used in the study and the pattern matrix that resulted was inspected.

In order to decide how many factors to retain, two rules are generally considered. The first one is Kaiser's criterion of retaining factors with eigenvalues greater than 1 and the second one is the Scree test (Cattell, 1966) of eigenvalues plotted versus factors. According to Kaiser's Rule, five eigenvalues were extracted to have a higher value than 1 and 58% of the total variance was explained. According to Stevens (2002), when N > 200 and most of the communalities are reasonably large, the use of the scree test is more appropriate. In light of the results of the scree test, there were three eigenvalues in the sharp descent where they started to level off as shown in figure 3.1 and in this case the scree test seemed more appropriate.

The results showing the initial factor extraction statistics and the Scree plot are shown in Table 3.3 and Figure 3.1 respectively.

Table 3.3. Total Variance Explained (Initial Factor Extraction)

Factor	Initial Eigenvalues			Extraction SS Loadings			Rotation
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.962	31.647	31.647	6.379	28.997	28.997	5.152
2	2.336	10.620	42.267	1.816	8.257	37.254	3.924
3	1.312	5.964	48.230	.827	3.761	41.014	3.347
4	1.135	5.158	53.388	.603	2.742	43.756	1.496
5	1.076	4.891	58.279	.519	2.359	46.115	2.477
6	.875	3.976	62.255				
…							
22	.256	1.164	100.000				

Note. Maximum Likelihood extraction method was used.

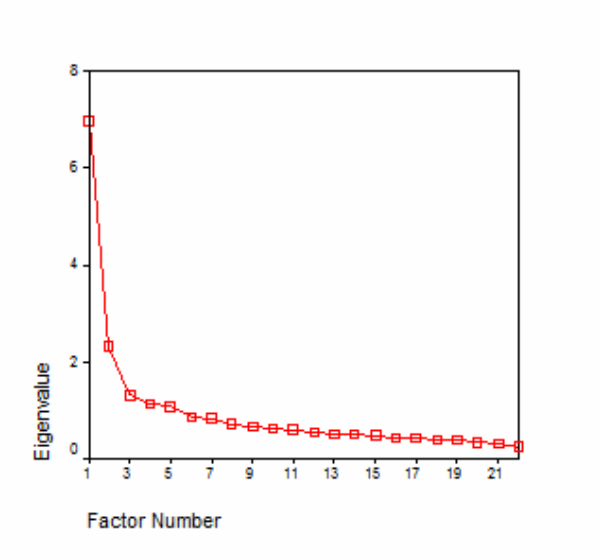

Figure 3.1: Scree Plot of eigenvalues

Factor Rotation

The results with factor extraction of three factors produced the pattern matrix which is presented in Table 3.4. Moreover, as shown in Table 3.3, the first, the second and the third factors accounted for 31.65%, 10.62%, and 5.97% variance of the 22 variables. In total, the three factors accounted for 48.23% of the variable variance.

Table 3.4. Pattern Matrix

Item No	Factor		
	1	2	3
5	**.818**		-.115
2	**.815**		
3	**.790**		
4	**.704**		
1	**.633**		.142
12	**.539**		.179
20	**.422**		.136
9	**.384**		.139
6	**.305**		.259
13		**.649**	
8	.164	**.629**	-.139
10		**.629**	
15		**.585**	.187
19		**.573**	
21		**.560**	.101
18	.183	**.526**	
7		**.486**	
16		-.116	**.737**
17	.138		**.656**
14			**.496**
11	.174		**.354**
22		.101	**.283**

Note. Oblimin with Kaiser Normalization Rotation Method was used.

Factor Interpretation

The factor structure of the adapted scale that emerged was observed to be different than the original one. Construct bias might have occurred, "where the construct under consideration might be functioning differently between the cultures in which the scale was originally developed and the culture for which the scale was adapted" (Berberoglu, 2004).

The first factor extracted (items: 1, 2, 3, 4, 5, 6, 9, 12, 20) was named as teachers' perceptions about the utility and impact of the curriculum. The second factor extracted (items: 7, 8, 10, 13, 15, 18, 19, 21) was composed of items measuring teachers' efficacy beliefs regarding the impact of curriculum. It seems that

teachers responded to the items about the impact of the curriculum parallel to their efficacy beliefs. For example, it is probable that if an individual felt less efficacious in a situation, he or she chose the negative impact of the curriculum; however if a person believed in the practicality of the curriculum, they indicated the curriculum to have a positive impact on instruction. Therefore, this factor was named as teachers' perceptions about the impact of the curriculum regarding their efficacy beliefs. Moreover, the third factor (items:11,14,16,17,22) was named as teachers' efficacy beliefs regarding the new curriculum since this factor was composed of items which included "can" in the wording and was composed of specific situations regarding the new curriculum.

3.3.5.2. Factor Structure of the Second part of the Questionnaire (Items between 23 and 46)

First, the factorability of the data was tested through KMO value and Bartlett's Test of Sphericity. KMO value produced a value of .936 and Bartlett's test of Sphericity was significant. The results showing the initial factor extraction statistics and the Scree plot are shown in Table 3.5 and Figure 3.2 respectively.

Table 3.5. Total Variance Explained (Initial Factor Extraction)

	Factor	Initial Eigenvalues		Extraction SS Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.341	34.755	34.755	7.747	32.280	32.280
2	2.711	11.298	46.053	2.220	9.249	41.530
3	1.002	4.176	50.229	.493	2.052	43.582
4	.975	4.062	54.291			
…						
24	.290	1.209	100.000			

Note. Maximum Likelihood extraction method was used.

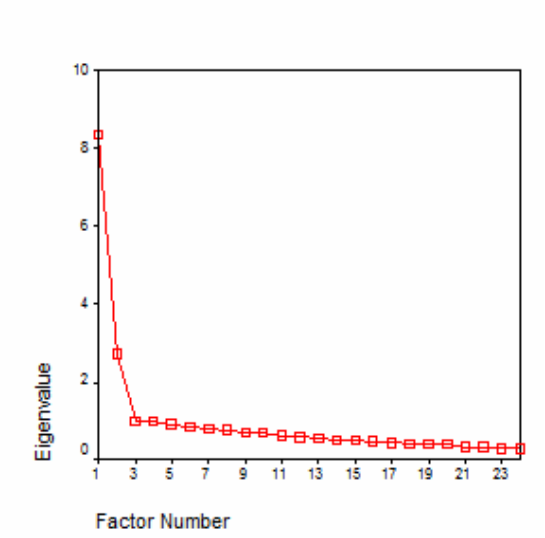

Figure 3.2: Scree Plot

Based on eigenvalue criterion, 50.2% of the variance was explained with three factors extracted; however, two factors extracted in respect to inflection point in the scree plot. In this case, two factors were interpreted to be more meaningful accounting for 46 % of the total variance. The pattern matrix produced from rotation is presented in Table 3.6.

Table 3.6: Pattern Matrix

Item No	Factor	
	1	2
29	**.733**	
25	**.723**	-.114
32	**.717**	
26	**.715**	
27	**.703**	
30	**.700**	
28	**.685**	
31	**.678**	
33	**.665**	
23	**.611**	
24	**.559**	
40		**.773**
41		**.728**
44		**.698**
42		**.659**
43		**.628**
37		**.605**
45		**.574**
35		**.530**
36	.198	**.497**
39	.123	**.493**
38	.140	**.472**
46	.156	**.328**
34	.216	**.313**

Note. Oblimin with Kaiser Normalization Rotation Method was used.

Factor Interpretation

The original utilization items and the added items on the utilization sub-scale were observed to be loaded differently on the two factors. Therefore, while the first one was named as Utilization of Curriculum sub-scale (items: 23 -33); the other one was named as Utilization of Special Techniques sub-scale (items: 34 -46). This is because the latter part consisted of teachers' employment of various techniques such as cooperative group work during mathematics instruction independent of the curriculum.

3.3.5.3. Factor Structure of the Third part of the Questionnaire (The short form of TSES)

The KMO value produced a value of .929 and Bartlett's Test of Sphericity was significant indicating that the data were appropriate for the factor analysis. The initial factor extraction with eigenvalues greater than 1 and the accounted variance are shown in Table 3.7.

Table 3.7. Total Variance Explained (Initial Factor Extraction)

	Factor	Initial Eigenvalues		Extraction SS Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.145	51.211	51.211	5.654	47.116	47.116
2	1.008	8.399	59.610	.627	5.226	52.342
3	.754	6.285	65.895			
…						
12	.293	2.441	100.000			

Note. Maximum Likelihood extraction method was used

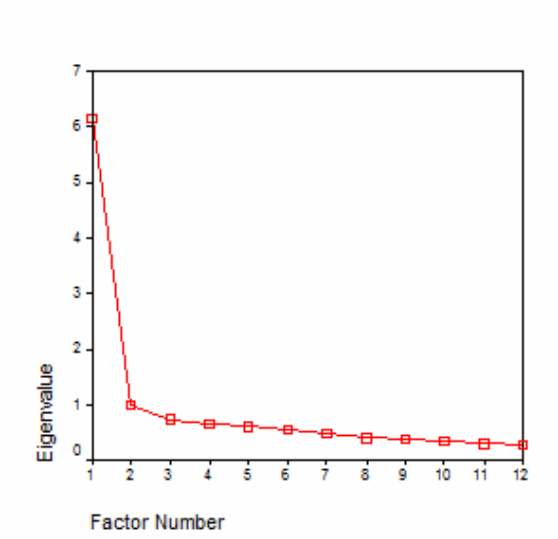

Figure 3.3: Scree Plot

Although Kaiser's criterion maintained two factors accounting for 60% of the total variance, the scree plot indicated one or two factors. The scale was interpreted to be unidimensional accounting 51% of the total variance. Cheung (2006) also found the Chinese version of the short form of TSES administered to 728 primary teachers to be unidimensional. Moreover, Lin and Gorrell (2001) indicated that teacher efficacy is a culturally oriented construct which need to be carefully specified when applied to teachers in different countries. The factor matrix produced is shown in Table 3.8.

Table 3.8. Factor Matrix

Item No	Factor
	1
12	.754
8	.736
3	.715
9	.697
10	.695
7	.691
4	.681
5	.656
1	.655
2	.645
6	.642
11	.630

Note. Oblimin with Kaiser Normalization Rotation Method was used

Factor Interpretation

The TSES sub-scale had been confirmed to have three sub-scales which were Efficacy for Students Engagement (SE), Efficacy for Instructional Practices (IS) and Efficacy for Classroom Management (CM) (Tschannen-Moran & Hoy, 2001; Capa, Cakiroglu, & Sarikaya, 2005). However, it was suggested that both the long and short form of TSES be used in an unidimensional framework (Tschannen-Moran & Hoy, 2001). In this study, the one-factor solution seemed acceptable.

3.3.5.4. Computing the Sub-scale Scores

After the factors were extracted, scale scores were generated by computing the means of scores corresponding to that subscale. The scores of each sub-dimension were found by computing the means of the individual items located in those sub-dimensions by using SPSS Commands. The scores of the first factor indicate teachers' perceptions about the utility and impact of the curriculum (UI). The higher the scores teachers have in this dimension, the more positive perceptions they have about the utility and impact of the curriculum. The scores of the second factor, on the other hand, mean teachers' perceptions about the impact of the curriculum regarding their efficacy beliefs (IRE). The higher the scores teachers possess in this sub-scale, the more positive perceptions they have about the impact of the curriculum regarding their efficacy beliefs and the lower the scores they possess, the more negative perceptions they have about the impact of the curriculum regarding their efficacy beliefs. The scores of the third factor mean teachers' efficacy beliefs regarding the new curriculum (EB). The higher the scores teachers have, the higher efficacy beliefs they perceive in the situations regarding the new curriculum and the lower the scores, the less efficacious teachers felt in actualizing the desired outcome. The scores of the fourth factor mean teachers' perceived utilization of the curriculum (UC). The higher the scores, the more frequent the teachers' perceived utilization of the new curriculum. The scores of the fifth factor mean teachers' perceived utilization of special techniques during mathematics instruction (UT). Therefore, the higher the scores on this sub-scale, the more frequent the teachers' perceived utilization of special techniques during mathematics instruction. Finally, the scores of the sixth factor mean teachers' sense of efficacy beliefs (TSE) regarding classroom management (CM), instructional strategies (IS) and student engagement (SE). The higher the scores, the more teachers felt themselves to be efficacious while the lower the scores, the less efficacious teachers felt themselves to be in general sense of teacher efficacy.

