A SURVEY OF TEACHERS' IMPLEMENTATIONS OF NEW ELEMENTARY SCHOOL MATHEMATICS CURRICULUM IN SIXTH GRADE

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

A SURVEY OF TEACHERS' IMPLEMENTATIONS OF NEW ELEMENTARY SCHOOL MATHEMATICS CURRICULUM IN SIXTH GRADE

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The purpose of this study was to investigate the implementation process of the present and newly introduced instructional techniques in new elementary school mathematics curriculum in sixth grade through the reports of teachers, which has been piloted in some specific schools. Moreover, it was aimed to find out the effects of several parameters on implementation, like city where school teachers are working is located, teachers' gender, teaching experience and number of students in the classroom. In addition, difficulties faced by teachers during the implementation process and teachers' general opinions about the new curriculum are examined.

The sample consisted of 80 teachers working at elementary schools located in Ankara, Istanbul, Bolu and Kocaeli (Izmit). The Teacher Questionnaire was administered to participants in the 2005-2006 academic year. In order to investigate

the differences in Teacher Questionnaire's sub-scales' scores (Learning-Teaching Process, Material Usage, Evaluation Techniques) of the participants with respect to city, gender, teaching experience, academic level and number of students in classes, separate Multivariate Analysis of Variance were run.

The results of this study indicated that teachers' implementation of the new methods and techniques highlighted in the curriculum can be interpreted as at high level. MANOVA tests indicated that teachers' implementation of the new methods and techniques were not affected by number of students in the classrooms, gender and teaching experience. According to the results of the study, teachers' usage of recommended educational equipments was found as at average level and MANOVA tests indicated that teachers' usage of recommended educational equipments was affected by teaching experience but not by gender and number of students in the classroom. The results of this study also showed that teachers' implementation of new evaluation techniques was at average level and MANOVA tests indicated that teachers' implementation of new evaluation techniques were not affected by gender, teaching experience and number of students in the classrooms.

Keywords: New Elementary Mathematics Curriculum, Curriculum Reform, Mathematics Education.

ÖZ

ÖĞRETMENLERİN YENİ ALTINCI SINIF MATEMATİK ÖĞRETİM PROGRAMINI UYGULAMALARI ÜZERİNE BİR ARAŞTIRMA

Ulubay, Mutlu

Yüksek Lisans, Orta Öğretim Fen ve Matematik Alanları Eğitimi Bölümü

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Bu çalışmanın amacı, bazı okullarda pilot uygulaması yapılmakta olan ilköğretim altıncı sınıf Matematik müfredatındaki öğretim tekniklerinin uygulanma sürecini öğretmenlerin raporları doğrultusunda incelemektir. Ayrıca, okulun bulunduğu il, cinsiyet, kıdem ve sınıf mevcudu gibi parametrelerin uygulama üzerindeki etkilerinin belirlenmesi de hedeflenmiştir. Ayrıca, öğretmenlerin uygulama sürecinde karşılaştıkları zorluklar ve öğretmenlerin yeni müfredat hakkındaki görüşleri de incelenmiştir.

Örneklem Ankara, İstanbul, Bolu ve Kocaeli (İzmit) illerindeki ilköğretim okullarında çalışan 80 öğretmenden oluşmaktadır. Anket, katılımcılara 2006 - 2007 eğitim öğretim yılında uygulanmıştır. Katılımcıların, Öğretmen Anketinin alt

ölçekleri puanlarındaki cinsiyet, kıdem ve sınıf mevcuduna göre farklılıkları araştırmak için ayrı ayrı MANOVA uygulanmıştır.

Bu araştırmanın sonuçlarına göre, öğretmenlerin müfredatta vurgulanan yeni yöntem ve teknikleri uygulama düzeyleri yüksek olarak yorumlanabilir. MANOVA testlerinden elde edilen veriler, yeni yöntem ve tekniklerin uygulanma düzeyinin sınıf mevcudu, cinsiyet ve öğretmenlerin kıdeminden etkilenmediğini göstermiştir. Öğretmenlerin tavsiye edilen eğitim araç ve gereçlerini kullanma düzeyleri ortalama olarak bulunmuştur ve MANOVA testlerine göre, öğretmenlerin tavsiye edilen eğitim araç ve gereçlerini kullanma düzeyleri kıdemden etkilenirken, cinsiyet ve sınıf mevcudunun önemli bir etkisi olmamıştır. Bu araştırmanın sonuçları, öğretmenlerin yeni değerlendirme tekniklerini orta derecede kullandıklarını da göstermiştir ve MANOVA testlerinin sonuçları öğretmenlerin yeni değerlendirme tekniklerini uygulama düzeylerinin cinsiyet, kıdem ve sınıf mevcudundan etkilenmediğini göstermiştir.

Anahtar Kelimeler: Yeni İlköğretim Matematik Öğretim Programı, Müfredat Reformu, Matematik Eğitimi.

To my father and mother...

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LIST OF ABBREVIATIONS

TQ : Teacher Questionnaire
LTPQ : Learning-Teaching Processes Questionnaire
MUQ : Material Usage Questionnaire
ETQ : Evaluation Techniques Questionnaire
MANOVA : Multivariate analysis of variance
MNE : Ministry of National Educational
EU : European Union
TTKB : The Authority of Turkish Education Board
CCTDM : Classroom Centered Teacher Development Mathematics
Df : Degree of freedom
f : Frequency
N : Sample size
p : Significance level
M : Mean
SD : Standard Deviation

CHAPTER 1

INTRODUCTION

The rapid changes in science and technology demand individuals who can keep step with those changes and development. Individuals can adapt themselves to the innovations in relation to the level of education they have (Gözütok, 2002). Many countries have felt the necessity to change their school curricula and make necessary reforms to lift up their citizens' level of education (Ersoy, 2002). Having striven for joining the European Union (EU) for many years, the Turkish society needs the same reform (Ersoy, 2006).

The prevalence and the rapid development of information and technology have brought about radical changes in individual and social life as well as in the social system. In order to train the individuals to adapt themselves to these changes, schools should prepare their curricula according to these changes and developments. (Gömleksiz, Yaşar, Sağlam, Hakan, Sözer, Gözütok, et al., 2005)

As the most apparent dimension of this age of change is the increasing importance and accessibility of information. The changes experienced have started the process of becoming an information society. One of the most important aspects of the transition to the society of information is investment in information (MEB, 2007). A second important aspect and cause of the social/political change and efforts for reforms in all fields of society, is our country's endeavor for accession to EU. There have been several reform movements pursued for adapting EU standards in all fields, including education. The last reform named as "Program Development Process" by The Authority of Turkish Education Board (TTKB) is explained to be founded on this national policy of accession to EU and the latest change and developments in all over the world within the context of transition from industry societies to information societies. In many countries like Southeast Asia, North

America and European Union, educational authorities felt the necessity of initiating curriculum movements in response to this transition to information society. These curriculum movements stated as the source of inspiration for the curriculum reform in Turkey by TTKB and Turkish Ministry of National Education (MNE).

The new mathematics curriculum for 6-8 grades is an instantiation and part of the curriculum reform described above. The Ministry of National Education has felt the need for a change in the school mathematics curricula according to contemporary needs. The new curriculum has been prepared on the bases of national and international studies in the field of mathematics education, mathematics curricula of some developed countries, and experiences of mathematics teaching in Turkey (MEB, 2007). Mathematical concepts of abstract quality have been considered according to daily life models. The curriculum gives importance to conceptual learning as well as computational skills. In addition, the goals of the curriculum also involves improving students' individual abilities and skills such as independent thinking, decision making and self-regulation (MEB, 2007).

1.1 Statement of the Problem

The curriculum for the mathematics courses for the grades 1-5 has been replaced by a new one by the Ministry of National Education. After having been piloted in some selected schools during the academic year of 2004 – 2005, the new program has been implemented in all primary schools in Turkey. Later, a similar change in the curricula of the grades 6-8 was made as the second step of the curriculum reform. The latter change has been piloted in 120 schools located in 9 cities in 2005-2006.

The curriculum developed by the MNE and TTKB for the mathematics courses of the grades 6-8, focuses on students' conceptual learning within and between the branches of mathematics and across disciplines, and a learning developed through personal experience and real-world situations (MEB, 2007). The research studies concerning reform efforts which have similar objectives in other countries have shown that reformed mathematics curricula increase student

performance and provides greater conceptual learning (Ross, Hogaboam-Gray & McDougall, 2002). Despite the fact that reform may bring higher student achievement and better understanding of mathematical concepts, related research studies indicate that there are many obstacles to implementation of reform ideas, such as teachers' beliefs and their earlier teaching experiences (Ball, 1993).

One of the most crucial elements of the reform process is the teacher beliefs (Yates, 2005). The change in teachers' beliefs and behaviors result in a parallel change in student outcomes; and so content specific reform can be achieved (Crawford, Chamblee & Rowlett, 1998). Teachers, who are one of the most important components of a curriculum reform process, often experience difficulties to adapt themselves to the new instructional methods unless they grasp the new methods completely and recognize the benefits of change for themselves and their students (Guskey, 1986; Thompson, 1992). One should convince teachers that they, together with their students, will benefit from the change; otherwise they are likely to resist the change (Thompson, 1992). According to Crawford et al. (1998), this reaction stems partly from teachers' reluctance to view themselves as elements of change. Realizing the importance of the role of teacher's concerns in the effective implementation of innovations require investigation of the nature of these concerns in the adoptation process for innovation. For the Turkish case of curriculum reform in mathematics education, there is a substantial change in teachers' roles during the instructional practices; for example, previous role of transmitting knowledge to students turned into an instructional activity of guidance and facilitation of access to knowledge and learning. In this new student centered curriculum, students learn by constructing new knowledge in terms of their existing knowledge and discover and learn new concepts by experiencing relevant activities by themselves (MEB, 2007).

On the other hand, the success of the implementation of a curriculum is as important as reformative or revolutionary or progressive qualities of this curriculum, since any reform which is not implemented properly cannot have any effect on student achievement in mathematics, as well as in any other subject matter. Surely this success of implementation depends on teachers' commitment to and their orientation about the new curriculum (Ersoy, 2006). The success of implementation,

of course, is affected by teachers' performance as a function of several parameters like their concerns, attitudes, opinions about the new curriculum, past experiences of these teachers, teachers' working conditions such as number of students in classrooms and location of their school (Chiristov, Elipthou- Menon & Philippou, 2004; Henke, Chen & Goldman, 1999; Ross et al., 2002). So in curriculum reforms, implementation success can be studied in terms of teachers' success in implementing the new curriculum and this study may depend on careful analysis of their reports obtained by relevant questionnaires.

1.2 Purpose of the Study

The purpose of this study was to investigate the implementation process of present and newly introduced instructional techniques in the new elementary school mathematics curriculum in sixth grade through the reports of teachers, which has been piloted in some specific schools.

The causal relations among teachers' concerns, attitudes, opinions and level of their implementation are not the central concern of this study. Yet, the main concerns of the study are "the extent to which teachers implement the curriculum" which is measured by a questionnaire and the effect of parameters on implementation like city where school is located, gender, teaching experience (in years) and number of students in the classroom.

1.3 The Sub-problems

In this study, answers for the following research questions will be examined and related hypotheses will be tested:

1. Is there any significant effect of gender on teachers' scores on the Learning-Teaching Processes Questionnaire (LTPQ), Material Usage Questionnaire (MUQ), and Evaluation Techniques Questionnaire (ETQ)?

H_0: There will be no significant effect of gender on the means of collective dependent variables of teachers' scores on the LTPQ, MUQ, and ETQ.

2. Is there any significant effect of teaching experience on teachers' scores on the LTPQ, MUQ, and ETQ?

   H_0: There will be no significant effect of teaching experience on the means of collective dependent variables of teachers' scores on the LTPQ, MUQ, and ETQ.

3. Is there any significant effect of number of students in the classroom on teachers' scores on the LTPQ, MUQ, and ETQ?

   H_0: There will be no significant effect of number of students in classes on the means of collective dependent variables of teachers' scores on the LTPQ, MUQ, and ETQ.

4. How do teachers' scores on the LTPQ, MUQ, and ETQ vary with respect to location of their school (city)?

5. What are the difficulties faced by teachers when implementing the new curriculum?

6. What are the teachers' general opinions about the new curriculum?

1.4 Rationale

In order to implement the new elementary mathematics curriculum more effectively, teachers should obtain the necessary information, act more consciously and sensitively and they should adopt their changed roles and functions (Ersoy, 2006). In this context, teachers' general opinions for and attitudes towards the new curriculum should be specified as they are the ones who will get use of the curriculum. Teachers' opinions and attitudes will be useful for determining teachers' needs during this transitional period. Moreover, this information is also important for

avoiding the possible problems to emerge in the future. This is one of the major aspects, which makes the study is important.

Research studies should be conducted in order to develop new curricula. Effectiveness of curricula is increased by evaluating and utilizing the results of these studies (Erden, 1998). The results of this kind of studies can contribute to the improvement of the curriculum as well as development of in-service training activities for teachers.

People who will determine the effectiveness of a curriculum are teachers who implement that curriculum. No matter how perfect the curricula are prepared, they cannot be considered as successful if teachers do not have necessary qualifications for implementing them. In other words, the success of a curriculum depends on how much the teachers know about new curriculum; how much they adopt the curriculum and how appropriately they perform the necessary activities (Yaşar, Gültekin, Türkan, Yıldız, & Girmen, 2005). So, studies on teachers' knowledge about new curriculum and their implementation of necessary activities are essential.

Teachers not only simply adopt the curriculum guides, but also implement new instructional methods in terms of their inherited beliefs, knowledge and practices. Therefore, when teachers change through the innovations, they change in terms of their previous practice, knowledge, and beliefs (Cohen & Ball, 1990). Accordingly, it becomes crucial to nourish and pay attention to teachers' knowledge, feelings and beliefs in order to succeed in implementing the reform (Friel & Gann, 1993).

According to Cuban (1993 cited in Handal & Herrington, 2003) three kinds of curriculum can be considered in education; intended, implemented and attained curriculum. There are usually gaps between these three. While the intended curriculum involves the guidelines described by the policy makers, the implemented curriculum is what is done by the teachers in the classroom. The attained curriculum is what is gained by the students (Howson& Wilson, 1986). According to Short and Burke (1996, cited in Handal & Herrington, 2003) the implemented curriculum is the set of beliefs put into action. In this sense, the curriculum developers should take

teachers' beliefs into account. If teachers' beliefs and curriculum's underpinning beliefs are not similar, success of the innovation may be influenced negatively as well as teachers' motivation (Handal & Herrington, 2003). So, research studies that focus on mathematics teachers' beliefs and teachers' implementation process are essential.

In order to adapt the new curriculum standards, teachers should make great changes in the content and the style of their teaching and in their roles in the teaching environments (Goertz, 1999). Furthermore, teachers should understand the characteristics of the implementation of reform-based teaching in order to perform transmission mathematics reform to the classroom (Scott, 2005). For this reason, long-lasting and effective in-service training program are necessary and studies on teachers' level of implementation of curriculum ideas and on factors affecting this implementation will contribute the organization of these in-service training programs.

The success of a curriculum reform can be evaluated or measured at different levels. Especially for the first years of a curriculum reform, research on implementation level is important for being informed about the feasibility of the offered changes in the curriculum, and about the level of realization of concrete activities which have to be performed during the lessons. Additionally, guidance of these studies is indispensable for other studies concerning the attainment level of a curriculum reform; it is useless to try to measure and evaluate the attainment of some curriculum goals which have never been implemented.

1.5 Assumptions

The study is based on the following assumptions:

a. The sample reflects the population.

b. The questionnaire is qualified enough for fulfilling the purpose of the study.

c. The teachers filled in the questionnaire forms sincerely and impartially reflecting their real opinions.

1.6 Limitations

This study is limited to the opinions of the teachers working at the schools where the new mathematics curriculum for grades 6-8 was being piloted in the following cities, Ankara, İstanbul, İzmit and Bolu.

The first limitation about the scope of this research, as mentioned in the statement of problem part above, is that it is restricted to level of implementation (not to the level of attainment) in order to control the size of survey and number of variables examined and so the feasibility of this study as a MS thesis.

Second limitation is that the implementation levels of methods or techniques investigated are related to the goals for cognitive domain of the students. Implementation of applications or activities which aims development in attitudes, emotions (i.e., the affective domain of students) is not considered due to the same reason about the feasibility of the whole study.

CHAPTER 2

REVIEW OF THE LITERATURE

In this chapter, a summary of the research studies about the implementation process of curriculum reforms in mathematics education and factors affecting this process are presented. While the first section of the literature review includes research studies on implementation of curriculum reforms worldwide, the second section focuses on the research related to the curriculum reforms made in Turkey.

2.1. Research on the Implementation of Curriculum Reforms Worldwide

In this section, the research on the curriculum reforms made in other countries and their results are presented. The research studies are examined in two groups: implementation results and teacher beliefs.

2.1.1. Research on Implementation of Reform Movements in Education

The implementation process and results of reform efforts particularly in mathematics education have been a subject matter in the literature of educational science for many instances. Here, some of them are presented. These studies emphasize the effects of implementation of reformative curriculums on student achievement and teachers' concerns. Also, factors and difficulties affecting the implementation process are mentioned. As a general observation, research has shown that reform efforts require longer time to be achieved than the planners can expect (Guskey, 1986; Hall & Hord, 1987; Friel & Gann, 1993). As a remark, it must be

noted that in most of these studies level of implementation is an independent variable and its effect on student achievement and other similar independent variables are investigated unlike in our study where level of implementation is a dependent variable.

In their review of 153 studies published between years 1993 and 2000, Ross, Hogaboam-Gray and McDougall (2002) report both evidences of positive effects of reform movements in education and the difficulty of implementing reform. Research on mathematics reform consisted of two main parts. The first part involves a number of studies related to the effects of reform on student achievement. The second part is larger than the first and, concentrates on the evidence of non-implementation and barriers to performance. Results showed that students in classrooms where mathematics education reform is implemented are more successful in problem-solving and conceptual understanding, have more positive attitudes toward the subject, and at least, they are not worse in reaching the objectives emphasized by traditional programs such as computational efficiency. Moreover, teachers' beliefs and their prior experiences are stated as the most important obstacle in mathematics reform according to their study. Teachers' experiences on mathematics teaching are mentioned as they are not congruent with standards' assumptions. It is also mentioned that teachers generally support the goals of the reform but do not implement the practices strictly and need time to complete the curriculum. In the study, professional development is stated as the most powerful mechanism for overcoming these obstacles.

Henke, Chen and Goldman (1999) examined the extent to which teachers use instructional practices recommended in National Board for Professional Teaching Standards in the US. They also investigated the methods that teachers use to assess and evaluate the students and whether teachers' instructional practice preferences differed with respect to their and their students' personal characteristics. They used 1994-1995 Teacher Follow-Up Survey (TFS: 94-95) to gather the data. According to survey results, public school teachers are more likely to implement recommended teaching practices in their classrooms than private school teachers. Teachers who taught higher ability students use recommended practices less often than did teacher who taught lower ability students. Conversely, in evaluation techniques, teachers of higher ability students were more likely to use recommended practices then teachers

of lower ability students. More experienced teachers were less likely to use recommended practices and assessment techniques than others. Teachers who have advanced degrees and participated in Professional development program were more likely to use recommended practices and assessment methods than the others.

Constantinos Chiristov, Maria Elipthou- Menon and George Philippou (2004) identify and examine teachers' concerns in response to new situations emerging from the adoption of new curriculum and new textbooks in Cyprus with Concerns-Based Adoption Model (CBAM). In this model, three main tools are used to collect relevant data: The first one is the Stages of Concerns (SoC) questionnaire, which is used to evaluate teachers' concerns about an innovation they are expected to make (Hall & Hord, 2001). The second one is the Levels of Use (LoU) tool, used to determine the actual usage of the innovations by teachers. The last one is the Innovation Configurations (IC) tool which is used to recognize the patterns of innovations resulting from different teachers' implementation of the innovations (Hord et al., 1998). According to the results of the study, teachers agreed to the idea of implementing a change in mathematics curricula and it seems that they do not have high self-concerns about the innovation. It is also mentioned in the study that teachers felt themselves capable of implementing the innovation and were not worried about their abilities in relation to the new mathematics textbooks but they thought that teaching and planning the lessons for too many students would be a problem. The study indicates that teachers' concerns were about the processes and tasks needed for using the mathematics textbooks and about issues associated with the requirements of organizing, managing, and time. It is indicated in the study as an evident fact that, the year of teachers' involvement with the innovation did not entirely explain the developmental structure of concerns as the relevant data did not show a significant change in teacher's concerns across the three groups of teachers with different time periods of involvement with the innovation. On the other hand, the major factor in explaining the change in teachers' concerns is teaching experience. Beginning teachers who participated in this study seemed to be more interested in the implications of the curriculum changes; they paid more attention on the issues relating to the changes in their personal work situations, and on how they would have to prepare their daily work. Experienced teachers, on the contrary, focused more on the consequences of the innovation for their students and had more

ideas relating to the adoption of the innovation in comparison to beginning teachers. Another study about teachers' attitude towards implementation of new curriculum conducted in Netherlands.

In their study, Roelofs and Terwel (1999) investigated the extent of Dutch teachers' getting use of teaching strategies to promote authentic learning. Firstly, they defined "authentic pedagogy" in the context of the philosophy of education, theories of teaching and learning and reform movements. According to these researchers, the four main aspects of authentic pedagogy are as follows:

1. Knowledge should be constructed in complete task environments
2. Connectedness to the real life
3. Learning activities outside the school should not be undervalued
4. Co-operation and communication should always exist. (p.206)

The instruments used for collecting data were; teacher questionnaire, student questionnaire, classroom observations and interviews with teachers. They reported that they used examples from a foreign language (English) and mathematics education for focusing on the nature and function of the knowledge acquired at schools. From 1993 to 1996, an in-depth inquiry was conducted for three large Dutch secondary schools implementing the state-mandated innovations in the 1993-1994 core curriculums. According to the results, none of the schools had a high score on the characteristics of authentic pedagogy. Authentic pedagogy requires a major change in the teacher's role, including a change in the utilization of curricular materials and the development of new teaching strategies embedded in a supporting school organization. It is also concluded in the study that changing process can be accelerated by giving support in implementation of new methods to teachers. Another study on effect of "professional development" in reform process was made by Chapplin.

In her study, Chapplin (2001) gives brief information about Classroom Centered Teacher Development Mathematics (CCTDM) Project provided by Massachusetts Higher Education Coordinating Council and The Dwight D. Eisenhower Mathematics and Science Act during 1991-1994. They developed a multiyear plan for professional development at the elementary and middle grade levels in Chelsea. In order to make the community's staff development efforts self-sustaining, this model was used for two years to develop a small number of effective

"lead teachers". Prior to this project, majority of Chelsea teachers' knowledge of mathematics was procedural rather than conceptual. At the start of this project, teachers followed the lecture made of presentation almost exclusively and mathematics tended to be a passive activity for the learner. The CCDTM staff development model was designed to strengthen teachers' knowledge of content and methodology concurrently. In the CCTDM model, the lead mathematics teachers (who were trained for two years) provide on-site professional development for colleagues. The effectiveness of the model has been determined by examining teachers' knowledge of mathematics content and pedagogy, teachers' beliefs about mathematics, teachers' practices, students' attitudes about mathematics and their scores on tests. In examining the effectiveness of CCTDM model pre and post attitudinal surveys were administered. Teachers' attitudes towards teaching and learning of mathematics significantly positively improved after three years and were found to be parallel with current math reform. Student achievement in standardized test scores also has improved significantly for those students whose teachers have participated in the project. In summary, the use of the CCTDM model has had a significant positive effect on both teacher and student attitude and student achievement.

In general, these research studies show that implementation of student-centred curricula and with constructivist approach have positive effects on students' learning and their attitudes towards mathematics. Also, the implementation process may be impeded by teachers' beliefs, early experiences and habits. Time scarcity for completing the curriculum and the need for professional development are additional common issues emphasized in these studies.

2. 1. 2 Research on Teachers' Beliefs and Reform Implementations

According to the research made on the implementation of large-scale educational innovations, the beliefs and concerns of teachers play an important role in the successful development of the innovations (Hall, George, & Rutherford, 1977).

In her study, Manouchehri (2003) interviewed 21 mathematics teachers to understand their motives for their strong support for standards based teaching and practice. Semi-structured interviews with teachers were conducted for data

collection. The four main issues addressed are; 1) Teachers' opinions about the changes and their problems in implementation or the advantageous aspects of the reform, 2) Factors for their assessment of the changes. 3) Their professional background in mathematical and pedagogical training and their needs in each of these areas. 4) Their professional goals and the basis for those goals. According to the researcher, it was clear from the results that teachers' pedagogical choices and their thoughts on the recommendations for reform were affected by their political views and philosophies. It is also stated by the researcher that teachers' lived experiences as intellectual beings with missions and goals were the most important aspects forming their professional values and belief systems. The teachers' pedagogical points of view were defined by their personal preferences. These points of view were created and preserved emotionally as well as intellectually. It is evident from the study that teaching was about learning, as much for them as for the learners. This view of teaching both confirmed their confidence in their ability to affect student learning, and their ability to take risks in the classroom. The results of the study indicated a relationship between teacher confidence and an inclination to innovative instruction. It seemed that there was a close relationship between teacher confidence and mathematical knowledge. The participants had been used to implement a standards-based learning and teaching, and tended to support a deep understanding of the content the mathematics standards. It is mentioned that teacher preparation must help teachers build reform-based learning and teaching, and a conceptual understanding of the subject matter in the course of their own mathematics preparation.