3.3.6. The Reliability Statistics for the Sub-scales

Cronbach (1951 cited in Field, 2005) noted that if a scale has subscales, then the Cronbach's α- the most common measure of reliability- should be applied

separately to these subscales. Therefore, the reliability statistics produced are presented in Table 3.9 with the corresponded sub-scales.

Table 3.9. Reliability statistics of the Sub-scales

Sub-scale	Cronbach's Alpha (α)	Number of Items
Utility and Impact of the curriculum (UI)	.873	9
Impact of the curriculum regarding Efficacy beliefs (IRE)	.821	8
Efficacy beliefs regarding the new curriculum (EB)	.670	5
Utilization of Curriculum (UC)	.910	11
Utilization of Special Techniques (UT)	.864	13
Teachers' Sense of Efficacy (TSE)	.912	12

The reliability coefficients of the sub-scales produced high levels of reliability coefficients except the EB subscale. However; Cortina (1993) noted that the more the number of items in the scale, the higher the Cronbach's α. Therefore, the EB subscale was expected to produce a lower coefficient alpha than the other subscales and since the alpha level is .670, it could be said that the reliability of items is satisfactory. This means that at least 67% of the total EB variance is due to true score variance. Moreover, in all of the sub-scales, the item-total correlations and alpha if item deleted sections were inspected. All of the item-total correlations in the sub-scales were higher than .3 except for item 22 which was found to have an item-total correlation of .27 in the efficacy beliefs regarding the new curriculum (EB) sub-scale. Nevertheless, the alpha coefficient of the sub-scale would be .72 which was higher than the produced one if the item was deleted. Therefore, a decision to omit item 22 in the further use of the scale was made.

3.4. Variables

The variables of the study are presented in Table 3.10.

Table 3.10. The classification of Variables used in the study

Name	Variable Type	Value Type	Scale Type
Gender	Independent	Categorical	Nominal
Teaching Experience	Independent	Categorical	Ordinal
Area of Certification	Independent	Categorical	Nominal
Number of Students in classroom	Independent	Categorical	Ordinal
Utility and Impact of the curriculum scores (UI)	Dependent	Continuous	Interval
Impact of the curriculum regarding Efficacy beliefs scores (IRE)	Dependent	Continuous	Interval
Efficacy beliefs regarding the new curriculum scores (EB)	Dependent	Continuous	Interval
Utilization of Curriculum scores (UC)	Dependent	Continuous	Interval
Utilization of Special Techniques scores (UT)	Dependent	Continuous	Interval
Teachers' Sense of Efficacy scores (TSE)	Dependent	Continuous	Interval

The dependent variables utilized in this study are Utility and Impact of the curriculum scores (UI), Impact of the curriculum regarding Efficacy beliefs scores (IRE), Efficacy beliefs regarding the new curriculum scores (EB), Utilization of Curriculum scores (UC), Utilization of Special Techniques scores (UT), and Teachers' Sense of Efficacy scores (TSE). The independent variables of this study are noted as follows: Gender (Male or female), Area of Certification (Primary teacher and mathematics teacher), Teaching Experience (Less than 5 years, 6-10, 11-15, 16-20, 21 and more years) and Number of Students in the classroom (19 or less, 20-29, 30-39 and 40 or more).

3.5. Procedures

Official permission was obtained from the Ministry of Education (Appendix A) before data collection was initiated in the 2nd semester of the academic year 2007-2008. All of the schools were visited by the researcher. First, the administrators of the schools were informed about the purpose of the study and one copy of the written permission was left. Then, the primary and mathematics teachers were found generally in the teachers' room during the short and long breaks and after the

purpose of the study was explained, the questionnaire was administered face-to-face. Some of the teachers were also allowed to complete the questionnaires at home since they left the school at noon. These teachers returned their questionnaires the following day. All teachers were assured of the significance of their participation in the study. In addition, some of the teachers were met in their free hours. This allowed the researcher not only to administer the questionnaire, but also to conduct interviews with them.

3.6. Data Analysis

The data were analyzed using both descriptive and inferential statistics. In order to find the answers to the research questions, multivariate analysis of variance (MANOVA) was conducted. MANOVA is an extension of analysis of variance when there is more than one dependent variable and it takes account of the correlation between dependent variables in the analysis (Field, 2005). It has an advantage of controlling the risk of Type-1 error, which means that the researcher rejects the null hypothesis that is actually true, thus claiming a significant effect although it does not exist (Fraenkel & Wallen, 2006). Furthermore, MANOVA also provides univariate ANOVAs in the output to observe the separate effects of independent variables on each dependent variable (Field, 2005); however the significance of the follow-up tests should be evaluated by using Bonferroni method by dividing the alpha by the number of dependent variables in the analysis.

CHAPTER IV

RESULTS

In this chapter, first descriptive statistics results, then inferential statistics results will be presented. For the inferential part, results of multivariate analysis of variance (MANOVA) will be demonstrated.

4.1. Descriptive Results

The first research question was about determining teachers' perceptions and beliefs with respect to the 6 variables; Utility and Impact of the new curriculum (UI), Impact of the curriculum regarding Efficacy beliefs (IRE), Efficacy beliefs regarding the new curriculum (EB), Utilization of Curriculum (UC), Utilization of Special Techniques (UT), and Teachers' Sense of Efficacy beliefs (TSE). To investigate the research question, first a summary of the descriptive results corresponding to the independent variables were calculated (Table 4.1) and then, overall mean descriptive statistics were found.

Research Question 1: What is the portrait of teachers with respect to the following variables: Utility and Impact of the new curriculum (UI), Impact of the curriculum regarding Efficacy beliefs (IRE), Efficacy beliefs regarding the new curriculum (EB), Utilization of Curriculum (UC), Utilization of Special Techniques (UT) and Teachers' Sense of Efficacy beliefs (TSE)?

Table 4.1. Mean Scores and Standard deviations for the dependent variables by Gender, Experience, Area of certification and Number of students in classroom

	UI		EB		IRE		UC		UT		TSE	
	M	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**
Gender												
Female (N=442)	3.59[a]	0.588	3.71[a]	0.525	3.35[a]	0.618	3.60[a]	0.607	3.82[a]	0.493	7.13[b]	0.849
Male (N =262)	3.66[a]	0.608	3.78[a]	0.571	3.26[a]	0.716	3.69[a]	0.574	3.85[a]	0.517	7.30[b]	0.832
Experience												
5 or less (N=49)	3.55[a]	0.544	3.64[a]	0.521	3.42[a]	0.607	3.42[a]	0.577	3.61[a]	0.485	7.07[b]	0.836
6-10 (N=104)	3.58[a]	0.624	3.70[a]	0.523	3.39[a]	0.550	3.58[a]	0.585	3.68[a]	0.484	7.04[b]	0.800
11-15 (N=147)	3.64[a]	0.573	3.77[a]	0.510	3.41[a]	0.640	3.66[a]	0.546	3.90[a]	0.473	7.20[b]	0.869
16-20 (N=109)	3.58[a]	0.672	3.71[a]	0.512	3.22[a]	0.667	3.69[a]	0.642	3.86[a]	0.458	7.15[b]	0.818
21 or more (N=289)	3.65[a]	0.577	3.75[a]	0.581	3.27[a]	0.699	3.66[a]	0.608	3.88[a]	0.521	7.27[b]	0.860
Area of Cert.												
Primary (N=608)	3.64[a]	0.588	3.76[a]	0.538	3.33[a]	0.669	3.64[a]	0.601	3.85[a]	0.505	7.19[b]	0.846
Math's (N=96)	3.47[a]	0.612	3.57[a]	0.545	3.24[a]	0.577	3.60[a]	0.569	3.75[a]	0.476	7.17[b]	0.852
# of Students in Classroom												
19 or less (N=19)	3.60[a]	0.675	3.82[a]	0.485	3.17[a]	0.666	3.78[a]	0.545	3.91[a]	0.404	7.64[b]	0.794
20-29 (N=158)	3.58[a]	0.584	3.72[a]	0.528	3.30[a]	0.656	3.58[a]	0.618	3.83[a]	0.481	7.21[b]	0.828
30-39 (N=369)	3.67[a]	0.592	3.78[a]	0.533	3.35[a]	0.681	3.67[a]	0.590	3.87[a]	0.509	7.22[b]	0.834
40 or more (N=158)	3.53[a]	0.591	3.64[a]	0.576	3.27[a]	0.598	3.60[a]	0.591	3.73[a]	0.504	7.06[b]	0.881

[a]The highest possible score is 5; the lowest possible score is 1.

[b]The highest possible score is 9; the lowest possible score is 1

When the gender variable was inspected in table 4.1, the mean scores of male teachers were observed to be higher than the mean scores of female teachers in all of the dependent variables UI, EB, UC, UT, and TSE except IRE. Moreover, in respect to the area of certification variable, the mean scores of primary teachers were higher than the mean scores of mathematics teachers in all of the dependent variables. Furthermore, when the teachers' mean scores regarding the number of students in classroom were examined, the mean scores of teachers having 19 or less students in classroom were observed to possess the highest means in EB, UC, UT and TSE. However in UI and IRE dimensions, teachers having 30-39 students in classroom were observed to have the highest means. Finally, when mean scores in the experience variable were examined, teachers possessing 21 or more years of teaching experience had the highest means in UI and TSE and teachers with 5 years or less experience had the highest means in IRE while their mean scores were the lowest in EB, UC and UT.

The overall means and standard deviations for each scale are presented in Table 4.2.

Table 4.2. Descriptive Statistics for Each Dependent Variable

Dependent Variables	N	M	SD
UI	732	3.61[a]	0.598
IRE	732	3.31[a]	0.656
EB	732	3.73[a]	0.545
UC	714	3.64[a]	0.599
UT	733	3.84[a]	0.508
TSE	723	7.19[b]	0.846

[a]The possible highest score is 5; the possible lowest score is 1.

[b]The possible highest score is 9; the possible lowest score is 1.

Table 4.2 shows that, teachers obtained the highest mean scores in the agreement part of the scale (M=3.73, SD=0.545) on their efficacy beliefs regarding the new curriculum. Moreover, the results showed that they utilized the special techniques during instruction more frequently (M=3.84, SD=0.508) than the utilization of the

general ideas of the new curriculum (M = 3.64, SD=0.599) resulted in the frequency part of the scale. In addition, teachers' general sense of efficacy beliefs about classroom management, student engagement and instructional strategies was found to be near the "very competent" level (M=7.19, SD=0.846).

4.2. Inferential Results

MANOVA was employed to predict several continuous variables by a set of discrete independent variables. In this study, there are four independent variables: Area of certification, gender, teaching experience and number of students in classroom. Investigating the difference between the primary and mathematics teachers in terms of their perceptions and beliefs about the new mathematics curriculum was the main purpose of the study. Therefore, an attempt was made to analyze the area of certification variable separately from the other variables. Moreover, when the other three independent variables (gender, experience and number of students in classroom) were included in the analysis simultaneously, no significant interaction effect was found between them. Therefore, further Multivariate analyses were also run separately and the alpha level was adjusted by dividing it to four in order to prevent type 1 error in the multivariate results. On the other hand, power of MANOVA depends on the relationship of dependent variables. That is, the higher the correlation between them, the more the power (Tabachnick & Fidell, 2007). Thus, the correlation coefficients between the dependent variables were investigated and they were observed to be between .126 and .609.

4.2.1. Assumptions of MANOVA

Before conducting the analysis, several assumptions of MANOVA were checked. The requirement about *sample size* indicates having more cases in each cell than the number of dependent variables (Pallant, 2007) which was already met in this study as shown in Table 4.1. On the other hand, missing values which revealed a percentage of 2.6 % or lower missing values of the total scores were neglected in the study.

For the *assumption of independent observation*, although the data were collected from 57 different schools, it might not be sufficient to meet this

assumption. Therefore, acquiring no practical way of this assumption, the analysis was continued while being cautious about violation of independence.

Multivariate normality assumption was checked by controlling the univariate and bivariate normality. In order to check univariate normality, skewness and kurtosis values for each cell were observed and found to be between ±2 for all of the dependent variables as shown in Table 4.3.

Table 4.3. Skewness and Kurtosis Values for Each Dependent Variable

	UI		EB		IRE		UC		UT		TSE	
	Skew	**Kurt**	**Skew**	**Kurt**	**Skew**	**Kurt**	**Skew**	**Kurt**	**Skew**	**Kurt**	**Skew**	**Kurt**
Gender												
Female	-.79	.45	-.39	.30	-.14	-.41	-.45	.03	-.17	.14	-.23	-.07
Male	-.93	1.04	-.65	1.21	-.15	-.28	-.24	-.25	-.17	.09	-.31	.28
Experience												
5 or less	-.86	.70	-.80	1.44	-.24	-.49	-.36	-.46	-.31	.22	.03	-.66
6-10	-.91	.60	-.13	.48	-.37	-.16	-.39	.27	-.42	.01	-.34	-.37
11-15	-.62	.24	-.41	.44	-.17	-.04	-.40	-.28	.01	.45	-.11	-.05
16-20	-.79	.78	-.48	1.75	-.27	-.45	-.67	.81	-.06	.01	-.14	.06
21 or more	-.91	.75	-.58	.48	-.03	-.37	-.32	-.24	-.22	-.03	-.46	.42
Area of Cert.												
Primary	-.88	.80	-.49	.64	-.17	-.30	-.43	.03	-.17	.17	-.26	.09
Math's	-.58	.11	-.49	1.00	-.27	-.43	-.12	-.24	-.14	-.10	-.25	-.31
# of Students in Classroom												
19 or less	-.62	.40	-.63	1.38	.23	-.21	-1.06	1.45	.09	-.58	.40	-1.19
20-29	-.91	.72	-.57	1.25	-.19	-.32	-.23	-.66	-.08	.40	-.20	-.08
30-39	-.79	.65	-.63	.71	-.19	-.27	-.54	.41	-.14	-.06	-.30	.19
40 or more	-.99	.72	-.14	.43	-.19	-.34	-.16	-.08	-.34	.25	-.25	-.18

Moreover, Kolmogorov-Smirnov and Shapiro-Wilks statistics were examined; however, they revealed significant results indicating non- normality. According to Pallant (2007), in large samples violation of the assumption of normality is quite met. When Normal Q-Q Plots of all the dependent variables were inspected, almost straight lines were observed suggesting a normal distribution. In addition, bivariate normality was checked by inspecting the scatterplots between all of the pairs of the dependent variables. The scatterplots were observed as almost elliptical which indicates bivariate normality.

On the other hand, univariate outliers were checked with boxplots and 5% trimmed mean. It is noted that if there are minimal differences between the 5% Trimmed Mean and the actual mean, it means that extreme cases do not have high influence on the mean which was the case in this study (Pallant, 2007). Moreover, in the data $z = \left|3.3\right|$ criterion were used, by computing the standardized z-scores for dependent variables and no outliers were detected (Tabachnick & Fidell, 2007). Furthermore, Mahalanobis distances were calculated by using the Regression menu in order to check for multivariate outliers. If Mahalanobis distance of a case is greater than the critical value which is given according to the number of dependent variables (Pallant, 2007, p. 280), it means the case is an outlier. In this study, there are six dependent variables, so the critical value is 22.46. Therefore, in the column MAH_1 produced in the data, the five cases which had higher values than the critical value were inspected and deleted from further analysis.

Another assumption of the MANOVA was the *homogeneity of population covariance matrix for dependent variables*. Box's M Test of Equality of Covariance Matrices and Levene's test which are both outputs of MANOVA were used in order to check this assumption (Field, 2005). Levene's test assesses whether the null hypothesis that indicates error variance of the dependent variable is equal across groups. Since this assumption needs to be confirmed for each of the four MANOVA procedures in the current study, the conclusions regarding this assumption are presented in following sections.

4.2.2. Results Regarding Area of Certification

In the first MANOVA, the following research question was investigated: Is there a statistically significant difference between teachers' perceptions and beliefs regarding the curriculum and general efficacy beliefs by area of certification (primary or mathematics teacher)?

The result of the Box's M test showed that homogeneity of variance-covariance matrix assumption was met for the analysis, F (21, 102491.7) = 1.045, p>.05. Levene's test results are presented in Table 4.4. As can be seen, the assumption was observed to have been met. When there are two levels of an independent variable, all multivariate test statistics are equal to each other; therefore, Wilks' Lambda was chosen in order to test the significance.

Table 4.4. Levene's Test of Equality of Error Variances

	F	**df1**	**df2**	**Sig.**
UI	.608	1	702	.436
IRE	3.446	1	702	.064
EB	.013	1	702	.911
UC	.445	1	702	.505
UT	.123	1	702	.726
TSE	.052	1	702	.819

MANOVA results regarding the area of certification of teachers are presented in Table 4.5. Results of MANOVA indicated that Wilks' Lambda revealed a significant effect for area of certification (Wilks' Lambda =0.976, F (6.000, 697.000) = 2.800, p<.0125, η^2=.024) on the combined dependent variables.

Table 4.5. MANOVA Results for Area of certification

Effect	**Wilks' Lambda**	**F**	**Hypothesis df**	**Error df**	***P***	**Partial η^2**	**Observed Power**
Area of certification	.976	2.800	6.000	697.000	.011	.024	.884

Follow-up analyses of variances on each dependent variable are presented in Table 4.6 and significance was tested using the Bonferroni method. Each comparison was tested at the alpha level of .002 which was calculated by dividing the selected alpha level of .0125 by the number of dependent variables (.0125÷6). The univariate ANOVA for area of certification was significant on EB, F (1, 702) = 4459.033, p<.001, η^2 = .015. The partial eta squared value of .015 represented that the 1.5 % of the variance in EB could be explained by area of certification. Moreover, the observed power- the probability of detecting a significant effect when the effect truly does exist in nature-was found to be .896 which is very high (Field, 2005).

Table 4.6. Tests of Between-Subjects Effects

Source	Dependent Variable	df	F	*p*	Partial η^2	Observed Power
Area of certification	UI	1	4189.900	.007	.010	.774
	IRE	1	3574.510	.188	.002	.260
	EB	1	4459.033	.001	.015	.896
	UC	1	4349.029	.518	.001	.099
	UT	1	4779.916	.068	.005	.446
	TSE	1	17109.087	.803	.000	.057

Descriptive results yielded that primary teachers (M = 3.76, SD = .538) possessed significantly higher efficacy beliefs regarding the new curriculum than mathematics teachers (M = 3.57, SD=.545).

4.2.3. Results Regarding Gender

The second MANOVA was conducted to answer the second research question:

Is there a statistically significant difference between female and male teachers' perceptions and beliefs regarding the curriculum and general efficacy beliefs? One-way MANOVA was employed in order to analyze the effect of gender on the collective dependent variables. The relevant descriptive statistics are provided in Table 4.1. The result of the Box's M test showed that the assumption was not met

for the analysis, F (21, 1122058) = 2.124, p<.05. The unequal cell sizes may have affected the value to be significant. However, it was not less than .001. Hence, the result of the analysis could be trusted with caution (Field, 2005). Moreover, Pillai's Trace statistics needed to be considered in the analysis, since it is more robust to the violation of this assumption (Tabachnick & Fidell, 2007). Levene's test result is presented in Table 4.7 and it was observed that the homogeneity of variance assumption was not met for only IRE.

Table 4.7. Levene's Test of Equality of Error Variances

	F	df1	df2	Sig.
UI	.015	1	702	.901
IRE	4.865	1	702	.028
EB	.003	1	702	.952
UC	1.011	1	702	.315
UT	.402	1	702	.526
TSE	1.212	1	702	.271

Second MANOVA results were about the gender differences, which are presented in Table 4.8. Results of MANOVA indicated that Pillai's Trace revealed a significant effect for gender (Pillai's Trace =0.034 F (6.000, 697.000) = 4.124, p<.0125, η^2=.034).

Table 4.8. MANOVA Results for Gender

Effect	Pillai's Trace	F	Hypothesis df	Error df	*p*	Partial η^2	Observed Power
Gender	.034	4.124	6.000	697.000	.000	.034	.977

Follow-up analyses of variances on each dependent variable are presented in Table 4.8 and significance was tested again by using the Bonferroni method. Each comparison was tested at the alpha level of .002 which was calculated by dividing the selected alpha level of .0125 by the number of dependent variables (.0125÷6). The univariate ANOVA for gender was not significant on any of the dependent variables presented in Table 4.9.

Table 4.9. Tests of Between-Subjects Effects

Source	Dependent Variable	df	F	*p*	Partial η^2	Observed Power
Gender	UI	1	2.138	.144	.003	.309
	IRE	1	3.519	.061	.005	.465
	EB	1	2.217	.137	.003	.318
	UC	1	3.505	.062	.005	.464
	UT	1	.362	.548	.001	.092
	TSE	1	6.888	.009	.010	.746

The results showed no significant difference between males and females on the collective dependent variables. Therefore, the significance in MANOVA had been revealed by the effect of the correlation between the dependent variables. Although found not to be statistically significant, descriptive results indicated that male teachers had stronger perceptions and beliefs about the curriculum than females except for the dimension of IRE (Table 4.1). Moreover, the sense of efficacy beliefs of males was found to be higher than females.

In continuation of MANOVA and Univariate ANOVA, Discriminant Function Analysis (DFA) was conducted to capture how the dependent variables discriminate between the groups since there was significance in MANOVA but not in univariate ANOVAs when the relationship between dependent variables were not considered (Field, 2005). In the DFA output, Wilks' Lambda was found significant. The $p< 0.001$ score indicates that the combination of dependent variables significantly discriminate the females and males. Standardized function coefficients showed that the dependent variables IRE and TSE strongly contributed to the combined dependents in an opposite way because of the negative sign as shown in Table 4.10.

Table 4.10. Standardized Canonical Discriminant Function Coefficients

	Function
	1
UI	.367
IRE	-.815
EB	.201
UC	.431
UT	-.586
TSE	.827

Furthermore, Functions at Group Centroids output was used to determine the group which had an opposite sign that is discriminated by the combined dependents (Field, 2005). The results showed that females were discriminated by the combined dependents.

4.2.4. Results Regarding the Teaching Experience

The third MANOVA was conducted to analyze the effect of experience on the collective dependent variables. The following research question was investigated: Is there a statistically significant difference between teachers' perceptions and beliefs regarding the curriculum and general efficacy beliefs by their years of experience (5 years or less, 6-10, 11-15, 16-20 and 20 years or more)?