Crawford, Chamblee and Rowlett (1998) studied about an in-service program for algebra teachers working in North Carolina and about the implementation of the new curriculum and the changes in the teachers' concerns over a year. In order to recognize the stages of concern of the teachers, The Concerns Based Adoption Model (CBAM) was used. The differences in stages of concern of middle grades algebra teachers and secondary algebra teachers were also compared in this research. The alterations in stages of concern over the year after the initial workshops during the summer of 1992 were also examined. The teachers attending the first workshops (summer1) were given the Stages of Concern Questionnaire in order to recognize the initial levels of concern. This questionnaire was given again to the teachers

attending the follow-up workshops (summer2). Only the teachers attending both summers were involved in the second test sample (n=128). As for the initial levels of concern for the seven stages which were awareness, information, personnel, management, consequences and refocusing; no significant difference between the groups was observed. The results show that teachers participating in the first summer workshops were mainly concerned about their needs to learn more about the new curriculum. Also, no significant difference between the secondary and middle grade teachers' concerns for each of the seven stages was seen. There was a significant difference in only the collaboration stage when the levels of concerns of teachers who had no previous in-service training and who had minor and who had major training were compared. This result strengthens the idea that teachers who have had either major or minor in-service training should be "leaders" in their schools. After one year, significant differences between teachers' existing concerns and their initial concerns for the awareness, information and refocusing stages was seen. While their concerns for the awareness and information stages decreased, those for the refocusing stage significantly increased. According to the results, teachers were still not highly concerned with the new curriculum and student learning at the consequence stage after one year. It is concluded that staff development programs on changing knowledge and beliefs about teaching are needed and teachers should be supported while implementing new methods in classroom. It is also stated that such programs should be monitored over three or five years in order to understand how teachers adapt new methods into the classroom and construct pedagogical knowledge.

In their study, Berg, Sleegers, Geijsel, and Vandenberghe (2000) examined outcomes of the support program called "adaptive teaching in primary education" which was developed to facilitate the implementation of an innovation. The support program was developed in 1996 for nine schools with the participation of two regional educational canters in Netherlands. They also investigated (1) how the teachers experience the support program and (2) the changes in the concerns of teachers produced by the program and also the support that school teachers need to put an actual innovation into practice. A one-group pre- and post- test design was used for the first part. The second part was set up on the basis of the Concerns-Based Adoption Model. Nine primary schools from two cities located in The Netherlands

participated in the study. The support program was implemented with the participation of a total of 129 teachers. It is mentioned in the study that, according to survey results a good leadership provides motivation for teachers to implement the innovations. The results showed that the support program provides higher level of scores for the specified categorized concerns. While scores on self concerns (awareness, need for information, and consequences for pupils) were decreased, the scores on impact-concerns (collaboration, refocusing) increase. This situation is explained in the study as teachers have had grater insight about adaptive teaching and its consequences.

Manouchehri and Goodman (2001) examined the evaluation and implementation processes of four standards-based curricula by 66 middle school teachers over 2 years. The four programs which had common philosophies framed by constructivist approach were Mathematics in Context, Sixth through Eight Mathematics, Connected Mathematics Program, and Seeing and Thinking Mathematically. In their research, they observed teachers' classrooms and schools, interviews, surveys and the data collected through teachers' statements during the regional and state meetings. According to the results, almost all teachers were in favour of the idea that student interest in learning mathematics and involvement in class activities increased when standards based materials were used. Teachers who were used to student-centered and constructivist instructional practices were more enthusiastic about using programs. The results showed that a successful reform was easier and more natural in the schools where teachers were supported both emotionally and intellectually. On the contrary, attempts to use the standards-based programs were unsuccessful in the schools where the teachers were not supported and encouraged. Teachers' experiences and personal theories, social environment, leadership and professional support were stated as factors effecting teachers' use of new materials and instructional practices. Major obstacles in implementing new programs investigated in the study were teachers' previous personal and professional experiences and the lack of adequate time for planning and instruction.

Handal and Herrington (2003) examined the effect of teachers' beliefs on curriculum reform. They presented a literature review about the relationship between mathematics teachers' beliefs and practices in curriculum reform, factors affecting the curriculum change in mathematics education, and gave examples of studies of

mismatch between principles of innovative mathematics curriculum and teachers' beliefs. It is concluded in the paper that when determining the fundamentals of a curriculum related to the practice; teachers' beliefs, attitudes, feelings and perceptions should be considered for a successful curriculum change.

Yates (2005) surveyed 127 classroom teachers to investigate relationships between teachers' beliefs about mathematics and the teaching and learning of mathematics, and their experiences of curriculum reforms in mathematics in South Australian Department of Education and Children's Services (DECS). The South Australian Curriculum Standards and Accountability Framework (SACSA) which is based on constructivism had been implemented in these schools since 2001. A survey, consisted of items about teachers' demographic information and their beliefs and experiences in mathematics curriculum reform was used. No statistically significant relationships were found between teachers' constructivist beliefs about mathematics and any of the time allocations for mathematics lessons. Similarly, no statistically significant correlations were found between their beliefs in the beauty and meaningfulness of mathematics and any of the three measures of time allocation for mathematics lessons. According to the results of the survey, teachers with stronger beliefs in the beauty and meaningfulness of mathematics used manipulatives more frequently. The number of curriculum reforms teachers reported having experienced was not statistically significantly related to either their constructivist teaching beliefs or beliefs about the beauty of mathematics. Moreover, teacher age, qualifications and length of mathematics teaching experience were not statistically significantly related to constructivist teaching beliefs, beliefs about the beauty of mathematics or teaching practices measured in the survey. However, teachers who scored highly on the number of reforms encountered needed to know what students understood in mathematics more often, use a computer during mathematics lessons, use tests to assess student knowledge and understanding of mathematics.

Generally, studies mention the effect of teachers' beliefs on their usage of new techniques and on their instructional practices. Studies emphasize the importance of the teachers' attitudes, feelings and perceptions and suggest that they should be considered while changing the curriculum. In these research studies, for motivating teachers for using new techniques, a good leadership and teacher support are stated as the most effective solutions.

2.2. Related Research in Turkey

In this section, studies about the new curriculum which may support and enlighten our research are presented. The results of these studies are important sources of confirmation or examination of results of our study in the following chapters.

Yılmaz (2006) researched 5th grade teachers' views on the new mathematics curriculum and whether these views had changed with respect to the level of education of teachers, gender and their teaching experience. 200 of fifth grade teachers working in Sakarya were given a questionnaire. According to the results of the survey, teachers' views on the new mathematics curriculum did not significantly differ with respect to their level of education, gender and teaching experience. The findings showed that having inadequate educational tools and equipments have been an important problem. Teachers reported that the evaluation forms provided in order to be used during the educational process have also been a problem and they admit that they use the former method of evaluation. However, it is mentioned in the study that teachers have not given up their habits relating the former curriculum and they have not been completely adapted to changes in the content and the implementation process. For this reason, it is suggested in the study that they should be given a more comprehensive in-service program.

Bulut (2006) has made a research in the 2004-2005 academic year with a purpose of evaluating the effectiveness of the new curriculums (for the subjects Turkish, Mathematics, Natural Science and Social Studies, and Science and Technology) for primary schools from the 1st to the 5th classes. He has made studies in the 2004-2005 academic year at the schools located in the cities İstanbul, Ankara, İzmir, Kocaeli, Van, Hatay, Samsun and Bolu, where the new curriculum has been tested. According to the results of the study, related to the new mathematics curriculum, the effectiveness of the content, acquirements and educational aspects were at "much" level, while measurement and evaluation was at "middle" level. When the variables of city, grade, gender and number of the students in the classroom were considered, there was a significant difference in the teachers' views

on the acquirements of the new Mathematics curriculum. In contrast, there was no significant difference for the variables of experience and level of education. While the teachers' views on the content of the new mathematics curriculum differ significantly for the grade and gender variables, there was no meaningful difference in their views when the variables of city, experience, level of education and the number of students in class were considered. The teachers' views on the educational aspects of the new mathematics curriculum did not change significantly according to the city, grade, gender, experience, level of education and the number of students in the class variables. While there was a significant difference in teachers' views on the evaluation aspects of the new mathematics curriculum according to the grade and gender variables, no such significant difference was seen according to the city, experience, level of education and the number of students in the class variables.

Özdaş, Tanışlı, Köse and Kılıç (2005) endeavored to scrutinize the mathematics curriculum from the points of view of objectives, content, teaching-learning process, convenience and coherence of evaluation methods, and the probable problems. In their study, they utilized teachers' views using the qualitative method. 20 volunteers were selected out of 100 primary school teachers who participated in a seminar about the new curricula for primary schools. The data were obtained by using semi-structured interview method and analyzed using descriptive analysis method. According to the findings, most of the primary school teachers have a positive view on the new Mathematics Curriculum for its objectives, content, learning-teaching process and evaluation characteristics, but when it comes to implementation of the curriculum, there are similar opinions that some problems regarding teachers, students, parents and teaching environment may be faced.

In his study, Soycan (2006) examined whether the mathematics curriculum for the fifth grade which had started to be implemented in the 2005-2006 academic year, had been implemented through constructivist approach or not. The survey was applied to 601 elementary student attending 5^{th} classes and 51 teachers in Karacabey and Yıldırım, two districts of Bursa. According to the findings of the study, both teachers' and students' evaluating the curriculum, with respect to their scores on survey, interpreted as "sufficient" level. According to the results of the survey, there wasn't a significant difference between teachers' and students' general points of view and also there was no significant difference with respect to teachers' teaching

experience and the schools from which they had graduated. The study also showed that teachers complained mainly about the insufficiency of time and explanations about evaluation techniques and learning-teaching activities.

In his study, Akça (2007) investigated the mathematics curriculum which was put into practice in the 2005-2006 academic year, through the views of teachers, administrators and primary school inspectors. The study was carried out through applying survey to the 253 teachers, 20 administrators and 15 inspectors working at primary schools located in Afyonkarahisar. The findings of the study showed that the participants had positive views for the mathematics curriculum. There was no significant difference in participants' mean scores with respect to variables of sex and occupation, while there was a significant difference with respect to the variable of teaching experience. This difference was between the mean scores of teachers who had 6-10 and those who had 16-20 and 21 years of teaching experience. With respect to teaching experience, the most positive views about the curriculum belonged to the teachers having 16-20 years of experience. As for the academic level, there was a significant difference between those who had undergraduate and those having bachelor's degree. Those having undergraduate degree had the most positive views about the curriculum. The mean scores of the participants of the survey who had a bachelor's degree were the lowest.

Orbeyi (2007) studied teachers' opinions about the implementation of the new elementary mathematics curriculum for 1-5th grades and evaluated the program through these opinions. For this reason, she developed a survey related to acquirements, content, teaching-learning process and evaluation components of the new curriculum. The survey was applied to 459 elementary school teachers working in Çanakkale, Edirne and Eskişehir. Based on the research results, it is determined that teachers found the acquirements, content and teaching-learning process components of the new curriculum sufficient at "agree" level. It is mentioned in the study that the mean value of teachers' opinions about material usage in the new curriculum was found at "rarely" level. This result was interpreted as teachers were not utilizing educational equipments during teaching-learning process sufficiently or such a result had occurred naturally because of the inadequacy of educational equipments at school. While there were no significant differences among elementary school teachers' views on the acquirements and content of the Mathematics

Curriculum with respect to professional experience, academic level and city, there was a significant difference with respect to the variables of grade levels and teachers' previous in-service training courses. The significant difference about acquirements with respect to the variable of grade levels was among 1-4th classes. This result is such that teachers teaching for 1st classes showed more positive views than those teaching for 4th classes. According to the findings, difference related to the content of the curriculum was between 1-4th and 5-4th classes. In addition, those who had in-service training courses expressed more positive views about acquirements of the curriculum than the others who didn't have such a course. No significant difference was found among teacher views relating learning-teaching process of the curriculum with respect to the variables of teaching experience, academic level, city, grade level, in-service training courses. It was concluded that teachers' views relating the evaluation process of the curriculum differed with respect to the variables of city and having an in-service training course. This difference is that teachers working in Eskişehir showed more positive views than those working in Çanakkale. Moreover, teachers who had an in-service training course showed more positive views about the evaluation process of the curriculum than those who didn't have such a course.