Relevant descriptive statistics were provided in Table 4.1. The result of the Box's M test showed that the assumption was met for the analysis, F (84, 189794.5) = 1.129, p>.05. Levene's test result is presented in Table 4.11. It was observed that the assumption was not met for only IRE.

Table 4.11. Levene's Test of Equality of Error Variances

	F	df1	df2	Sig.
UI	.650	4	693	.627
IRE	2.765	4	693	.027
EB	1.292	4	693	.272
UC	.473	4	693	.756
UT	.940	4	693	.440
TSE	.144	4	693	.966

The results of MANOVA are presented in Table 4.12. Results of MANOVA indicated that Wilks' Lambda revealed a significant effect for experience (Wilks' Lambda =0.929, F (24.000, 2401.335) = 4.124, p<.0125, η^2=.018).

Table 4.12. MANOVA Results for Experience

Effect	Wilks' Lambda	F	Hypothesis df	Error df	*p*	Partial η^2	Observed Power
Experience	.929	4.124	24.000	2401.335	.001	.018	.993

Follow-up analyses of variances on each dependent variable are presented in Table 4.13 and significance was tested using the Bonferroni method. Each comparison was tested at the alpha level of .002 which was calculated by dividing the selected alpha level of .0125 by the number of dependent variables (.0125÷6). The univariate ANOVA for experience was significant for UT, F (4, 693) = 6.417, p<.001, η^2 = .036. The partial eta squared value of .036 represented that the 3.6 % of the variance in UT could be explained by experience. Moreover, the observed power was found to be .991 which is very high.

Table 4.13. Tests of Between-Subjects Effects

Source	Dependent Variable	df	F	*p*	Partial η^2	Observed Power
Experience	UI	4	.561	.691	.003	.188
	IRE	4	2.285	.059	.013	.668
	EB	4	.751	.557	.004	.243
	UC	4	2.322	.055	.013	.676
	UT	4	6.417	.000	.036	.991
	TSE	4	1.787	.130	.010	.547

Post-hoc analysis yielded that teachers with 11-15, 16-20 and 21 and more years of experience had significantly higher scores of perceived utilization of specific techniques than teachers with 5 and fewer years of experience. Furthermore, teachers with 6-10 years of experience had significantly lower scores of perceived utilization than teachers with 11-15 and 21 and more years of experience. Therefore, while teachers with 11-15 years of experience had the highest means, teachers possessing 5 or fewer years of experience possessed the lowest means on UT.

4.2.5. Results with Respect to Number of Students in the Classroom

In the fourth MANOVA, the following research question was investigated: Is there a statistically significant difference between teachers' perceptions and beliefs regarding the curriculum and general efficacy beliefs in respect to the number of students in the classroom (19 or less, 20-29, 30-39 and 40 or more students)?

The result of the Box's M test showed that homogeneity of variance-covariance matrix assumption was met for the analysis, F (63, 14023.231) = .911, $p>.05$. Moreover, Levene's test results are presented in Table 4.14. As can be seen, the assumption was observed to have been met.

Table 4.14. Levene's Test of Equality of Error Variances

	F	df1	df2	Sig.
UI	.130	3	700	.942
IRE	1.426	3	700	.234
EB	.582	3	700	.627
UC	1.153	3	700	.327
UT	.755	3	700	.520
TSE	.269	3	700	.848

The findings of MANOVA by number of students in the classroom are presented in Table 4.15. Results of MANOVA indicated that Wilks' Lambda revealed a non-significant effect for number of students in the classroom (Wilks' Lambda =0.960, $\underline{F}$ (18.000, 1966.242) = 1.581, p>.0125, η^2=.013).

Table 4.15. MANOVA Results for Number of students in classroom

Effect	Wilks' Lambda	F	Hypothesis df	Error df	*p*	Partial η^2	Observed Power
# of students in classroom	.960	1.581	18.000	1966.242	.057	.013	.920

Although not identified to be significant, descriptive results indicated that teachers' efficacy beliefs about the curriculum and their sense of efficacy beliefs were the highest in the classroom having 19 or less students and they were found to decrease as the classroom size increases.

4.2.6. Summary of Inferential Results

To sum up, separate MANOVA analysis indicated that area of certification and experience had a significant difference on the collective dependent variables, while the number of students and gender did not. Results revealed that primary teachers had significantly stronger efficacy beliefs about the new curriculum than mathematics teachers. Moreover, teachers with 11-15 and 21 and more years of experience were significantly found to possess a higher perceived utilization of

special techniques than teachers with 10 years or less experience. In a similar sense, teachers with 16-20 years of experience were found to have a significantly higher perceived utilization of special techniques than teachers with 5 or fewer years of experience. On the other hand, the number of students in the classroom was found to have no significant effect on teachers' beliefs and perceptions about the new curriculum as well as on their sense of efficacy beliefs. Although not found to be significant, teachers who have 19 or less students in their classroom were found to have the highest efficacy beliefs about the new curriculum and the strongest sense of efficacy beliefs among other teachers. Moreover, the means statistics showed that the efficacy beliefs of teachers were observed to decrease while the classroom size increases. Likewise, no significant difference was found between males and females on the collective dependent variables. However, male teachers were found to have stronger perceptions and beliefs about the curriculum than females except for the IRE dimension and their sense of efficacy beliefs were found to be higher than female counterparts.

CHAPTER V

DISCUSSION AND RECOMMENDATIONS

5.1. Discussion

The main purpose of this study was to examine primary school and mathematics teachers' beliefs and perceptions about the new curriculum and to gain a general understanding of their sense of efficacy beliefs. Another purpose of the study was to identify differences, if any, in teachers' beliefs and perceptions based on their gender, experience and number of students in the classroom. In this chapter, first, findings of the study will be summarized successively, then the implications about the major findings will be discussed under the headings and recommendations for future research will be presented.

5.1.1. Discussion based on the descriptive results

The findings of this study suggested that primary teachers and mathematics teachers scored the highest in their efficacy beliefs about the implementation of the new curriculum (EB) in their general mean scores. However, their scores in this dimension indicated that they were slightly above the medium level (M=3.73). In a study conducted by Gözütok, Akgün and Karacaoğlu (2005), the results showed that teachers felt themselves to be more competent in the implementation of the new curriculum than the professors who observed and rated them in their classroom. On the other hand, Erdal (2007) found that teachers felt inadequate in using new alternative assessment methods in the new curriculum.

Regarding the teachers' responses about the frequency of their use of the ideas given in the new mathematics curriculum, teachers reported to utilize both general curriculum recommendations and specific techniques. Furthermore, teachers' responses indicated that they use specific techniques during mathematics instruction more frequently (M=3.84) than utilizing the general ideas of new curriculum (M = 3.64). The techniques mentioned in this study included cooperative group work,

manipulative usage, organization of the projects, and application of performance-based assessments which were suggested by the new curriculum (MEB, 2005). Therefore, this difference between the perceived utilization of the curriculum and techniques might have resulted from teachers' benefitting from the techniques offered by the curriculum but not benefitting as much from the general ideas of the new curriculum. Smith (1996) has an argument that may explain this situation. He argued that teachers may make "paste-on adjustments" in their teaching by incorporating group work activities, and utilizing manipulative, technological tools while leaving their core beliefs intact about the "teaching by telling model". In other words, teachers may believe that they are implementing the new curriculum when in fact they are just adding some elements to their old traditional form of teaching. In addition, the literature includes many studies that focus on teachers' utilization of the curriculum. For example, Ulubay (2007) found that mathematics teachers who were working in the pilot schools highly utilized the new methods and techniques offered by the curriculum. However, they reported to moderately utilize the manipulatives and evaluation techniques. The teachers in Orbeyi's (2007) study, on the other hand, reported to rarely utilize the manipulative materials during instruction. Also, Gömleksiz and Bulut (2007) indicated that primary teachers' perceived use of the new mathematics curriculum was high. Özpolat, Sezer, İşgör and Sezer (2007) stated that teachers had positive perceptions regarding the curriculum and found the curriculum practical. Despite much research indicating that teachers utilized the curriculum, Soycan (2006) in her study, indicated that teachers did not use the new curriculum guide book while preparing for teaching.

Finally, teachers' sense of efficacy beliefs scores was found to be high, indicating that they feel "very competent" about general teaching situations (M=7.19). Analysis of the literature shows that Cerit (2007) also found primary teachers' sense of efficacy to be high (M =3.75) based on the results obtained from the application of the 5-likert point TSES. However, Wheatley (2005) proposed that many pre-service and in-service teachers like to seem more confident in themselves than they really are. Hence, the results obtained need to be interpreted with caution.

5.1.2. Teachers' beliefs and perceptions based on area of certification

Results indicated that primary teachers had significantly stronger efficacy beliefs about the new curriculum (EB) than mathematics teachers. This result is interesting in the sense that primary teachers who teach all subjects possessed higher efficacy beliefs in the implementation of the curriculum than mathematics subject-matter teachers. One of the reasons may be that primary teachers teach younger students than mathematics teachers. For example, Ross (1994) noted that declines occur in teacher efficacy when the grade levels taught are increased. Also, Capa (2005) found that elementary school teachers were more efficacious about student engagement than secondary school teachers in their first-year of teaching. Another possible reason for the lower sense of efficacy in the mathematics teachers may be because the new mathematics curriculum has been implemented since 2005 and it was first conducted in primary grades (1-5), then in the upper primary grades (6-8). Therefore, primary school teachers have been implementing the new curriculum for a longer time than mathematics teachers; thus, primary school teachers may be more acquainted with the new curriculum. Furthermore, primary teachers may have more congruent practices with the new curriculum such as developing and using hands-on activities with their students in the primary levels. Therefore, they may have felt more efficacious than mathematics teachers in the implementation of the new curriculum. A study was conducted by Wilson and Cooney (2002) including mathematics and primary teachers. The results showed that while the mathematics teachers focused on content knowledge; elementary teachers focused on different views of instructional strategies that claimed to have more "constructivist-oriented" views (p.143). Another claim for this result may be, in the grades between 6^{th} and 8^{th}, upper primary level, there are national examinations held at the end of each year for the purpose of placement of students to high schools after the 8^{th} grade. Therefore, mathematics teachers may focus more on the scope of these examinations during their instructions rather than the requirements of the new curriculum, so that they may feel less efficacious about the new curriculum than primary teachers. Moreover, Ross, et al. (1999) found that only the teachers' area of specialization was a significant predictor of teacher efficacy; however, that study can only be generalized to secondary school teachers. On the other hand, Battista (1994) underlined the need

for primary school teachers to specialize in subject matter areas such as mathematics in order to be congruent with curriculum reform practices. Furthermore, in all other dimensions, while primary and mathematics teachers' perceptions and beliefs about the new mathematics curriculum did not differ significantly, primary teachers' perceptions and beliefs were found to be higher than mathematics teachers.

5.1.3. Teachers' beliefs and perceptions based on experience

Results indicated that teachers with 11-15 and 21 and more years of experience had significantly higher perceived utilization of special techniques (UT) than teachers possessing 10 or less years of experience. Moreover, teachers with 16-20 years of experience possessed significantly higher perceived utilization of special techniques than teachers with 5 or less years of experience. The first five years of teaching profession is a period where teachers are in the beginning of experiencing the learning to teach and developing ideas about themselves as a teacher. This may be a reason of why less experienced teachers perceive themselves to utilize the specific techniques suggested in the new curriculum less frequently. Ghaith and Shaaban (1999), founding their measurement on Veenman's (1984) list of teaching problems pointed out that teachers' concerns about teaching decrease after 15 years of experience. Therefore, more experienced teachers were expected to integrate special techniques more frequently than their beginning or less experienced counterparts since they may have less concerns about other issues such as maintaining classroom management and discipline. Veenman (1984) also called the first-year experience of teachers as a "reality shock" because of the gap between the theory they learned and the practice they are engaged in.

Furthermore, Ulubay (2007) found that teachers with 21 or more years of experience reported to use the manipulatives significantly more than the teachers with 5 or fewer years of experience which is one of the techniques underlined in this study. Moreover, Akça (2007) found that primary teachers with 16-20 years of experience had significantly higher positive opinions of the curriculum than the other teachers and Şahin (2007) found that primary teachers possessing 15-24 years experience had the highest positive perceptions whereas teachers possessing 5-14 years experience had the least positive perceptions about the new mathematics

curriculum. On the contrary, Ghaith and Yaghi (1997) found that experience was negatively correlated with attitudes toward instructional innovation. There are also studies which found no difference of experience on teachers' attitudes; for instance, Orbeyi (2007) found that primary teachers' opinions regarding the objectives, content, teaching-learning process and measurement and evaluation components of the new curriculum did not differ significantly in terms of teachers' experience. Yılmaz (2006) also found no significant effect of experience on teachers' general opinions about the new curriculum.

Interestingly, the study revealed that, although found to be insignificant, teachers' efficacy beliefs about the new curriculum (EB) increased when teaching experience increased. However, De Mesquita and Drake (1994) investigated primary school teachers' attitudes and efficacy beliefs towards a nongraded state mandated educational reform and found that teachers possessed a lower-sense of efficacy when their experience increased. Teachers' sense of efficacy beliefs (TSE), on the other hand, was found to increase when teaching experience increased although this increase was not found to be significant. Wenner also (2001) indicated in his study with pre-service and in-service teachers that experience leads to greater perceived efficacy of teachers. However, Cerit (2007) found that teachers' efficacy beliefs decreased as experience increased based on the results he obtained by employing TSES.

5.1.4. Teachers' beliefs and perceptions based on number of students in classroom

The number of students in classroom was found to have no significant effect on teachers' beliefs and perceptions about the new curriculum as well as on their sense of efficacy beliefs. Descriptive results revealed that teachers who have 19 or less students in their classroom had the highest efficacy beliefs about the new curriculum (EB) and the strongest sense of efficacy beliefs (TSE) among other teachers. Moreover, the efficacy beliefs of teachers were observed to decrease while the classroom size increases. Ashton, et al. (1983) found that teachers indicated class size as an important factor in their ability to motivate students effectively. Gelbal and Kelecioğlu (2007) conducted a study about teachers' competencies in terms of

the measurement and evaluation component of the new curriculum and found that a high number of students in a classroom was considered as a restriction to teachers' use of the new measurement and evaluation methods in the curriculum. Moreover, Özpolat, Sezer, İşgör and Sezer (2007) investigated teachers' opinions about the new curriculum and indicated that in order to implement the activities better, the number of students in each class needed to decrease. Similarly, Kartallıoğlu (2005) found that 75% of the primary teachers working in the pilot schools in Bolu thought that the curriculum could be "implemented" if the high number of class sizes were adjusted.

5.1.5. Teachers' beliefs and perceptions based on gender

The results showed that there was no significant difference between male and female teachers on the combined dependent variables. Akca (2007), Yılmaz (2006) and Halat (2007) similarly found no significant effect of gender on the general opinions of primary teachers about the new curriculum. Cerit (2007) also found no significant effect of gender on primary teachers' efficacy beliefs by employing TSES. Furthermore, descriptive results showed that male teachers had stronger perceptions and beliefs about the curriculum than females except for efficacy beliefs related to the impact of the curriculum (IRE). Gömleksiz and Bulut (2007) indicated that male primary teachers found the new curriculum more effective than females in terms of its objectives, content, measurement and evaluation components except for the teaching-learning process. On the contrary, Şentürk (2007) indicated that female teachers had significantly positive opinions regarding the new curriculum than male teachers.

Moreover, further descriptive results revealed that the sense of efficacy beliefs of male teachers (TSE) was higher than females; despite not being significant. On the contrary, Evans and Tribble (1986) found that females had higher teaching efficacy than males and Cheung (2006) found that female teachers had significantly higher general efficacy beliefs than male teachers by employing TSES. On the other hand, there have also been some studies which indicate no relationship between gender and teacher efficacy (Hoy & Woolfolk, 1993; Ghaith & Shaaban, 1999).

5.2. Recommendations

It should be noted that change is a process rather than an event. Therefore, the teachers' adaptation process should not be underestimated. In-service trainings may aim to develop new sources for teachers' efficacy beliefs compatible with the reform efforts especially for mathematics teachers. For the design of the in-service training sessions, collaboration between schools and universities may provide educational opportunity for teachers. Furthermore, the in-service training should be parallel to the approach of what is expected from teachers as conductors of the curriculum, so that the teachers may gain mastery experiences which may provide them more efficacies about the new approaches of the innovation. As the English philosopher, Herbert Spencer emphasized "The great aim of education is not knowledge but action".

Based on the findings of the current study, it can be suggested that elementary mathematics teachers may need more attention in terms of in-service training and research studies regarding the implementation of the new mathematics curriculum. Moreover, their level of efficacy about utilizing the new curriculum was found to be lower than that of the primary teachers. The national examinations held between 6^{th} and 8^{th} grades at the end of eacy year should be designed parallel to the new curriculum so that mathematics teachers' utilization of the new curriculum may increase. Thus, further studies should be conducted about mathematics curriculum including both the primary and mathematics teachers to gain better insight about their beliefs and perceptions of the new curriculum.

Another recommendation might be to provide high quality support to inexperienced teachers about the specific techniques recommended in the curriculum. Although all teachers have such a need; findings of this study suggested that teachers with less experience may need further attention; hence, contact should be maintained with teachers having completed their teacher education programs, especially during their first years in teaching career . On the other hand, classroom sizes should try to be lowered since individual needs are important during the implementation of the curriculum and teachers may feel more competent in classrooms with a lower number of students.

In order to achieve the intended changes through implementation of the new curriculum, teachers' practices and beliefs in the adaptation process should continue

to be analyzed well. Also, the questionnaire administered in this survey can be employed in further studies by adapting it to different subject-matters and may be enhanced in terms of construct validity in the replication studies while the exclusion of item 22 from the survey can be discussed. Moreover, qualitative studies may be conducted to support teachers' self-report measures such as classroom observations and interviews in order to gain in-depth data about teachers' efficacy beliefs regarding the new curriculum and their adaptation processes to the new curriculum.

REFERENCES

Akça, S. (2007). *İlköğretim 5. sınıf 2005 matematik programının öğretmen yönetici ve ilköğretim müfettişleri görüşleri doğrultusunda değerlendirilmesi (Afyonkarahisar ili örneği).* Unpublished master's thesis, Afyon Kocatepe Üniversitesi, Afyon, Türkiye.

Ashton, P. T. (1985). *Motivation and the teacher's sense of efficacy.* In C. Ames & R. Ames (Eds.), Research on motivation in education: Vol. 2. The classroom milieu (pp. 141-174). Orlando, FL: Academic Press.

Ashton, P. T., Buhr, D., & Crocker, L. (1984). Teachers' sense of efficacy: A self-or norm-referenced construct? *Florida Journal of Educational Research, 26*(1), 29-41.

Ashton, P. T., Webb, R. B., & Doda, N. (1982). *A study of teachers' sense of efficacy. Final Report, Volume II*. (ERIC Document Reproduction Service No. ED 231 835).

Ashton, P. T., Webb, R. B., & Doda, N. (1983). *A study of teachers' sense of efficacy. Final Report, Executive Summary*. (ERIC Document Reproduction Service No. ED 231 833).

Babadogan, C., & Olkun, S. (2006). Program development models and reform in Turkish primary school mathematics curriculum. *International Journal for Mathematics Teaching and Learning*. Retrieved from June, 12, 2008 http://www.cimt.plymouth.ac.uk/journal/default.htm

Babbie, E. (1990). *Survey research methods*. Belmont: Wadsworth Publishing Company.

Ball, D.L., & Cohen, D.K. (1996). Reform by the book: Or might be: The role of curriculum materials in teacher learning and instructional reform? *Educational Researcher, 25*(9), 6-14.

Bandura, A. (1977). *Social learning theory*. New York: General Learning Press.

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

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

Bandura, A. (2006). Guide for constructing self-efficacy scales. F. Pajares & T. Urdan (Eds.). *Self-efficacy beliefs of adolescents*, 5, 307-337. Greenwich, CT: Information Age Publishing.

Bandura, A. (n.d.). *Teacher self-efficacy scale*. Retrieved July 15, 2008, from http://www.coe.ohio-state.edu/ahoy/Bandura%20Instr.pdf

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

Bay, J.M., Reys B.J., & Reys R.E. (1999). The top 10 elements that must be in place to implement standards-based mathematics curricula. *Phi Delta Kappan, 80*, 503-506.

Berman, P., McLaughlin, M. W. (1978). *Federal programs supporting educational change: Vol. VIII. Implementing and sustaining innovations.* Santa Monica, CA: RAND.

Berberoglu, G. (2004). *Translating tests across languages for different uses: Issues, problems and possible solutions.* Paper presented at METU Faculty of Education, Ankara, Turkey.

Bikmaz, F. H. (2006). Yeni ilköğretim programları ve öğretmenler. *Ankara Üniversitesi Eğitim Bilimleri Dergisi, 39* (1), 99-116.

Braverman, M. T., & Slater, J. K. (1996). *Advances in survey research*. San Francisco: Jossey-Bass.

Brennan, M. D., & Robison, C.(1995). Gender comparison of teachers' sense of efficacy. (ERIC Document Reproduction Service No: ED 384288).

Brosnan, A. P (1994). An exploration of change in teachers' beliefs and practices during implementation of mathematics standards. (ERIC Document Reproduction Service No: ED 372949).

Bulut, S. (2004). İlköğretim programlarında yeni yaklaşımlar, Matematik (1–5), *Bilim ve Aklın Aydınlığında Eğitim Dergisi*, 54–55.

Cakiroglu, E. (2000). *Pre-service elementary teachers' sense of efficacy in reform oriented mathematics.* Unpublished doctoral dissertation, Indiana University.

Cakiroglu, E. (2008). The teaching efficacy beliefs of pre-service teachers in the USA and Turkey, *Journal of Education for Teaching. 34* (1), 33–44.

Capa, Y. (2005). *Factors influencing first-year teachers' sense of efficacy.* Unpublished doctoral dissertation, The Ohio State University.

Capa, Y., Cakiroglu, J., & Sarikaya, H. (2005). Öğretmenlik öz-yeterlik ölçeğinin Türkçe uyarlamasının geçerlik ve güvenirlik çalışması. *Eğitim ve Bilim, 30* (137), 74–81.

Carleton, L. E., Fitch, J. C., & Krockover, G. H. (2008). An in-service teacher education program's effect on teacher efficacy and attitudes. *The Educational Forum, 72*(1), 46-62.

Cerit, Y. (2007). Sınıf öğretmenlerinin öz yeterlik inanç düzeyleri. *Hacettepe Üniversitesi İlköğretim Kongresi: İlköğretimde Eğitim ve Öğretim, Ankara,Türkiye.*

Chan, D. W. (2008). General, collective and domain-specific teacher self-efficacy among Chinese prospective and in-service teachers in Hong Kong. *Teaching and Teacher Education, 24,* 1057–1069.

Charambous, C., Philippou, G., & Kyriakides, L. (2004). Towards a unified model on teachers' concerns and efficacy beliefs related to a mathematics reform. *Proceedings of the 28th conference on the international group for the psychology of mathematics education,* 2, 199-206.

Cheung, H.Y. (2006). The measurement of teacher efficacy: Hong Kong primary in-service teachers. *Journal of Education for Teaching, 32* (4), 435–451.

Chester, M., & Beaudin, B. Q. (1996). Efficacy beliefs of newly hired teachers in urban schools. *American Educational Research Journal, 33*, 233-257.