The purpose of Erdal's (2007) study was to determine elementary teachers' order of preference of usage of the different evaluation methods (i.e. performance homework, projects, portfolios, rubrics, self evaluation, peer evaluation, mathematics diaries and checklists) in the new elementary mathematics curriculum and to examine their level of knowledge about these evaluation techniques. The research was made in Afyonkarahisar in the 2006-2007 academic year, with the participation of 200 elementary teachers. A survey, developed by the researcher, consisting of three pieces was used for collecting data. The results of the study showed that a high portion of the elementary students participating in the study did not have adequate information about the evaluation techniques of the mathematics curriculum. The participants reported that they were unable to use some of the evaluation techniques in mathematics lessons because of this reason. According to the results, teachers' order of preference of usage of the evaluation methods is as follows: 1- multiple choice tests, 2- written exams, 3-performance homework and portfolio, 4- projects, 5- peer evaluation, 6- self evaluation, 7- mathematics dairies and 8- rubrics. In the study, it's told that this order should be just the opposite and reasons such as lack of

knowledge about alternative evaluation techniques of the new curriculum, lack of materials, parents, insufficient time, gender, socio-economic and cultural factors, experience and motivation may cause this conflict.

In her study, Kartallıoğlu (2005) intends to identify the teachers' views on the newly developed curriculum and the manner of implementation of the program in the pilot areas. With this aim, semi-structured interviews were made with 5 female and 20 male teachers working at the pilot schools located in Bolu. In the study, teachers were asked some questions about the new curriculum and their views on the structure and practicality of the program were taken. The data collected were examined through descriptive and content-based analyses. According to the teachers, the positive sides of the new curriculum are its aim to encourage students to research and to investigate; that it is a student-centered curriculum; that it encourages students to play an active role in the educational process in the classroom; the reduced content; and its focus on the individual differences among students. However, it is also mentioned in the study that the philosophy of the curriculum had not been completely understood, the necessary sources in the pilot study were inadequate, the parents were not pleased with the new curriculum as they were against a change, in-service training activities were inadequate, the substructure for implementing the curriculum in all the schools was insufficient, the alternative evaluation methods had not been fully understood and teachers did not know how to use them.

EARGED (2006) has made a survey about teachers' views on new mathematics curriculum for 6^{th} grades. In the study teachers' views were considered from the point of the comprehensiveness and explanations, examples about implementations and acquirements of new curriculum. Generally, teachers found the new curriculum as "comprehensive" and there is no significant difference between teachers' opinions with respect to their teaching experience and having in-service training course except evaluating component of curriculum. According to the results of the study, teachers who have 11-20 years of experience found the evaluation component of the new curriculum as completely explanatory while others did not. The study shows that number of teachers who found the examples about implementations in the curriculum at sufficient level increases parallel to the teaching experience. In the study it is mentioned that most of teachers had positive

opinions about acquirements of curriculum and this situation did not change with respect to teachers' having in-service training and teaching experience.

As a brief comparison of the research conducted in Turkey and abroad we can say that there are considerable difference in terms of results and findings. For example, teaching experience has been found to be correlated with a negative attitude towards educational reform in the foreign studies, while in Turkey, research reviewed in this section indicates that there is either no significant effect or positive effect on the same variable (educational reform). To exemplify the similarities between these two groups of studies, we can mention that in-service training of teachers who will participate in the curriculum reform has critical effect on the implementation process for both foreign and Turkish studies.

CHAPTER 3

METHODOLOGY

This chapter describes the methodology of the research including the design, description of the sample, variables, instruments and data collection and analysis procedure.

3.1 Research Design

In this study, descriptive survey method was utilized (Gay & Airasian, 2000). The researcher developed and adopted structured written questionnaires to determine the extent to which the teachers in the schools where the new mathematics curriculum for grades 6-8 was being piloted were utilizing the content and approaches of the new curriculum. The quantitative approach which is used in this study is so advantageous that it makes possible to measure the feedbacks of a great number of people using a limited set of questions. Therefore, it makes data comparison and statistical aggregation easier (Patton, 1990).

The advantage of small-scale observational studies is giving the most convincing evidence of implementation (Ross, McDougall, & Hogaboam-Gray, 2003), but they are too expensive to be used in needs assessment or assessment of large-scale school improvement projects and it is very difficult to generalize them to other classrooms (Mayer, 1999). In contrast, in self-report surveys you get satisfactory results for your efforts and expenses (Ross, McDougall, & Hogaboam-Gray, 2003). As they provide satisfactory results for the outlay, surveys will be a suitable way to explore large numbers of classrooms (Mayer, 1999). Case studies provide comprehensive information about "what" and "how" of classroom practice, but the survey data give understandings about "how many" and "how much" (Stecher and Borko, 2002).

3.2 Sample Selection

The population for this study consisted of mathematics teachers from 120 pilot schools located in 9 cities, Ankara, Istanbul, Izmir, Bolu, Izmir Kocaeli, Samsun, Van, and Hatay. There were about 165 teachers of mathematics in total working at those schools. 80 teachers working at schools located in Ankara, Istanbul, Bolu and Izmit constitute the sample of this study. There are schools located in both city centers and urban areas in the sample. As the schools were being chosen, their location was considered. The other reason for choosing these cities as sample of this study is that, there are more pilot schools in these cities than others and nearly half of the population was reached. All teachers working in these schools which constitute the sample of the study were reached. Distribution of number of schools and teachers participated in the study according to locations is given 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
Ankara	17	38
Istanbul	10	19
İzmit	9	16
Bolu	6	7
Total	42	80

According to the results in Table 3.1, nearly half of the teachers participating in the study work in Ankara. The following cities are Istanbul, Izmir and Bolu, respectively.

The schools chosen were assumed as having the necessary equipments and facilities for implementing the new curriculum, because the new curriculum for grades 1 through 5 was being piloted in these schools. In addition, it has been known that seminars about new curriculum have been hold for the teachers working in these schools at the beginning of the 2005-2006 academic year. The results of teachers' answers given to the questions about the sufficiency level of necessary educational equipments at schools showed that 45% of teachers reported the sufficiency level of

necessary educational equipments at their schools as “high”, 37.5 % of them as “average”, and 17.5% of them as “low”.

3.2.1 Demographic Background of the Teachers Participating in the Study

In this section, general characteristics of the teachers participating in the study such as their ages, gender, teaching experiences, and academic levels are presented. In Table 3.2 the numbers of teachers participating in the study according to their general characteristics.

Table 3.2: *The Distribution of the Teachers (N = 80) by Age, Gender,* T*eaching Experience, Academic Level and Number of Students in Classrooms*

		f	%
Age	25 or younger	13	16.3
	26 – 29	11	13.8
	30 – 39	18	22.5
	40 – 49	23	28.8
	50 – 59	15	18.8
	60 or older	0	0
Gender	Male	39	48.8
	Female	41	51.2
Teaching experience	5 years or less	20	25.0
	6 – 20 years	26	32.5
	21 years or more	34	42.5
Academic level	2 or 3 years Teachers’ College*	7	8.8
	Bachelor’s Degree	65	81.1
	Master’s Degree	3	3.8
	Missing	5	6.3
Number of students in classrooms	30 or less	21	26.3
	31- 40	43	53.8
	41 or more	16	20.0

*These “Teacher Colleges” were changed as four years’ “Education Faculties “in 1982.

As seen in Table 3.2, most of the teachers’ ages participating in the study are between 40 and 49. Also, it can be said that, the number teachers participating in the study is normally distributed with respect to their ages. According to the results, the

numbers of the male and female teachers participating in the study can be considered as even and the majority of the teachers participating in the study have taught for 21 or more years. It is also seen that most of the teachers participating in the study have bachelor's degree and the majority of the classrooms' student number, teachers participating in the study taught, is between 31 and 40. In addition to these results, in the questionnaire, teachers' asked whether they have had in-service training about new curriculum and it is found that 68.8% of teachers have had in-service training about new curriculum.

3.3 Instrumentation

A three-section, structured questionnaire (See Appendix B) was developed and administered to the teachers. The first section of the questionnaire contains 7 items about teachers' demographic information such as gender, years of teaching experience, level of education.

In second part, there are 49 items related to implementation of new methods and techniques highlighted in the curriculum. The items in the second part of the questionnaire have several subcategories. The first 17 items are about the learning-teaching process (teachers' implementation of new instructional methods) in the classroom, the next 7 items are related to teachers' usage of the necessary materials during the teaching process, and the last 21 items are related to the usage of the new evaluation techniques. These subcategories are named as "learning-teaching process questionnaire" (LTPQ), "material usage questionnaire" (MUQ) and "evaluation techniques questionnaire" (ETQ). The questions in the second section are about whether teachers implement the necessary teaching methods and techniques to improve basic mathematical skills (problem solving, reasoning, making connections, communicating) and evaluation techniques; and whether they utilize the materials. These items were written by using The Teaching Syllabus and Guidebook for Elementary School Mathematics Course (Grades 6-8) in which teachers are introduced the new curriculum (MEB, 2007). Detailed information about learning-teaching process, material usage and evaluation techniques suggested in the new elementary school mathematics curriculum are given in Appendix A. Responses to the questions were on a five-point scale (1 never/completely disagree, 5 always/completely agree). Mean values of the scores on second section of the

questionnaire were used for determining the implementation level of new methods and techniques and for testing hypothesis. The implementation levels and their point intervals are given in Table 3.3. In Table 3.4 the explanations of the implementation levels given in Table 3.3 are presented. Also, the table summarizes the differences between implementation levels (Ross, Hogaboam-Gray & McDougall, 2003).

Table 3.3: *The Implementation Levels and Their Point Intervals*

Level	Point interval
Completely	4.21–5.00
High	3.41–4.20
Average	2.61–3.40
Low	1.81–2.60
Non use	1 – 1.80

Table 3.4: *The Descriptions of the Implementation Levels*

Level	Description
Completely	Variety of strategies mentioned in LTQ to improve students' cognitive skills is used during the lessons. Teacher uses the materials mentioned in MUQ to bridge between concrete and abstract representation of mathematical concepts, students always use materials in activities done in classrooms. Variety of performance based evaluation methods, integrated with the instruction, is used.
High	Various strategies to improve students' cognitive skills are used frequently. Students frequently use materials in activities done in classrooms. Various alternative assessment methods and/or strategies are utilized and integrated within instruction.
Average	Various strategies to improve students' cognitive skills are used. There are few activities done in classrooms that require the use of materials. Standard assessment methods and/or strategies are utilized and integrated within instruction

Table 3.4 continued

Low	Different of strategies to improve students' cognitive skills is rarely used. Only teacher uses the materials for demonstrations. There is limited number of alternative evaluation methods, research, projects.
Non use	Traditional methods are used for instruction. Teachers do not use concrete materials in classroom. Traditional assessment techniques are used.

The third section of the questionnaire contains items about difficulties faced by teachers during the implementation process of the new curriculum and teachers' general opinions about the new curriculum. There are 14 items in this section. These items were determined by reviewing the related research and teachers' opinions about implementing new curriculum. Responses to the questions were on a five-point scale (1- completely disagree, 5- completely agree). Percentages of the answers given to the questions were used for determining teachers' major difficulties in implementation process and their opinions about the curriculum.

In addition, at the end of the questionnaire the teachers were asked whether they had anything to add about the new curriculum and the implementation process. Their answers were noted down by the researcher.

3.3.1 Validity and Reliability of Instrument Used

If a scale measures its purpose, then it can be considered as valid (Gay & Airasian, 2000). One of the forms of validity is construct validity. In this study, the construct validity of the instruments was determined by review of research on curriculum reform and on measuring instructional practices and by asking a mathematics educator in a university and 7 mathematics teachers implementing the curriculum to understand whether the items in the questionnaire met teachers' understanding of new curriculum. The last but more important aspect is that the items in the survey are created as a result of comprehensive review of the new curriculum itself. In most cases, the questions related to implementation are paraphrases of relevant goals stated in the section about "fundamental elements of the curriculum" in Teaching Syllabus and Guidebook for Elementary School Mathematics Course (Grades 6-8).

The questionnaire was administered to 55 teachers from different private schools working in Istanbul for piloting. After the administration of the pilot study, the some questions which have low reliability coefficients had been eliminated.

The reliability of the results has been computed by using Cronbach Alpha. The Cronbach Alpha reliability coefficient of the scale consisted of 66 items is found as .89. The reliability coefficients of subsections of the questionnaire are given in Table 3.5.