Chissick, N. (2002). Factors affecting the implementation of reforms in school mathematics. *Proceedings of the annual meeting of the international group for the psychology of mathematics education, 26th, Norwich, England,* 2-9.

Christou, C., Eliophotou-Menon M., & Philippou G. (2004). Teachers' Concerns regarding the Adoption of a New Mathematics Curriculum: An Application of CBAM. *Educational Studies in Mathematics, 57* (2), 157-176.

Clarke, B., Clarke D., & Sullivan P. (1996). Chapter 33: The mathematics teacher and curriculum development. *International Handbook of Mathematics Education,* 1207-1233.

Cohen, D. K. & Hill, H. C. (2001). *Learning policy.* London: Yale University Press.

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, *78*(1), 98-104.

Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation, 10* (7).

Crocker, L., & Algina, J. (1986). *Introduction to classical and modem test theory*. New York: Holt, Rinehart and Winston.

Çınar, O., Teyfur, E., & Teyfur, M. (2006). İlköğretim okulu öğretmen ve yöneticilerinin yapılandırmacı eğitim yaklaşımı ve program hakkındaki görüşleri, *İnönü Üniversitesi Eğitim Fakültesi Dergisi, 7* (11), 47–64.

Deemer, S. A., & Minke, K. M. (1999). An investigation of the factor structure of the teacher efficacy scale. *The Journal of Educational Research, 93*(1), 3–10.

Dembo, M. H., & Gibson, S. (1985). Teachers' sense of efficacy: An important factor in school improvement. *The Elementary School Journal, 86,* 173-184.

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* (3), 291–302.

Drake, C. & Sherin M.G. (2006). Practicing Change: Curriculum adaptation and teacher narrative in the context of mathematics education reform. *Curriculum Inquiry 36* (2), 154-187.

Enoch, L G., & Riggs, I. M. (1990). Further development of an Elementary Science Teaching Efficacy Belief Instrument: A Pre-service Elementary Scale. *School Science and Mathematics, 90*(8), 694-706.

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.

Erdal, H. (2007). *2005 İlköğretim matenatik programı ölçme değerlendirme kısmının incelenmesi (Afyonkarahisar ili örneği).* Unpublished master's thesis, Afyon Kocatepe Üniversitesi, Afyon, Türkiye.

Erdoğan, M., Mısırlı, A., & Temli, Y. (2007). Yeni öğretim programlarında öğretmenin değişen rolü. *Eğitimde Yeni Yaklaşımlar*, ODTÜ Mezunlar Derneği Yayınları, Ankara

Ernest, P. (1989). *The impact of beliefs on the teaching of mathematics.* Retrieved January 20, 2008 from http://webdoc.sub.gwdg.de/edoc/e/pome/impact.htm

Evans, E. D., & Tribble, M. (1986). Perceived teaching problems, self-efficacy, and commitment to teaching among pre-service teachers. *Journal of Educational Research, 80*(2), 81-85.

Field, A. (2005). *Discovering statistics: Using SPSS for windows*. London: SAGE Publications

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

Friedman, I. A. (2003). Self-efficacy and burnout in teaching: The importance of interpersonal-relations efficacy. *Social Psychology of Education, 6*, 191-215.

Friedman, I. A., & Kass, E. (2002). Teacher self-efficacy: A classroom-organization conceptualization. *Teaching and Teacher Education, 18,* 675-686.

Fullan, M. G. (1993). Why teachers must become change agents. *Educational Leadership, 50* (6), 12-17.

Fullan, M. G. (2000a). The three stories of education reform. *Phi Delta Kappan, 81*(8) 581-584.

Fullan, M. G. (2000b). The return of large-scale reform. *Journal of Educational Change, 1,* 5-28.

Gable, R. K., & Wolf, M. B. (1993). *Instrument development in the affective domain* (2nd ed.). Boston: Kluwer Academic Publishers.

Gelbal, S., & Kelecioğlu, H. (2007). Öğretmenlerin ölçme ve değerlendirme yöntemleri hakkındaki yeterlik algıları ve karşılaştıkları sorunlar. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 33,* 135-145.

Ghaith, G. & Yaghi, H. (1997) Relationships among experience, teacher efficacy and attitudes toward the implementation of instructional innovation. *Teaching and Teacher Education 13,* 451-458.

Ghaith, G., & Shaaban, K. (1999). The relationship between perceptions of teaching concerns, teacher efficacy, and selected teacher characteristics. *Teaching and Teacher Education, 15,* 487-496.

Gibson, S., & Dembo, M. (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*, 183–211.

Goddard, R. D. & Goddard, Y. L. (2001) A multilevel analysis of the relationship between teacher and collective efficacy in urban schools. *Teaching and Teacher Education, 17,* 807–818.

Goya, S. (2006). The critical need for skilled math teachers. *Phi Delta Kappan 87*(5), 370-372.

Gömleksiz, M. N., & Bulut, İ. (2007), Yeni matematik dersi öğretim programının uygulamadaki etkililiğinin değerlendirilmesi. *Kuram ve Uygulamada Eğitim Bilimleri, 7*(1), 41-94.

Gözütok, F. D., Akgün, Ö. E., & Karacaoğlu, Ö. C. (2005). İlköğretim programlarının öğretmen yeterlilikleri açısından değerlendirilmesi. *Eğitimde Yansımalar: VIII Yeni İlköğretim Programlarını Değerlendirme Sempozyumu Bildiriler Kitabı,* 17–40.

Guskey, T. R. (1981). Differences in Teachers' Perceptions of the Causes of Positive Versus Negative Student Achievement Outcomes Paper presented at the Annual Meeting of the American Educational Research Association, Los Angeles, CA. (ERIC Document Reproduction Service No. ED200624).

Guskey, T. R. (1988). Teacher efficacy, self-concept, and attitudes toward the implementation of instructional innovation. *Teaching and Teacher Education, 4*(1), 63-69.

Guskey, T. R. (1998). Teacher efficacy measurement and change. Paper presented at the Annual Meeting of the American Educational Research Association, San Diego, CA.

Guskey, T. R., & Passaro, P. D. (1994). Teacher efficacy: A study of construct dimensions. *American Educational Research Journal, 31*(3), 627-643.

Halat, E. (2007). Yeni ilköğretim matematik programı (1–5) ile ilgili sınıf öğretmenlerinin görüşleri. *Afyon Kocatepe Üniversitesi Sosyal Bilimler Dergisi, IX* (1), 63–88.

Haney, J. J., Lumpe, A. T., Czerniak, C. M., & Egan, V. (2002). From beliefs to actions: The beliefs and actions of teachers implementing change. *Journal of Science Teacher Education, 13*(3), 287-313.

Heneman, H. G., III, Kimball, S., & Milanowski, A. (2006, October). The teacher sense of efficacy scale: Validation evidence and behavioral prediction (WCER Working Paper N.2006-7). Madison: University of Wisconsin-Madison, Wisconsin Center for Education Research. Retrieved July 30, 2008 from http://www.wcer.wisc.edu/publications/workingPapers/papers.php

Henson, R. K. (2001). The effects of participation in teacher research on teacher efficacy. *Teaching and Teacher Education, 17,* 819-836.

Henson, R. K., Kogan, L. R. & Vacha-Haase, T. (2001). A reliability generalization study of the teacher efficacy scale and related instruments. *Educational and Psychological Measurement, 61(3),* 404–420.

Hoy, W. K., & Woolfolk, A. E. (1993). Teachers' sense of efficacy and the organizational health of schools. *Elementary School Journal, 93,* 335–372.

Kaban, İ. (2006). *MEB 2004 eğitim programı çerçevesinde ilköğretim I. kademede okutulan matematik kitaplarında yapılan değişikliklerin matematiğe karşı olumlu tutum geliştirmeye katkısı üzerine.* Unpublished master's thesis, Konya Selçuk Üniversitesi, Konya, Türkiye.

Kartallıoğlu, F. (2005). *Yeni ilköğretim programlarının uygulandığı pilot okullardaki öğretmenlerin yeni program ve pilot çalışmalar hakkındaki görüşleri* . Unpublished master's thesis, Abant İzzet Baysal Üniversitesi, Bolu, Türkiye.

Kieffer, K. M. & Henson, R. K. (2000). Development and validation of the sources of self-efficacy inventory (SOSI): Exploring a new measure of teacher efficacy. Paper presented at the Annual Meeting of the National Council on Measurement in Education, New Orleans, LA. (ERIC Document Reproduction Service No. ED453254)

Koc, Y., Isiksal, M., & Bulut, S. (2007). Elementary school curriculum reform in Turkey. *International Education Journal, 8(1),* 30-39.

Labaree, D.F. (1999). The chronic failure of curriculum reform. *Education Week, 18*(36), 42-45

Labone, E. (2004). Teacher efficacy: Maturing the construct through research in alternative paradigms. *Teaching and Teacher Education, 20,* 341–359.

Lee, V., Dedrick, R., & Smith, J. (1991). The effect of the social organization of schools on teachers' efficacy and satisfaction. *Sociology of Education, 64,* 190-208.

Lin, H., & Gorrell, J. (2001). Exploratory analysis of pre-service teacher efficacy in Taiwan. *Teaching and Teacher Education, 17,* 623-635.

Lloyd, G. M. (1999). Two teachers' conceptions of a reform-oriented curriculum: Implications for mathematics teacher development. *Journal of Mathematics Teacher Education, 2*, 227-252.

Manouchehri, A., & Goodman, T. (2001). Mathematics curriculum reform and teachers: Understanding the connections. *The Journal of Educational Research, 92*(1), 27-41.

McKinney, M., Sexton, T., & Meyerson, M. J. (1999). Validating the Efficacy-Based Change Model. *Teaching and Teacher Education, 15,* 471-485.

Milli Eğitim Bakanlığı [MEB] (2005). *İlköğretim matematik dersi öğretim programı 1–5. sınıflar.* Ankara: MEB.

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.

Newton, X. (2007). Reflections on math reforms in the U.S., *Phi Delta Kappan 88*(1), 681-685.

Orbeyi, S. (2007). *İlköğretim matematik dersi öğretim programının öğretmen görüşlerine dayalı olarak değerlendirilmesi*. Unpublished master's thesis. Onsekiz Mart Üniversitesi, Çanakkale, Türkiye.

Olson, J.K. (1977). Teacher education and curriculum change: Reexamining the relationship. *Curriculum Inquiry, 7*(1), 61-66.

Özdaş, T., Tanışlı, D., Köse, N. Y., & Kılıç, Ç. (2005). Yeni ilköğretim matematik dersi(1. – 5. sınıflar) öğretim programının öğretmen görüşlerine dayalı olarak değerlendirilmesi *Eğitimde Yansımalar: VIII Yeni İlköğretim Programlarını Değerlendirme Sempozyumu Bildiriler Kitabı,* 239–255.

Özpolat, A.R., Sezer F., İşgör, İ.Y., & Sezer. M. (2007). Sınıf öğretmenlerinin yeni ilköğretim programına ilişkin görüşlerinin incelenmesi. *Milli Eğitim, 36*(174), 206–211.

Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research, 62,* 307-332.

Pallant, J. (2007). *SPSS survival manual.* U.S.A: Open University Press.

Ponder, G., & Doyle, W. (1977). Teacher practically and curriculum change: An ecological analysis. Paper presented at the Annual Meeting of the American Educational Research Association, New York.

Remillard, J.T. (1999). Curriculum materials in mathematics education reform: A framework for examining teachers' curriculum development. *Curriculum Inquiry, 29*(3), 315-342.

Remillard, J.T. (2000). Can curriculum materials support teachers' learning? Two fourth-grade teachers' use of a new mathematics text. *The Elementary School Journal, 100*(4), 331-350.