Table 3.5: *Cronbach Alpha Reliability Coefficients of the Subsections of the Questionnaire*

Section	Item No.	Cronbach Alpha
Learning-Teaching Process	8,9,10,11,12,13,14,15,1617, 18,19,20,21,22,23,24	.82
Material Usage	25,26,27,28,29,30,31	.71
Evaluation Techniques	32,33,34,35,36,37,38,39,40, 41,42,43,44,45,46,47,48,49, 50,51,52	.73
Opinions about New Curriculum	53,54,55,56,57,58,59,60,61, 62,63,64,65,66	.76

From the values given in Table 3.5, it can be said that not only the whole questionnaire but also every subcategory of the questionnaire can be considered as having acceptable reliability estimates (Gay & Airasian, 2000).

3.4 Variables

There are eight variables which can be classified as dependent and independent, in the study. In Table 3.6, these variables and their classification are given.

Table 3.6: *Classification of Variables*

Name	Variable Type	Value Type	Scale Type
Gender	Independent	Categorical	Nominal
Teaching Experience	Independent	Categorical	Interval
Number of Students in the Classes	Independent	Categorical	Interval
Learning-Teaching Process Questionnaire Scores	Dependent	Continuous	Interval
Material Usage Questionnaire Scores	Dependent	Continuous	Interval
Evaluation Techniques Questionnaire Scores	Dependent	Continuous	Interval

3.4.1 Independent Variables

The independent variables of this study were gender, teaching experience and number of students in classrooms. These variables were considered as categorical variable and measured on a nominal scale.

3.4.2 Dependent Variables

Dependent variables in this study were teachers' implementation levels of the new methods and techniques highlighted in the program, utilizing recommended educational equipments during the lessons and the new evaluation techniques. These dependent variables were measured by a teacher questionnaire developed by the researcher.

3.5 Data Collection

The data collection tool (i.e., the questionnaire) was administered to 80 mathematics teachers working at some of the pilot primary schools located in Istanbul, Ankara, Bolu and Izmit. Before meeting with teachers, the principals of the schools were informed about the goals of the study to get permission. While administering the survey, the researchers gave the teachers information about the objectives of the study and explained them how to fill in the questionnaire forms correctly. In order to take the participant teachers' attention to the survey, to answer

their questions and to ensure that the data would be collected without any mistakes or deficiencies, the questionnaire forms were handed out by the researcher. Whenever there was a problem with the questions in the form, necessary information was provided. In this way, the researcher tried to ensure that all the questions were answered.

3.6 Data Analysis

Traditional quantitative analytic techniques were used to examine the survey results. Frequency distributions were computed for the items with fixed response actions, such as teachers' occupational and personal information. Multivariate analysis of variance (MANOVA) was used for determining the existence of a significant difference among teacher opinions relating the three or more grouped variables (city, number of students in the class and teaching experience). In the situations where significant differences were found, The Post Hoc Tests were applied in order to find among which groups the difference emerged. There were 23 missing data across the whole data and they were replaced by using series mean method. During the analyses, α level was specified as .05 which is commonly used value in the educational studies.

CHAPTER 4

RESULTS

In this chapter, the results of MANOVA's which were carried out to investigate the mean differences between teachers' scores with respect to gender, teaching experience and number of students in classrooms.

Before doing Multivariate analysis of variance (MANOVA) analyses, the following assumptions of MANOVA were checked: normality, homogeneity of variances and covariances, and independency of observations. Normality assumption was checked for each of the dependent variables by SPSS.

Table 4.1: *Tests of Normality for MANOVA Model*

	Kolmogorov-Smirnov		
	Statistic	*df*	*p*
Learning-Teaching Process	.094	80	.081
Material Usage	.080	80	.200
Evaluation Techniques	.091	80	.098

As seen from the Table 4.1, since $p > .05$ for each dependent variable, we can conclude that dependent variables are normally distributed. For the equality of covariance assumption, Box's test of equality of covariance matrices was conducted for each dependent variable. These test results will be given before presenting each of the MANOVA results.

Table 4.2: *Box's Test of Equality of Covariance Matrices*

	Gender	Teaching experience	Number of Students
Box's M	10.039	23.299	8.484
F	1.603	.858	.651
Df_1	6	24	12
Df_2	43772	5482	7553
P	.142	.663	.799

As seen from the Table 4.2, the assumption of covariance equality has met which means groups have equal covariance for all dependent variables. For the equality of variances assumption, Levene's Test of Equality was used.

Table 4.3: *Levene's Test of Equality of Error Variances*

Variable		*F*	df_1	df_2	*p*
Gender	LPTQ	1.500	1	78	.224
	MUQ	.185	1	78	.668
	ETQ	1.642	1	78	.203
Teaching Experience	LPTQ	1.057	4	75	.384
	MUQ	.819	4	75	.517
	ETQ	.714	4	75	.585
Number of students	LPTQ	.886	4	75	.476
	MUQ	.721	4	75	.580
	ETQ	1.336	4	75	.265

For the equality of variances assumption, Levene's Test of Equality was used. As indicated in Table 4.3 variances on the three sub-scales of the TQ across gender, teaching experience and number of students in classrooms were equal. So, the assumption of equality of variance was satisfied for each dependent variable across all groups.

As for the last assumption, independency of observation, it is assumed that participants did not influence each other. As a result, it was concluded that all the assumptions for carrying out the MANOVA analyses were met.

There are four tests statistics Pillai'Trace, Wilks'Lambda, Hotelling'sTrace and Roy's Largest Root which measure the effect of independent variable on

dependent variables. In our analysis, Wilks' Lambda which provides a good and commonly used multivariate F under most conditions when assumptions are met (Leech, Barett & Morgan, 2005), was used as test statistic.

4.1 The Results regarding the Relationship between "Gender" and Implementation Process

The first research question of the present study was "Is there any significant effect of "gender" on teachers' scores on the LTPQ, MUQ, and ETQ?" In order to determine the mean differences between teachers' scores with respect to the gender, a one-way multivariate analysis of variance (MANOVA) was conducted on mean TQ sub-scales' scores of teachers.

In Table 4.4, the mean and standard deviations of the LTPQ, MUQ and ETQ scores of teachers' with respect to the gender variable are given.

Table 4.4: *Means and Standard Deviations of the TQ Sub-scales' scores by Gender*

	Gender	*M*	*n*	*SD*
Learning and Teaching Process Questionnaire	Male	4.07	39	.41
	Female	4.12	41	.50
	Total	4.10	80	.45
Material Usage Questionnaire	Male	3.36	39	.62
	Female	3.34	41	.59
	Total	3.35	80	.60
Evaluation Techniques Questionnaire	Male	3.31	39	.39
	Female	3.50	41	.44
	Total	3.41	80	.42

As seen in Table 4.4, mean values of scores of females are higher than those of males in LTPQ and ETQ. As for MUQ, mean values of scores of males are higher than those of females.

Table 4.5: *MANOVA Results for Gender*

Effect	Wilks' Lambda Value	F	Hypothesis df	Error df	*p*	η^2	Observed Power
Intercept	.009	2690.34	3.00	76.00	.000	.991	1.000
Gender	.935	1.775	3.00	76.00	.159	.065	.445

The first hypothesis stated that there was no significant effect of "gender" on collective dependent variables. As seen in the Table 4.5; Wilks' Lambda = .935 and p = .159, therefore the first null hypotheses is not rejected. The results showed that there was no significant effect of "gender" on collective dependent variables.

4.2 The Results Regarding the Relationship between "Teaching Experience" and Implementation Process

The second research question of the present study was "Is there any significant effect of "teaching experience" on teachers' scores on the LTPQ, MUQ, and ETQ?" In order to determine the mean differences between teachers' scores with respect to the teaching experience, a one-way multivariate analysis of variance (MANOVA) was conducted on mean TQ sub-scales' scores of teachers.

In Table 4.6, the mean and standard deviations of the LTPQ, MUQ and ETQ scores of teachers' with respect to the teaching experience variable are given.

Table 4.6: *Means and Standard Deviations of the TQ Sub-scales' scores by Teaching Experience*

	Teaching Experience	*M*	*n*	*SD*
Learning and Teaching Process Questionnaire	5 years or less	3.95	20	.40
	6-20 years	4.05	26	.50
	21 years or more	4.23	34	.41
	Total	4.10	80	.45
Material Usage Questionnaire	5 years or less	3.10	20	.49
	6-20 years	3.28	26	.50
	21 years or more	3.56	34	.67
	Total	3.35	80	.60
Evaluation Techniques Questionnaire	5 years or less	3.38	20	.42
	6-20 years	3.44	26	.46
	21 years or more	3.41	34	.39
	Total	3.41	80	.42

According to Table 4.6, for LTPQ and MUQ, scores of teachers who have 21 years or more experience have the highest mean value. As for ETQ, scores of teachers who have 6-20 years of experience have the highest mean value.

Table 4.7: *MANOVA Results for Teaching Experience*

Effect	Wilks' Lambda	*F*	Hypothesis df	Error Df	*p*	η^2	Observed Power
Intercept	.010	2591.100	3.000	75.000	.000	.990	1.000
Teaching experience	.836	2.335	6.000	150.000	.035	.085	.794

The second hypothesis stated that there is no significant effect of "teaching experience" on collective dependent variables. As seen in the Table 4.7, Wilk's Lambda = .836, p = .035, therefore the second null hypotheses is rejected. The results showed that there was a significant effect of "teaching experience" on collective dependent variables. To understand on which dependent variable "teaching experience" has effect, Table 4.8 is given.

Table 4.8: *Tests of Between-Subjects Effects*

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	*F*	*p*	η^2	Observed Power
Intercept	LTP	126.6785	1	1266.785	6493,465	.000	.988	1.000
	MU	834.483	1	834.483	2519,944	.000	.970	1.000
	ET	886.678	1	886.678	4981,918	.000	.985	1.000
Teaching experience	LTP	1.076	2	.538	2.759	.070	.067	.529
	MU	3.006	2	1.503	4.539	.014	.105	.757
	ET	.004	2	.002	.133	.875	.003	.070

According to the results in Table 4.8, p = .014 for dependent variable MU. This means that teaching experience has effect on teachers' level of material usage.

The results of the Post Hoc Tests showed that there was a significant difference in the levels of material usage of teachers between teachers having 21 or more and 5 or less years of experience. The results also showed that the mean scores of the teachers with 21 or more years of experience were higher than those with 5 or less years of experience.

In addition to these results, for the observed effect of teaching experience, it was obvious that the eta square value for the scores of the MUQ was .11 which can be interpreted as small effect size. This explains 11% of the variance in the MUQ. Power for the scores of the MUQ was found as .76

4.3 Results regarding the Relationship between "Number of Students" and Implementation Process

The third research question of the present study was "Is there any significant effect of "number of students" on teachers' scores on the LTPQ, MUQ, and ETQ?" In order to determine the mean differences between teachers' scores with respect to the number of students, a one-way multivariate analysis of variance (MANOVA) was conducted on mean value of TQ sub-scales' scores of teachers.

In Table 4.9, the mean and standard deviations of the LTPQ, MUQ and ETQ scores of teachers' with respect to the number of student variable are given

Table 4.9: *Means and Standard Deviations of the TQ Sub-scales' scores by Number of Students*

	Number of student	*M*	*n*	*SD*
Learning and Teaching Process Questionnaire	30 or less	4.00	21	.49
	31-40	4.18	43	.40
	41 or more	4.02	16	.56
	Total	4.10	80	.45
Material Usage Questionnaire	30 or less	3.20	21	.61
	31-40	3.41	43	.53
	41 or more	3.39	16	.76
	Total	3.35	80	.60
Evaluation Techniques Questionnaire	30 or less	3.37	21	.46
	31-40	3.39	43	.37
	41 or more	3.52	16	.49
	Total	3.41	80	.42

According to the results in Table 4.9, scores of teachers working in classrooms of between 31 and 40 students have the highest mean value for LPTQ and MUQ scores, but for ETQ scores, teachers working in classrooms of 41 or more students have the highest mean value.

Table 4.10: *MANOVA Results for Number of Students*

Effect	Wilks' Lambda	*F*	Hypothesis df	Error df	*p*	η^2	Observed Power
Intercept	.011	2223.37	3.00	73500	.000	.989	1.000
Number of students	.906	1.263	6.00	150.00	.278	.048	.485

The third hypothesis stated that there is no significant effect of "number of students" on collective dependent variable of teachers' implementation level of the new methods and techniques highlighted in the program, their usage of recommended educational equipments during the lessons and the new evaluation techniques. As seen in the Table 4.10; Wilks' Lambda = .906, p = .278, therefore the last null hypothesis is not rejected. The results showed that there was no significant effect of "number of students in classes" on collective dependent variables.

4.4 Teachers' Scores on the LTPQ, MUQ and ETQ by Location of Their School

The fourth research question of the present study was "How do teachers' scores on the LTPQ, MUQ, and ETQ vary with respect to location of their school (city)?" In order to determine the mean differences between teachers' scores with respect to the city where the schools are located their test scores were compared. In Table 4.11, the mean and standard deviations of the LTPQ, MUQ and ETQ scores of teachers with respect to location of their school are given.

Table 4.11: *Means and Standard Deviations of the TQ Sub-scales' scores by City*

	City	*M*	*n*	*SD*
Learning and Teaching process Questionnaire	Ankara	4.06	38	.468
	Istanbul	4.29	19	.407
	İzmit	3.97	16	.372
	Bolu	4.07	7	.563
	Total	4.10	80	.45
Material usage Questionnaire	Ankara	3.17	38	.64
	Istanbul	3.74	19	.48
	Izmit	3.23	16	.46
	Bolu	3.51	7	.44
	Total	3.35	80	.60
Evaluation Techniques Questionnaire	Ankara	3.46	38	.42
	Istanbul	3.50	19	.41
	Izmit	3.21	16	.43
	Bolu	3.35	7	.29
	Total	3.41	80	.42

According to the findings of Table 4.11, for each sub-scales of TQ, teachers' scores working in Istanbul have the highest mean value. It is also seen in Table 4.11 that, for LTPQ and ETQ, teachers scores working in Izmit have lowest mean value and for MUQ, those working in Ankara have the lowest mean value.

4.5 The Results on the Fourth Research Question; "What are the difficulties faced by teachers during the implementation process of the new curriculum?"

In this part of the result section, teachers' answers given to the questions about difficulties during the implementation process of the curriculum through the teachers' opinions are presented.

Table 4.12: *Teachers' Opinions about Difficulties Faced During the Implementation Process*

On which level do you agree or disagree that the following problems impede the implementation process of the new curriculum?	Strongly agree f (%)	Agree f (%)	Undecided f (%)	Disagree f (%)	Strongly disagree f (%)
a. The number of students in classes does not suit the constructivist approach.	33 (41.3)	23 (28.8)	12 (15.0)	7 (8.8)	3 (3.8)
b. The recommended activities in curriculum cannot be done because of insufficient time.	45 (56.3)	24 (30.0)	6 (7.5)	3 (3.8)	1 (1.3)
c. The teaching technologies and materials required during the implementation of the curriculum (e.g. activities, overhead projector, slides, preparing a PowerPoint presentation, and not being able to use the necessary software) are not known and cannot be used.	11 (13.0)	24 (30.0)	25 (31.3)	13 (16.3)	6 (7.5)

Table 4.12 continued					
d. Teachers do not have enough knowledge about the evaluation techniques of the curriculum.	23 (28.8)	18 (22.5)	21 (26.3)	16 (20.0)	1 (1.3)
e. Parents do not give enough support	12 (15.0)	31 (38.8)	20 (25.0)	13 (16.3)	3 (3.8)
f. Students and teachers cannot adapt the new roles of the learning-teaching process.	9 (11.3)	23 (28.8)	26 (32.5)	20 (25.0)	0 (0.0)
g. There are not enough materials required for implementing the necessary activities.	7 (8.8)	21(26.3)	24 (30.0)	20 (25.0)	5(6.3)
h. Teachers have concerns that the central examination system will not	32 (40.0)	21 (26.3)	17 (21.3)	9 (11.3)	0 (0.0)
i. Private courses are implementing the previous system.	36 (45.0)	22 (27.5)	9 (11.3)	11 (13.8)	1 (1.3)

As seen in the Table 4.12, the items which are considered as problems by teachers are inability to do the recommended activities in the curriculum because of insufficient time (agree, 86.3%), the unsuitable number of students in classes for constructivist approach (agree, 70.1%), the problem that private courses are implementing the previous system (agree, 62.5%) and the concerns that the central examination system will not change (agree, 66.3%). The results also showed that totally 57.5% of teachers either disagree that students and they cannot adapt the new roles of the learning-teaching process or are not determined about the same problem. Additionally, 43.8% of teachers agree that teaching materials and technologies are not available for implementation.

4.6 The Results on the Fifth Research Question; "What are the teachers' general opinions about the new curriculum?"

In this part of the result section, teachers' answers given to the questions about their general opinions about the new curriculum are presented.

Table 4.13: *Teachers' General Opinions about the New Curriculum*

On which level do you agree or disagree with the following views about the Mathematics Curriculum?	Strongly agree f (%)	Agree f (%)	Undecided f (%)	Disagree f (%)	Strongly disagree f (%)
a. The curriculum is practicable.	33 (41.3)	36 (45.0)	7 (8.8)	1 (1.3)	2 (2.5)
b. Teachers need to be informed about the new curriculum.	34 (42.5)	40 (50.0)	2 (2.5)	1 (1.3)	2 (2.5)
c. The new curriculum will develop positive attitudes in students towards mathematics.	39 (48.8)	27 (33.8)	10 (12.5)	1 (1.3)	2 (2.5)
d. Meaningful and permanent learning will be ensured.	37 (46.3)	28 (35.0)	11 (13.8)	2 (2.5)	1 (1.3)
e. The methods and techniques recommended in the new curriculum are similar to those I have implemented before.	15 (18.8)	43 (53.8)	6 (7.5)	10 (12.5)	2 (2.5)

According to results of Table 4.13, teachers find the new curriculum practicable (agree, 86.3%) and think that they need to be informed about the new curriculum (agree, 92.5%). In addition, they think that the new curriculum will develop positive attitudes in students towards mathematics (agree, 82.6%) and meaningful and permanent learning will be ensured (agree, 81.3%). Additionally, 72.6% of teachers agree that the methods and techniques in new curriculum are similar to the techniques and methods they had used before.

At the end of the questionnaire, the teachers were asked whether they had anything to add about the new curriculum and the implementation process. In addition to their positive views on new curriculum, they commonly pointed out the following issues as problematic; scarcity of time for implementing recommended activities, crowded classrooms, teachers' and students' adaptation problems to the changes, indifference of MNE to this adaptation problem, inadequate support of parents, the necessity of a separate mathematics classroom, the complexity of evaluation methods and not instructing the subjects as a whole. Some of teachers' statements are given below:

"Velilerin yeni programda öğrencilerin öğrendiklerine inanmaları problem oluyor. Öğrenciler farklı şeyler öğrendiklerini sanıyorlar ve sınavlarda başarısız olacaklarını düşünüyorlar. Sınıf mevcutlarının fazlalığı uygulamayı zorlaştırıyor. Konuların parça parça işlenmesini öğrenciler yadırgıyor." (Bolu)

"Many parents have problems in believing that their children are learning something through the new curriculum. Parents think that students learn many useless things and that they will not be successful in central exams. Crowded classrooms make it difficult to implement the new curriculum. Students are confused by the separate instruction of the subjects." (Bolu)

"Bu sene müfredat ve ders saatleri uygun değildi, konular tamamlanamadı, yeterli tekrar yapılamadı."(İstanbul)

"Time was not enough for implementing the curriculum, the necessary subjects could not be completed and the repetitions were inadequate". (İstanbul)

"Aslında yeni program güzel ama etkinliklerin uygulanması esnasında zaman kaybı oluyor. Bu da öğretmende motivasyon kaybına neden oluyor. Müfredat azaltılırsa bu sorun ortadan kalkar." (Ankara)

"In fact, the new curriculum is fine but it takes too much time to do the necessary activities. This causes a loss of motivation in teacher. If the content of the curriculum is reduced this problem will disappear." (Ankara)

"Eski program genellikle ezbere dayalı olduğundan öğrenciler ezberlemek zorunda kalıyordu. Fakat yeni programda daha çok uygulamaya yer veriliyor, öğrenciler yaparak öğreniyor. Görsellik fazla olduğundan bilgiler kalıcı oluyor. Fakat konuların parça parça işlenişi konusunda aynı fikirde değilim. Konuların bütünlük içinde işlenişi öğrenmeyi daha kalıcı yapıyor."(Ankara)

"As the previous curriculum was based on memorization, students had to memorize everything. The new curriculum gives more importance to activities and students learn through doing something. As there are many illustrations learning becomes permanent. But, I do not support the separate instruction of the subjects. Instruction of the subject as a whole makes learning permanent."(Ankara)

4.7 Conclusions

In the light of the findings obtained by the statistical analyses, the results can be summarized as follows:

According to teachers' answers given to the questions about their implementation of the new methods and techniques highlighted in the curriculum, the mean value of the scores on LTPQ is 4.10. Therefore, teachers' implementation of new methods and techniques can be interpreted as at "high" level. This condition does not change according to gender, teaching experience and number of students in classrooms variables.

According to teachers' answers given to the questions about their utilization of recommended equipments during the lesson, the mean value of the scores on MUQ is 3.34. Therefore, teachers' usage of recommended educational equipments can be interpreted as at "average" level. This condition does not change according to gender and number of students in the classroom variables. There is effect of teaching experience on teachers' usage of recommended educational equipments.

According to teachers' answers given to the questions about their implementation of new evaluation techniques highlighted in the curriculum, the mean value of the scores on ETQ is 3,40. Therefore, teachers' implementation of new evaluation techniques can be interpreted as at "average" level. This condition does not change according to gender, teaching experience and number of students in the classroom variables.

According to teachers' answers given to the questions of TQ, for each sub-scale of TQ teachers' scores working in Istanbul have the highest mean value. For LTPQ and ETQ, teachers' scores working in Izmit have lowest mean value and for MUQ, those working in Ankara have the lowest mean value.

According to teachers' answers given to the questions about difficulties during the implementation process of the curriculum, the problems faced by teachers are inability to do the recommended activities in the curriculum because of insufficient time (agree, 86.3%), the unsuitable number of students in classes for constructivist approach (agree, 70.1%), the problem that private courses are implementing the previous system (agree, 62.5%) and the concerns that the central

examination system will not change (agree, 66.3%). According to the results, totally 57.5% of teachers either disagree that students and they cannot adapt the new roles of the learning-teaching process or are not determined about the same problem. Additionally, 43.8% of teachers agree that teaching materials and technologies are not available for implementation.

According to teachers' answers given to the questions about their general opinions about the new curriculum, teachers find the new curriculum practicable (agree, 86.3%) and think that they need to be informed about the new curriculum (agree, 92.5%). In addition, they think that the new curriculum will develop positive attitudes in students towards mathematics (agree, 82.6%) and meaningful and permanent learning will be ensured (agree, 81.3%). Additionally, 72.6% of teachers agree that the methods and techniques in new curriculum are similar to the techniques and methods they had used before.

CHAPTER 5

DISCUSSIONS AND RECOMMENDATIONS

5.1 Discussions

The purpose of this study was to investigate implementation process of new elementary school mathematics curriculum in sixth grade, through the points of view of teachers. The effect of parameters like city where school is located, gender, teaching experience and number of students in the classroom on implementation is also examined. In addition, difficulties faced by teachers during the implementation process and teachers' general opinions about the new curriculum are examined. In this section, as they relate to the educational research and practice, discussion of implications of the results will be presented.

5.1.1 Teachers' Level of Implementation of New Methods and Techniques Stated in the New Curriculum

According to teachers' answers given to the questions about their implementation of the new methods and techniques highlighted in the curriculum, the mean value of the scores on LTPQ is 4.10. Therefore, teachers' implementation of new methods and techniques can be interpreted as at "high" level. This result supports the findings of Bulut (2006) that teachers expressed frequent usage of new methods and techniques suggested in the new mathematics curricula. According to teachers' answers given to the last section of the questionnaire, teachers' have positive views on new curriculum. So, this result is also consistent with teachers' opinions.

There may be two issues to be considered while interpreting this result and the following results in this section. The first issue is the reliability of teachers'

reports which was an essential assumption of this study stated in the introduction section. So, the results' dependence on possible false reports will not be discussed. The second issue is about the main source of teacher reports (of which we rely on their integrity); is the self-perception of teachers about their activities and/or performance during the class. In this study, this self-perception is not assumed to be reliable in all instances; unlike we do so for teachers' reports, therefore we may claim that teachers' opinions about their accomplishment of required implementations are not dependable. Related to this discussion about reliability of reports of self performance, Cohen (1990, cited in Mayer, 1990) points out that

> "Researches suggest that teachers sometimes truly believe that they are embracing pedagogical reforms, but in practice, their teaching comes nowhere near the vision of the reformers." (p.33)

For example, teachers who may think that they are implementing the new curriculum properly may actually be assigning some classroom activities as homework. This or similar deficient perceptions of teachers about their performance may be explained by the findings of several research which mentions the common impartial acknowledgement of teachers about the necessary requirements of implementation of new curriculum (Bulut, 2006; Kartallıoğlu, 2005; Orbeyi, 2007; Soycan, 2006; Yılmaz, 2006). So, it is concluded that if there was some kind of deficient perception of teachers about their activity in the classroom, this might have been originated from what they understand by the term "implementation" or "activities related to the new curriculum". This study does not include the task of examining the reliability of teachers' perceptions by any means. Relying on the fact that subjects of our survey had been trained about the general approach and specific requirements of implementation of the new curriculum in seminars before academic year begins; we can conclude that the reports and perceptions of teachers reflect the actual level of implementation.