Rimm-Kaufman, S. E., & Sawyer, B. E. (2004). Primary-Grade Teachers' Self-Efficacy Beliefs, Attitudes toward Teaching, and Discipline and Teaching Practice Priorities in Relation to the "Responsive Classroom" Approach. *The Elementary School Journal*, *104*(4), 321-341.

Roberts, J. K., & Henson, R. K. (2001). A confirmatory factor analysis of a new measure of teacher efficacy: Ohio State Teacher Efficacy Scale. Paper presented at the Annual Meeting of the American Educational Research Association, Seattle, WA.

Rose, J. S., & Medway, F. J. (1981). Measurement of teachers' beliefs in their control over student outcome. *Journal of Educational Research, 74*, 185–190.

Ross, J. A. (1994). Beliefs that make a difference: the origins and impacts of teacher efficacy. Paper presented at the Annual Meeting of the Canadian Association for Curriculum Studies, June.

Ross, J. A., Cousins, J. B., Gadalla T., & Hannay, Lynne (1999). The effects of course assignment on teacher efficacy in restructuring secondary schools. Paper Presented at the Annual Meeting of the American Educational Research Association Montreal, Canada. (ERIC Document Reproduction Service No. ED430280).

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

Saxe, G.B., Gearhart, M., Franke M.L., Howard, S., & Crockett M. (1999). Teachers' shifting assessment practices in the context of educational reform in mathematics. *Teaching and Teacher Education, 15,* 85-105.

Schwarzer, R., & Schmitz, G. S. (2004). Perceived self-efficacy as a resource factor in teachers. In M. Salanova Soria, R. Grau Gumbau, I. M. Martínez Martínez, E. Cifre Gallego, S. Llorens Gumbau & M. García-Renedo (Eds.), *Nuevos horizontes en la investigación sobre la autoeficacia* (pp. 229-236). Castelló de la Plana: Universitat Jaume.

Shaughnessy, M. F. (2004). An interview with Anita Woolfolk: The educational psychology of teacher efficacy. *Educational Psychological Review, 16*(2), 153-176.

Skaalvik, E. M., Skaalvik, S. (2007). Dimensions of teacher self-efficacy and relations with strain factors, perceived collective teacher efficacy, and teacher burnout. *Journal of Educational Psychology, 99* (3), 611-625.

Smith, J. P. (1996). Efficacy and teaching mathematics by telling: A challenge for reform. *Journal of Research in Mathematics Education, 27*(4), 587-616.

Smith, M.S. (2000). Balancing old and new: An experienced middle school teacher's learning in the context of mathematics instructional reform. *The Elementary School Journal, 100*(4)*,* 352-375.

Soodak, L.& Podell, D. (1996). Teaching efficacy: Toward the understanding of a multi-faceted construct. *Teaching and Teacher Education, 12 ,* 401-412.

Sottile, J. M. Jr., Carter W. & Murphy R. A. (2002). The influence of self-efficacy on school culture, science achievement and math achievement among inservice teachers. Paper Presented at the Annual Meeting of the American Educational Research Association New Orleans, LA. (ERIC Document Reproduction Service No. ED470535)

Soycan, S. B. (2006). *2005 yılı ilköğretim 5. sınıf matematik programının değerlendirilmesi.* Unpublished master's thesis, Uludağ Üniversitesi, Bursa, Türkiye.

Stevens, J. P. (2002). *Applied multivariate statistics for the social sciences.* Mahvah, NJ: Lawrence Erlbaum Associates.

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, 32*(2), 139-147.

Şahin, Ü. (2007). *İlköğretim I. kademede sınıf öğretmenlerinin yapılandırmacı yaklaşıma dayalı olarak hazırlanan matematik dersi programına ilişkin algıları (Denizli ili örneği).* Unpublished master's thesis, Pamukkale Üniversitesi, Denizli, Türkiye.

Şentürk, Ş. (2007). *Yeni ilköğretim programlarının öğretmen ve müfettiş görüşlerine göre değerlendirilmesi (Amasya ili örneği).* Unpublished master's thesis, Niğde Üniversitesi, Niğde, Türkiye.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston : Allyn and Bacon.

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

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

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

Tertemiz, N. (2003). İlköğretim matematik öğretimine ilişkin yeni yeni görüşler ve standartlara dayalı program anlayışı. *Çağdaş Eğitim, 304,* 27-32.

Toptaş, V. (2007). *İlköğretim matematik dersi (1-5) öğretim programında yer alan 1. sınıf geometri öğrenme alanı öğrenme-öğretmen sürecinin incelenmesi*. Unpublished doctoral dissertation, Gazi Üniversitesi, Ankara, Türkiye.

Ulubay, M. (2007). *A survey of teachers' implementation of new elementary school mathematics curriculum in sixth grade.* Unpublished master's thesis, Orta Doğu Teknik Üniversitesi, Ankara, Türkiye.

van den Berg, R., Sleegers, P., Geijsel, F., & Vandenberghe, R. (2000). Implementation of an innovation: Meeting the concerns of teachers. *Studies in Educational Evaluation, 26,* 331-350.

Veenman, S. (1984). Perceived problems of beginning teachers. *Review of Educational Research*, 54, 143–178.

Wenner, G. (2001) Science and mathematics efficacy beliefs held by practicing and prospective teachers: a five-year perspective. *Journal of Science Education and Technology, 10*, 181–187.

Wheatley, K. F. (2002). The potential benefits of teacher efficacy doubts for educational reform. *Teaching and Teacher Education, 18,* 5–22.

Wheatley, K. F. (2005). The case for reconceptualizing teacher efficacy research. *Teaching and Teacher Education*, *21,* 747-766.

Wilson, M. C., & Cooney, T. (2002). Mathematics teacher change and development. In G. C. Leder, E. Pehkonen, &Törner, G. (Eds.), *Beliefs: a hidden variable in mathematics education?* (pp. 127-147). Dordrecht: Kluwer.

Wolfe, E. W., Viger, S. G., Jarvinen, D. W., & Linksman, J. (2007). Validation of scores from a measure of teachers' efficacy toward standards-aligned classroom assessment. *Educational and Psychological Measurement, 67*(3), 460-474.

Woolfolk, A. E., Rosoff, B. & Hoy, W. K. (1990). Teachers' sense of efficacy and their beliefs about managing students. *Teaching and Teacher Education, 6*(2), 137-148.

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*(4), 343-356.

Yaşar, Ş., Gültekin, M., Türkkan, B., Yıldız, N., & Girmen, P. (2005). Yeni ilköğretim programlarının uygulanmasına ilişkin sınıf öğretmenlerinin hazırbulunuşluk düzeylerinin ve eğitim gereksinimlerinin belirlenmesi (Eskişehir ili örneği). *Eğitimde Yansımalar: VIII Yeni İlköğretim Programlarını Değerlendirme Sempozyumu Bildiriler Kitabı,* 51–63.

Yero, J. L. (2001-2001). *Beliefs.* Retrieved from January 15, 2008, from http://www.teachersmind.com/pdfdirectory/Beliefs.PDF

Yılmaz, T. (2006). *Yenilenen 5. sınıf matematik programı hakkında öğretmen görüşleri (Sakarya ili örneği).* Unpublished master's thesis, Sakarya Üniversitesi, Sakarya.

Yost, D. S. (2006). Reflection and self-efficacy: Enhancing the retention of qualified teachers from a teacher education perspective. *Teacher Education Quarterly, 33*(4), 59-76.

Zajda, J. (2005). The educational reform and transformation in Russia. *International Handbook on Globalization, Education and Policy Research, 35*(1), 405-430.

APPENDICES

APPENDIX A

PERMISSION OBTAINED FROM MINISTRY OF EDUCATION

T.C.
MİLLÎ EĞİTİM BAKANLIĞI
Eğitimi Araştırma ve Geliştirme Dairesi Başkanlığı

Sayı : B.08.0.EGD.0.33.05.311- 149 /1343 28.../04/2008
Konu : Araştırma İzni

ORTA DOĞU TEKNİK ÜNİVERSİTESİ REKTÖRLÜĞÜNE

İlgi : a) 17.04.2008 tarih ve B.30.2.ODT.0.70.72.00-400-3078/5232 sayılı yazı
b) 28.02.2007 tarih ve B.08.0.EGD.0.33.05.311-311/1084 sayılı Makam Onayı ile Uygulamaya Konulan "Millî Eğitim Bakanlığına Bağlı Okul ve Kurumlarda Yapılacak Araştırma ve Araştırma Desteğine Yönelik İzin ve Uygulama Yönergesi

Üniversiteniz İlköğretim Fen ve Matematik Eğitimi Anabilim Dalı Yüksek Lisans öğrencisi Işıl İŞLER'in "Öğretmenlerin İlköğretim Matematik Öğretim Programına ve Ölçme Değerlendirme Uygulamalarına Yönelik İnanışları" konulu araştırmada veri toplama aracı olarak kullanılacak anketlerin Ankara, Mersin, İstanbul, Bolu ve Eskişehir illerindeki ilköğretim okullarında görevli Matematik ve Sınıf Öğretmenlerine uygulama izin talebi incelenmiştir.

Üniversiteniz tarafından kabul edilen onaylı bir örneği Bakanlığımızda muhafaza edilen (5 sayfa – 69 sorudan oluşan) anketlerin, belirtilen illerdeki ilköğretim okullarında görevli Matematik ve Sınıf Öğretmenlerine uygulanmasında bir sakınca görülmemektedir.

İlgi (b) Yönergenin 5. Maddesinin (o) bendi uyarınca taahhütnamenin ve araştırmanın bitiminde sonuç raporunun iki örneğinin Bakanlığımıza gönderilmesi gerekmektedir.

Bilgilerinizi ve gereğini rica ederim.

İbrahim DEMİRER
Bakan a.
Daire Başkanı

EK :
1- Anket Örneği (1 Adet-5 Sayfa)
2- Okul Listesi (1 Adet-4 Sayfa)

APPENDIX B

THE QUESTIONNAIRE USED IN THE STUDY

Sevgili Meslektaşımız,

Öğretmenlerimizin 2005 ilköğretim matematik öğretim programının etkililiğine ve kullanışlılığına ilişkin algıları ve öz-yeterlik inanışlarını belirlemek amacıyla bir araştırma yapılmaktadır. Bu nedenle görüşlerinize başvurulmaktadır. Anket 4 bölümden oluşmaktadır. Birinci bölümde kişisel bilgiler, diğer bölümlerde ise programa yönelik yaklaşımlarınızla ilgili ifadeler bulunmaktadır. Bu ifadelerde verilen derecelendirmede sizin duygu ve görüşlerinize en yakın olduğunu düşündüğünüz tek bir seçeneği işaretleyiniz. Kişisel bilgileriniz kesinlikle gizli tutulacaktır. Araştırma amacının gerçekleşmesi cevaplarınızın içtenliğine ve anketi eksiksiz olarak doldurmanıza bağlıdır.

Teşekkür ederim.

Işıl İşler
ODTÜ İlköğretim Bölümü

I.BÖLÜM KİŞİSEL BİLGİLER

1. Cinsiyetiniz nedir?

① Bayan ② Bay

2. Yaşınız : .....

3. Öğrenim durumunuz (en son aldığınız diploma derecesi) nedir?

① Öğretmen Okulu- Yüksek Öğretmen Okulu
② Ön Lisans
③ Lisans
④ Yüksek Lisans
⑤ Doktora

4. Mezun olduğunuz bölüm ve fakültenin adı :

_____

5. Branşınız nedir?

① Sınıf öğretmeni ② Matematik öğretmeni

6. Şu anda öğretim yapmakta olduğunuz sınıf(lar) hangilerdir? (Gerekiyorsa birden fazla işaretleyiniz.)