5.1.2 Teachers' Level of Implementation of Material Usage

According to teachers' answers given to the questions about their utilization of recommended equipments during the lesson, the mean value of the scores on MUQ is 3.34. Therefore, teachers' usage of recommended educational equipments can be interpreted as at "average" level. Bulut, (2006), Erdal (2007), Orbeyi (2007) and Yılmaz (2006) determined teachers' level of using recommended educational equipments at "occasionally" level in their studies. At this point, our study confirms similar studies made in our country. This result shows that teachers were not utilizing educational equipments during teaching-learning process sufficiently at school. This situation could be explained in two ways. Firstly, the reason may be the insufficiency of necessary educational equipments at schools, but when we analyse the results of the questionnaire for the level of availability of these materials, it is seen that 45% of teachers reported the sufficiency level of materials as "high" and 37.5% of them as "average". Second possible reason may be the insufficient levels of motivation and knowledge of teachers for using materials.

According to results of the questionnaire, 86.3% of teachers agreed that recommended activities in curriculum could not be done because of insufficient time. There is another common complaint about large number of students in the classrooms. These two issues can be another reason for teachers' non-use or insufficient use of educational materials recommended in curriculum.

5.1.3 Teachers' Usage of New Evaluation Techniques

According to teachers' answers given to the questions about their implementation of new evaluation techniques highlighted in the curriculum, the mean value of the scores on ETQ is 3,40. Therefore, teachers' implementation of new evaluation techniques can be interpreted as at "average" level.

To explain this result, we should concentrate on two dimensions of teachers' familiarity with the new evaluation techniques presented in the new curriculum. First dimension is the level of acknowledgement about what these new evaluation techniques are, at definition level. The second dimension is the question whether teachers acquired enough experience to utilize these new techniques during training

about new curriculum. Our impression is that, even teachers acquired adequate general information about what new evaluation techniques are in seminars, they do not have required experience to utilize these techniques or to have motivation to use them. Also, researches related to the subject mention teachers' need to be informed about new evaluation techniques (Bulut, 2006; Erdal, 2007; Soycan, 2006; Yılmaz, 2006).

5.1.4 Effect of "gender"

The results showed that gender has no significant effect on collective dependent variables which are teachers' implementation level of the new methods and techniques highlighted in the program, teachers' usage of recommended educational equipments during the lessons and the new evaluation techniques. These results are consistent with the findings of Akça (2007).

5.1.5 Effect of "teaching experience"

The results showed that there was a significant effect of "teaching experience" on collective dependent variables which are teachers' implementation level of the new methods and techniques highlighted in the program, teachers' usage of recommended educational equipments during the lessons and teachers' usage of new evaluation techniques. The results of MANOVA showed that teaching experience has effect on teachers' level of material usage. The results of the Post Hoc Tests showed that there was a significant difference in the levels of material usage of teachers between teachers having 21 or more and 5 or less years of experience. The results also showed that the mean scores of the teachers with 21 or more years of experience were higher than those with 5 or less years of experience. These results confirm the results of Akça (2007) and Bulut's (2006) study. The advantage of using time efficiently and of better classroom management of more experienced teachers may be the explanation for their better performance in material usage with respect to performance of teachers who have 5 or less years of teaching experience.

These results are not similar with previous research conducted abroad; these researches said that teaching experience has some negative effect on adopting new

instructional methods (Henke et al., 1999; Ross et al., 2002) including material usage for the implementation of new curriculum. The situation that our results confirms the results of studies conducted in Turkey, but contradict with the foreign research; may allow us to say that ability of more experienced teachers in Turkey to adopt educational reforms are higher than those teachers in the countries in which these foreign researches had been conducted. Of course we can neither confirm nor refute this claim about the level of adaptation of more experienced teachers in Turkey within this research. Additionally, the inspection system may be the another factor that contributes the adaptation of experienced teachers to new instructional practices.

5.1.6 Effect of "number of students"

The results showed that there no significant effect of "number of students in classes" on collective dependent variables which are teachers' implementation level of the new methods and techniques highlighted in the program, teachers' usage of recommended educational equipments during the lessons and the new evaluation techniques. Roughly speaking and in a surprising way, scores of teachers working in classrooms of between 31 and 40 students have the highest mean value for LPTQ and MUQ scores, for ETQ scores, teachers working in classrooms of 41 or more students have the highest mean value. Our results say that classes with more students have better implementation scores. We can interpret this from three points of view:

i. These results are inconsistent with common sense belief that the less number of students, the higher standard of education is. So we can consider this situation as a challenge to reliability of our survey or reliability of this kind of research in general, research which just rely on reports of subjects.

ii. On the other hand, we can consider the independent variable (i.e. the number of students), as a dependent variable of some other latent factor with more explanatory power:

For instance, classrooms with a size of less than 20 students are the ones in more rural or underdeveloped areas. Similarly, classrooms with a size of more than 50 students are under poor conditions to carry out a decent education.

iii. Similar with the results of previous studies (Bulut, 2006; Soycan, 2006), even the number of students was the most frequently mentioned negative factor for implementation, we did not found out a negative correlation between classroom size and scores of implementation level. The reason about this inconsistency may be that teachers' complaints about the classroom size originate from their level of satisfaction about their working conditions. A more crowded class costs a teacher more energy and effort to accomplish the educational goals because of challenges that classroom management and timing bring about. So in a classroom with a reasonable number of students, same or better level of implementation may be achieved with respect to a classroom with less number of students. But the teacher of crowded classroom will have less satisfaction about his working conditions and will refer to the "number of student" parameter as the most important matter of complaint. This means that teachers' reports about the effect of classroom size on implementation are in fact about their satisfaction about their working conditions. This may be an example of deficient self perception as it is mentioned in section 5.1.1 within this chapter.

The results also showed that there were differences in mean value of teachers' scores on LPTQ, MUQ and ETQ with respect to location of their school. The results showed that teachers' working in İstanbul had better implementation scores than the others had. According to teachers' scores on LTPQ and ETQ, teachers working in Izmit have lowest implementation scores and for MUQ, those working in Ankara have the lowest. There may be lots of reasons for this situation, and we do not have enough information to interpret this result. But this information can be used while organizing the in-service training courses for teachers working in those cities in which teachers have low implementation scores.

5.2 Recommendations

Based on the results presented in the study, discussion outlined above and the related researches the following recommendations are presented:

5.2.1 Recommendations for Policy Makers

Effective, long-lasting, and comprehensive in-service program should provide positive effect on both teacher attitudes and their implementation level. Researches on the subject mention the importance of professional development. This recommendation is grounded on opinions of teachers that we provided by means of our survey that additional information about the new curriculum was required. Teachers should be informed about the opportunities of new curriculum and should be aware of benefits of the curriculum or students. For this reason, teachers should be informed about the results of the researches on this issue.

According to the results of related researches done in Turkey and other countries, the most common complain of teaches is the lack of time for planning and instruction and number of students in classrooms (Constantinos et al.2004, Ross et al. 2002). Therefore, increasing the time for mathematics education within the weekly program in curriculum seems necessary for better utilization of reform ideas. If this increase is not possible, reorganizing the curriculum in a way that more time will be available for teachers and implementation of subject mater. Additionally, decreasing the number of students will increase the efficiency of curriculum.

A good leadership is necessary for motivating teachers to implement the recommended activities. Ministry of National Education or education faculties of universities can meet this requirement.

5.2.2 Recommendations for Further Research

More researches on the effectiveness of the curriculum, teachers' concerns, student attainments, and implementation process should be performed in order to assist in improvement of the curriculum. These researches can be supported by observation studies. Other than the teachers' concerns, experts', principals', and parents' views on curriculum can contribute the improvement of new curriculum.

To measure the efficiency, feasibility and level of realization of a curriculum reform focusing on implementation and student attainment are important. This study focused on the implementation side. Within the implementation level, the scope of the study was limited to make measurements and collect data about several parameters depending on teacher reports. Our findings were grounded on the interpretation of these collected data and statistical analysis of these measurements. These findings are still at descriptive level. For example, we found out that there are differences among several groups of teachers in implementation level or in material usage. More observatory research is required to give a casual explanation for these differences. For example one of discrepant findings of our research that the classes with more number of students may have higher scores of implementation requires further inquiry on the observation level to examine the validity of our tentative explanation in section 5.1.6 (iii).

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APPENDIX A

NEW ELEMENTARY SCHOOL MATHEMATICS CURRICULUM

The curriculum developed by the Ministry of Education for the Mathematics Courses of the 6-8th grades involves some ability and skills of students, which should be improved. In this section, these ability and skills, as well as the new evaluation techniques, will be summarized briefly as they are explained in The Guidebook and Curriculum for Teachers.

Cognitive Skills

Other than the skills, the objectives of which are commonly aimed by all subjects, the skills that the new curriculum aims to improve are problem solving, communication, reasoning and making connections.

Problem Solving

A problem in the new curriculum should not be perceived as an exercise or a question, the solution method of which is known in the beginning. One should not approach problem solving in a rule-based or an algorithmic way. Students should be given chance to work on the problem and an environment, suitable for encouraging creativity should be provided. Problem solving in the new curriculum is not a subject, but a process. It is stated that the following issues should be taken into consideration in order to the improve students' problem solving skills:

- Utilizes problem solving to learn mathematics.
- Develops awareness that problem solving contributes learning.
- Uses his problem solving skills in his daily life, in other subjects and in new situations in Mathematics.
- Follows the steps for problem-solving, meaningfully.
- Not only solves problems but also sets up his own problems.

- Develops self confidence while solving problems.
- Develops positive views attitudes towards problem solving.

It is emphasized in the new curriculum that problem solving considered extensively, that the problems chosen should be related to daily life and activities done at school, and that solution method is more important in the problem solving process than the result. In addition, it is stated that it is essential for students to give importance to different problem solving methods and also mentioned that it's important to provide environments that encourage students to construct their own methods. Different strategies of problem solving to solve different problems in the curriculum are presented. These strategies are as follows:

- Doing trial and error practices
- Using figures, drawings, tables etc.
- Using materials
- Forming a list systematically
- Searching for pattern
- Studying backwards
- Guessing and checking
- Using assumptions
- Expressing the problem in another way
- Simplifying a problem
- Solving a portion of the problem
- Solving a similar problem
- Reasoning
- Choosing the proper operation
- Using equations
- Imagining, etc.

Communication

The new curriculum gives importance to using the universal language of mathematics. Students should be informed about the necessity of this language in order to use it effectively and properly. Talking, writing and sharing ideas about

mathematics help students to improve their communication skills. Communication helps students to reconstruct their knowledge and helps teachers to evaluate students properly. It is stated that the following issues should be taken into consideration in order to the improve students' communication skills:

- Uses mathematical symbols and terms properly and effectively.
- Realizes the fact that mathematics is a language which has a special symbols and terminology.
- Uses the mathematical language in mathematics itself, in other disciplines and in his life appropriately and effectively.
- Expresses mathematical concepts, operations and circumstances using different forms of representation.
- Listens to the conversations about mathematics and understands them.
- Utilizes different forms of representation while expressing feelings and opinions.
- Has self-confidence while using the language of mathematics.
- Has positive feelings of opinions about the usage of mathematical language

Reasoning

According to the new curriculum, students should be informed about the reasoning skills which they acquire while doing mathematical activities. It is stated that the following issues should be taken into consideration in order to the improve students' reasoning skills:

- Uses reasoning during learning process.
- Uses his reasoning skills in mathematics and other subjects and in real life.
- Makes generalizations and inferences while learning mathematics.
- Can defend the truth of inferences in mathematics and in other disciplines.
- Questions the validity of his inferences, views and feelings.
- Feels self-confidence while reasoning.

- Has positive opinions and feelings about reasoning.

Making Connections

In order to get use of mathematics, students should connect mathematical concepts and skills to each other and to the other lessons as well as to their daily lives. It is stated that the following issues should be taken into consideration in order to the improve students' making connection skills.

- Utilizes making connections while learning mathematics.
- Makes internal connections in Mathematics.
- Makes connections between mathematics and other disciplines and real life.
- Connects different forms of representation of mathematical operations, concepts and situations.
- Makes transformations among different forms of representation.
- Feels self-confidence while making connections.
- Has positive views and feelings about making connections.

Perceptional Features

The curriculum gives importance to perceptional development of students positively. Perceptional development should be taken into consideration while developing mathematical concepts and skills in students. To achieve this, the following perceptional features are aimed to be acquired:

- Takes pleasure in mathematics
- Appreciates the power and beauty of mathematics.
- Feels self-confidence in mathematics.
- Is patient while solving a problem
- Believes that he can learn mathematics.
- Does not have concerns that can influence his positive attitudes towards and his success in mathematics.
- Discusses about subjects relating mathematics.
- Helps those who want to learn mathematics..

- Realizes the importance of mathematics in real life.
- Performs whatever is required in Mathematics lesson.
- Not only does the requirements of Mathematics lesson, but also makes additional studies.
- Adapts mathematical culture to his own life.
- Participates in the studies about mathematics.
- Realizes the contribution of mathematics to scientific and technological development.
- Believes that mathematics improves creativity and sense of aesthetics.
- Believes that mathematics contributes to making logical decisions.
- Realizes the aesthetic aspect of mathematics.
- Realizes the amusing aspect of mathematics.
- Thinks that mathematics contributes positively to intellectual development.

Self-Regulation Skills

Improvement of students' self-regulation skills takes an important place in the new curriculum. Some of the self-regulation skills are mentioned in "cognitive skills" and "perceptional features" sections above. In addition to these, the following self-regulation skills are aimed to be acquired.

- Motivates himself for the subjects about mathematics.
- Puts goals for mathematics lesson and directs himself towards these goals.
- Performs the required activities for the mathematics lesson in time
- Questions himself while studying mathematics.
- Asks his family, his friends and teachers for help when necessary.
- Studies Mathematics productively.
- Does not get excited or panic in mathematics exams.
- Appreciates the importance of respect, tolerance, giving importance, working together, sharing and honesty in mathematics lessons.
- Is clean and tidy during the activities made in mathematics lessons.
- Pays attention while using the materials in mathematics lessons.

Psychomotor Skills

The curriculum gives importance development of students' psychomotor skills. To achieve this, the following features are aimed to be acquired:

- Uses hundredth table effectively.
- Uses tenth blocks effectively.
- Uses the tenth and hundredth squares effectively.
- Uses ratio cards effectively.
- Constructs patterns, geometrical shapes by folding paper.
- Constructs patterns, geometrical shapes by cutting paper.
- Uses pattern blocks effectively.
- Uses simetrical mirrors effectively.
- Uses square geoboards effectively.
- Uses unit cubes effectively.
- Uses algebra tiles effectively.
- Use tangrams effectively
- Uses scissors effectively
- Uses compasses effectively.
- Uses the ruler effectively.
- Uses the setsquare effectively.
- Uses the protractor effectively.
- Uses the calculator effectively
- Uses computer software effectively.
- Develops the materials and uses them effectively.
- Uses his muscles effectively while doing activities.

Evaluation Techniques

In the new curriculum, evaluation supports the learning process and aims at observing improvement of the student.

Mathematics diaries, homework, exercises, quizes, checklists and interview forms can be used for evaluating daily studies. Questions appropriate for evaluating the performance, multiple choice tests, matching exercises and short answer questions can be used in the exams and tests.

Performance evaluation can be described as making evaluations by taking the individual differences of the students into consideration, transform their knowledge and skills into action and transfer them into real life. Performance evaluation demands the student to show how he will solve the problems in his daily life and how to use his skills and knowledge to solve problems. While evaluating students in Mathematics lessons, teachers may use traditional tests of short-answered, multiple choice, true-false and matching questions. As for doing performance based evaluation, they can use open ended questions, observations, posters, interviews, self-evaluation, portfolios, projects and performance tasks.

Perceptional development of students is as important as cognitive development of them. To evaluate the perceptional development, attitude scales are used. Someone's score is the sum of his scores that he collects from all the items of a scale. Samples of attitude scales are given in The Guidebook and Curriculum for Teachers. Choices of items in a scale can be: "completely agree", "agree", "not determined", "disagree" and "completely disagree".

APPENDIX B

TEACHER QUESTIONNAIRE

Değerli meslektaşlarım,
Milli Eğitim Bakanlığı İlköğretim Genel Müdürlüğü 6-7-8.Sınıflar Ders Kitap'ları yazım komisyonunda çalışıyorum. Aynı zamanda Orta Doğu Teknik Üniversitesi Fen ve Matematik Alanları Eğitimi Bölümü Yüksek Lisans öğrencisiyim.
Bu anket sizlerin değişen ilköğretim matematik programına ve programın uygulanmasına ilişkin görüşlerinizi öğrenmek amacıyla hazırlanmıştır.
Araştırmanın yürütülüşü ve değerlendirilişi, tamamen bilimsel kriterler çerçevesinde kalacak ve anketi cevaplayanların kim olduklarına bakılmayacaktır.
Araştırma sonuçlarının gerçeği yansıtması ve geçerli olabilmesi için lütfen bütün sorulara içtenlikle cevap veriniz.

Saygılarımla
Mutlu Ulubay
Matematik Öğretmeni

1. Kaç yaşındasınız?	
	25 veya daha küçük
	26 – 29
	30 – 39
	40 – 49
	50 – 59
	60 veya daha büyük

2. Cinsiyetiniz	
	Erkek
	Kadın

3. 2005 – 2006 eğitim öğretim yılı sonu itibarı ile kaç yıldır öğretmenlik yapıyorsunuz?	
	2 yıl veya daha az
	3 – 5 yıl
	6-10 yıl
	11 – 20 yıl
	21 yıl veya daha fazla

4. En son aldığınız akademik derece	
	Önlisans
	Lisans
	Yüksek Lisans
	Doktora

5. Sınıflarınızdaki ortalama öğrenci sayısı kaçtır?	……

6. Kendi okulunuzdaki eğitim öğretim araç ve gereçlerinin yeterlilik düzeyini nasıl tanımlarsınız?	Çok Yüksek	Yüksek	Orta	Düşük	Çok düşük

7. Yeni matematik müfredatı ile ilgili hizmet içi eğitim faaliyetlerine katıldınız mı?	Evet	Hayır

Matematik öğretirken, öğrencilerinizden aşağıdakileri yapmalarını ne sıklıkla istiyorsunuz?	Hemen hemen her zaman	Genellikle	Bazen	Nadiren	Hiç
8. Bir problemde yer alan verileri tablo veya grafik ile gösterme					
9. Problemlerin cevaplarını ve işlem basamaklarını açıklama					
10. Problem çözerken ortaya koyduğu fikirlerinin arkasındaki sebepleri açıklama					
11. Problemin sonucunu tahmin etme ve tahminin					

doğruluğunu kontrol etme					
12. Matematiksel düşüncelerini ifade ederken somut model, şekil, resim, grafik, tablo vb. temsil biçimlerini kullanma					
13. Matematik hakkındaki düşüncelerini açık bir şekilde sözlü ve yazılı ifade etme					
14. Günlük dil ile matematiksel ifade ve sembollerin anlamlarını dile getirme					
15. Matematik hakkında konuşma, yazma, tartışma ve okuma					
16. Yaptıkları işlemleri ilgili kavramlarla ilişkilendirme					
17. Öğrendiklerini günlük hayatları ile ilişkilendirme					
18. Öğrendiklerini diğer dersler ile ilişkilendirme					
19. Öğrendiklerini matematikte diğer konular ile ilişkilendirme					
20. Mantığa dayalı çıkarımlarda bulunma					
21. Probleme ilişkin çözüm yollarını ve cevapları savunma					
22. Matematiksel bir durumu analiz ederken örüntü ve ilişkileri kullanma					
23. Matematikteki örüntü ve ilişkileri analiz etme					
24. Tahminde bulunma					

Ders içinde ilgili konuları işlerken aşağıdaki materyalleri ne kadar sıklıkla kullanıyorsunuz?	Hemen hemen her zaman	Genellikle	Bazen	Nadiren	Hiç
25. Sayılar öğrenme alanına ait konularda yüzlük tabloyu, onluk kartları, onluk taban bloklarını, yüzdelik daireyi, onluk ve yüzdelik kareleri					
26. Kesir konuları işlenirken şeffaf kesir kartlarını, örüntü bloklarını ve kesir takımlarını					
27. Geometri konuları işlenirken milimetrik, noktalı ve izometrik kâğıtları, geometri tahtasını, geometri şeritlerini, birim küpleri ve tangramı					
28. Makas, pergel, cetvel, iletki ve gönyeyi					
29. Hesap makinesini					
30. Bilgisayar yazılımlarını					
31. İnterneti					

Eğer Matematik dersi için ev ödevi veriyorsanız, öğrencilerinize aşağıdaki ödev türlerini ne sıklıkta veriyorsunuz?	Her zaman	Genellikle	Bazen	Nadiren	Hiç
32. Çalışma kağıdı veya alıştırma kitabı					
33. Ders kitabındaki problemler / sorular					
34. Konu ile ilgili özet yazma					
35. Basit düzeyde araştırma veya veri toplama					
36. Uzun süreli projelerde bireysel çalışma					
37. Uzun süreli projelerde küçük gruplar halinde çalışma					
38. Küçük gruplar halinde veya bireysel olarak yapılan çalışmalar hakkında raporlar hazırlama					

Matematik derslerinde yaptığınız test veya sınavlarda aşağıdaki soru biçimlerini ne sıklıkta kullanırsınız?	Her zaman	Genellikle	Bazen	Nadiren	Hiçbir
39. Uygulama veya matematiksel işlem gerektiren sorular					
40. Örüntü veya ilişkileri araştırmayı gerektiren sorular					
41. Açıklama veya doğrulama gerektiren sorular					

Matematik dersi verdiğiniz sınıflardaki öğrencilerin başarı-başarısızlık durumlarını değerlendirirken aşağıdaki değerlendirme tiplerine ne kadar ağırlık veriyorsunuz?	Oldukça çok	Çok	Orta	Az	Hiç
42. Okul dışında hazırlanan standart testler					
43. Öğrencilerin kendi düşüncelerini açıklamalarını gerektiren öğretmenin hazırladığı kısa veya uzun cevaplı testler					
44. Öğretmenin hazırladığı çoktan seçmeli, doğru-yanlış veya eşleştirme testleri					
45. Öğrencilerin ev ödevlerinde gösterdikleri başarı					
46. Öğrencilerin projelerde gösterdikleri başarı					
47. Sınıf içi gözlemleri					
48. Öğrencilerin sınıfta verdikleri cevaplar					
49. Performans değerlendirme					
50. Öğrenci ürün dosyası ile değerlendirme					
51. Yazılı sınavlar					
52. Sözlü sınavlar					

Size göre aşağıda belirtilen sorunlar yeni programın uygulanma sürecinde ne ölçüde engel teşkil ediyor?	Oldukça çok	Çok	Orta	Az	Hiç
53. Sınıf mevcutlarının yapılandırmacı anlayışa uygun olmaması					
54. Derse ayrılan sürenin yetersiz olması nedeniyle programda yapılması öngörülen etkinliklerin yapılamaması					
55. Programda kullanılması gereken öğretim teknolojileri ve araç- gereçleri (etkinlik, tepegöz saydamı,slayt, Powerpoint sunusu hazırlama, bilgisayar programlarını kullanamama,...vs) tanımama ve kullanamama					
56. Programdaki ölçme değerlendirme yöntemleri hakkında yeterince bilgiye sahip olmama					
57. Velilerden yeterli maddi ve manevi destek alamama					
58. Öğrenci ve öğretmenlerin öğrenme ve öğretme süreci açısından değişen rollerine adapte olamaması					
59. Programda kullanılması öngörülen araç-gereçlerin okulda yeterli sayıda bulunmaması					
60. Sınav sisteminin değişmemesi endişesi					
61. Dersanelerin eski sistemle öğretime devam ediyor olmaları					
Diğer .....……..(lütfen belirtiniz)					

Matematik Dersi Öğretim Programı'na ilişkin aşağıda belirtilen görüşlere ne ölçüde katılıyor veya katılmıyorsunuz?	Kesinlikle katılıyorum	Katılıyorum	Kararsızım	Katılmıyoru	Kesinlikle katılmıyorum
62. Genel olarak yeni programın uygulanabilir.					
63. Yenilenen program hakkında öğretmenlerin bilgilendirilmeye ihtiyaçları var.					
64. Yeni program öğrencilerde matematiğe karşı olumlu tutum geliştirecektir.					
65. Anlamlı ve kalıcı öğrenme sağlanacaktır.					
66. Yeni programda önerilen yöntem ve teknikler daha önceden uyguladığım yöntem ve tekniklere benziyor.					
Diğer .....……..(lütfen belirtiniz)					