① 1. Sınıf ② 2.Sınıf ③ 3.Sınıf
④ 4. Sınıf ⑤ 5. Sınıf ⑥ 6. Sınıf
⑦ 7. Sınıf ⑧ 8. Sınıf

7. Sınıflarınızdaki ortalama öğrenci sayısı kaçtır?

① 19 ve daha az ② 20 - 29
③ 30 - 39 ④ 40 ve daha fazla

8. Öğretmenlik deneyiminiz (yıl): _____

9. Öğretmenlik yaptığınız okul türü nedir?

① İlköğretim Okulu (Devlet) ② İlköğretim Okulu (Özel)

10. Mesleğinizi yapıyor olmaktan duyduğunuz memnuniyet dereceniz nedir?

① Az ② Orta ③ Çok

11. 2005 matematik öğretim programı ile ilgili bir hizmet içi eğitim çalışmasına katıldınız mı?

① Evet ② Hayır

Cevabınız 'Evet' ise,

11 a. Ne zaman katıldınız? _____(ay ve yıl)

11 b. Süresi? _____(Saat)

11 c. Hizmet içi eğitim sonucunda yeni program hakkında ne kadar bilgi sahibi oldunuz?

① Hiç
② Kısmen
③ Orta
④ İyi
⑤ Çok

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DEVAMI İÇİN ARKA SAYFAYI ÇEVİRİNİZ.

II. BÖLÜM:
Yeni Matematik Öğretim Programı ve Kılavuz Kitabına Yönelik Görüşler

Bu bölümde 5'li derecelendirme yapılmış olup, 1 kesinlikle katılmıyorum, 2 katılmıyorum, 3 kararsızım, 4 katılıyorum, 5 kesinlikle katılıyorum olarak düşünülmüştür. Lütfen verilen ifadeler için 1 - 5 arası size en uygun olan rakamı yuvarlak içine alınız.

Yeni Matematik Öğretim Programı, (Program kılavuzu ve MEB öğretmen kılavuzu)	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
1. Sınıfta uygulanabilir.	1	2	3	4	5
2. Öğrencilerin kazanması gereken bilgi ve becerileri belirlemede kullanılabilir.	1	2	3	4	5
3. Ders içi uygulamaları belirlemede kullanılabilir.	1	2	3	4	5
4. Derse hazırlanırken kullanılabilir.	1	2	3	4	5
5. Uygulandığında öğrenciler kendi öğrenme süreçlerinden daha çok haberdar olurlar.	1	2	3	4	5
Yeni Matematik Öğretim Programı'nın, (Program kılavuzu ve MEB öğretmen kılavuzu)					
6. Önerdiği ölçme ve değerlendirme teknikleri sınıfta uygulanabilir.	1	2	3	4	5
7. Kazanımlarının doğrudan öğretilebilir olup olmadığına karar vermekte güçlük çekerim.	1	2	3	4	5
8. Önerdiği ölçme ve değerlendirme teknikleri öğrencilerin bilgi ve becerilerini ifade etmeyi zorlaştırır.	1	2	3	4	5
9. Önerdiği ölçme ve değerlendirme tekniklerini uygulamak, ölçme ve değerlendirme yapma becerilerimi geliştirir.	1	2	3	4	5
10. Kazanımları doğrultusunda derse hazırlanırken güçlük çekerim.	1	2	3	4	5
11. Önerdiği yaklaşımlar doğrultusunda ölçme ve değerlendirme uygulamalarını hazırlayabilirim.	1	2	3	4	5
12. Uygulandığı dersler öğrencilerin öğrenmeye güdülenmesini sağlar.	1	2	3	4	5
13. Önerdiği yaklaşımlar doğrultusunda öğretim yapmada zorlanırım.	1	2	3	4	5
14. Kazanımlarını gerçekleştirmede kendime güvenirim.	1	2	3	4	5
15. Önerdiği ölçme ve değerlendirme tekniklerini dersime entegre etme konusunda zorlanırım.	1	2	3	4	5
16. Kazanımlarını ders içi uygulamalar haline getirebilirim.	1	2	3	4	5
17. Önerdiği öğretim yöntemlerini sınıfta uygulayabilirim.	1	2	3	4	5
18. Uygulandığı derslerin öğrencilerin kalıcı bilgi edinmesine faydası olmaz.	1	2	3	4	5
Yeni Matematik Öğretim Programı'nın, (Program kılavuzu ve MEB öğretmen kılavuzu)					
19. Önerdiği yönde ölçme araçları hazırlamak bu konudaki becerilerimi sınırlandırır.	1	2	3	4	5
20. Önerdiği doğrultuda ders hazırlamak daha etkili bir öğretmen olmama yardımcı olur.	1	2	3	4	5
21. Uygulandığında, ders işlenişi ile uyumlu ölçme araçları hazırlamak zorlaşır.	1	2	3	4	5
22. Uygulanma sürecinde çıkabilecek sorunları (materyal eksikliği, sınıf mevcudu, sınıf yönetimi vs.) çözebilirim.	1	2	3	4	5

III. BÖLÜM:
Yeni Matematik Öğretim Programı Kullanım Sıklığına Yönelik Görüşler

Bu bölümde aşağıda yazan ifadeleri ne sıklıkta gerçekleştirdiğinizi belirtmeniz istenmektedir. Hiç (1): hiç yapmadığınızı; nadiren (2):dönemde 1 - 2 kez; ara-sıra (3): birkaç haftada bir; sıklıkla (4): haftada bir; her zaman (5): hemen hemen her ders yaptığınızı göstermektedir. Lütfen 1 - 5 arası yapılan derecelendirmede sizin için en uygun olan rakamı yuvarlak içine alınız.

Yeni Matematik Öğretim Programı'nı, (Program kılavuzu ve MEB öğretmen kılavuzu)	Hiç	Nadiren	Ara sıra	Sıklıkla	Her zaman
23. Problem çözmeye dayalı sınıf içi çalışmaları hazırlamada kullanırım.	1	2	3	4	5
24. Öğrencilerden isteyeceğim ürünleri (günlük ödev, proje, performans görevi vb.) belirlemede kullanırım.	1	2	3	4	5
25. Derse hazırlanırken kullanırım.	1	2	3	4	5
26. Ölçme ve değerlendirme uygulamalarını hazırlamada kullanırım.	1	2	3	4	5
27. İlişkilendirmeye dayalı (ders içi, diğer derslerle, günlük hayatla vb.) sınıf içi çalışmaları hazırlamada kullanırım.	1	2	3	4	5
28. Hangi ölçme ve değerlendirme uygulamalarını seçeceğime karar vermede kullanırım.	1	2	3	4	5
29. Akıl yürütmeye dayalı sınıf içi çalışmaları hazırlamada kullanırım.	1	2	3	4	5
30. Ders içi uygulamaları belirlemede düzenli olarak kullanırım.	1	2	3	4	5
31. İletişime dayalı sınıf içi çalışmaları hazırlamada kullanırım.	1	2	3	4	5
32. Öğrenci çalışmalarının niteliğini Değerlendirmede kullanırım.	1	2	3	4	5
33. Önerdiği ölçme-değerlendirme tekniklerini sınıfta kullanırım.	1	2	3	4	5
34. Yeni matematik programı hakkında meslektaşlarımla görüş alışverişi yaparım.	1	2	3	4	5

Matematik öğretirken;

		Hiç	Nadiren	Ara sıra	Sıklıkla	Her zaman
35.	Sınıf içi etkinliklerde, öğrencilerim için grup çalışmaları düzenlerim.	1	2	3	4	5
36.	Yeni matematik programının yaklaşımına uygun çeşitli sorular hazırlarım.	1	2	3	4	5
37.	Farklı öğretim yöntem ve tekniklerini (tartışma, keşif yaptırma, yaratıcı drama vb.) derslerimde kullanırım.	1	2	3	4	5
38.	Yeni matematik programının önerdiği öğretim materyallerini (Birim küpler, onluk taban blokları vb.) derslerimde kullanırım.	1	2	3	4	5
39.	Öğrencilerin performans ve proje görevlerini düzenlerim.	1	2	3	4	5
40.	Sınıf içi etkinliklerde öğrencilerimin kendi aralarında matematikle ilgili iletişim kurmalarını sağlarım.	1	2	3	4	5
41.	Öğrencilerime matematiksel akıl yürütme becerileri kazandıracak ortamlar oluştururum.	1	2	3	4	5
42.	Öğrencilerimin matematik konuları arasında ilişkilendirme yapmalarını sağlarım.	1	2	3	4	5
43.	Öğrencilerimi araştırma yapabilmeleri için çeşitli kaynaklara (internet sitesi, dergi, kitap, kurum veya kişi) yönlendiririm.	1	2	3	4	5
44.	Keşfetmeye dayalı sınıf içi etkinlikler düzenlerim.	1	2	3	4	5
45.	Velilerle yeni matematik öğretim programının uygulanması sürecinde iletişim kurarım.	1	2	3	4	5
46.	Okul idaresi yeni matematik öğretim programını uygulama konusunda beni destekler.	1	2	3	4	5

IV. Bölüm: Öğretmen Öz Yeterlik Ölçeği

Aşağıdaki ifadelerde kendinizi ne kadar yeterli hissediyorsanız, 1(Yetersiz) ile 9 (Çok yeterli) arası yapılan derecelendirmede lütfen sizin için en uygun olan rakamı yuvarlak içine alınız.

		Yetersiz							Çok yeterli
1.	Sınıfta dersi olumsuz yönde etkileyen davranışları kontrol etmeyi ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
2.	Derslere az ilgi gösteren öğrencileri motive etmeyi ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
3.	Öğrencileri okulda başarılı olabileceklerine inandırmayı ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
4.	Öğrencilerin öğrenmeye değer vermelerini ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
5.	Öğrencilerinizin iyi bir şekilde değerlendirilmesine olanak sağlayacak soruları ne ölçüde hazırlayabilirsiniz?	1	2	3	4	5	6	7	8	9
6.	Öğrencilerin sınıf kurallarına uymalarını ne kadar sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
7.	Dersi olumsuz yönde etkileyen ya da derste gürültü yapan öğrencileri ne kadar yatıştırabilirsiniz?	1	2	3	4	5	6	7	8	9
8.	Farklı öğrenci gruplarına uygun bir sınıf yönetim sistemini ne kadar iyi oluşturabilirsiniz?	1	2	3	4	5	6	7	8	9
9.	Farklı değerlendirme yöntemlerini ne kadar kullanabilirsiniz?	1	2	3	4	5	6	7	8	9
10.	Öğrencilerin kafası karıştığında ne kadar alternatif açıklama ya da örnek sağlayabilirsiniz?	1	2	3	4	5	6	7	8	9
11.	Çocuklarının okulda başarılı olmalarına yardımcı olmaları için ailelere ne kadar destek olabilirsiniz?	1	2	3	4	5	6	7	8	9
12.	Sınıfta farklı öğretim yöntemlerini ne kadar iyi uygulayabilirsiniz?	1	2	3	4	5	6	7	8	9

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8	8	8	8
9	9	9	9

- Yeni müfredata yönelik matematik derslerini geliştirirken öğrenme ihtiyacı duyduğunuz bilgi ve beceriler varsa lütfen yazınız.

- Yeni matematik müfredatının uygulanmasına yönelik eklemek istedikleriniz varsa lütfen yazınız.

Bu çalışmanın devamında yapacağımız görüşmede yer almak ister misiniz?
Eğer cevabınız EVET ise aşağıdaki bilgileri doldurur musunuz?

① EVET ② HAYIR

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Tel No:.....

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* Bu çalışma ile ilgili soru, öneri ve her türlü bilgi için iletişime geçebilirsiniz.

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Katıldığınız için teşekkür ederiz.