AN ASSESSMENT OF THE EFFECTIVENESS OF 6th GRADE MATHEMATICS CURRICULUM IN PRACTICE

6. Sınıf Matematik Dersi Öğretim Programının Uygulamadaki Etkililiğinin Değerlendirilmesi

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Öz

Bu araştırmanın amacı, 6. sınıf matematik dersi öğretim programının uygulamadaki etkililiğini belirlemektir. Araştırmada Bulut (2006) tarafından geliştirilen ve 32 maddeden oluşan beşli Likert tipi Matematik Dersi Öğretim Programı Ölçeği ile 10 maddeden oluşan üçlü Likert tipi Öğrenme Sürecini Etkileyen Bazı Değişkenler Ölçeği kullanılmıştır. Araştırmanın örneklemini, ilköğretim 6. sınıf Matematik Dersi Öğretim Programının uygulandığı Diyarbakır merkeze bağlı 49 ilköğretim okulunda görev yapan 135 matematik dersi öğretmeni oluşturmaktadır. Öğretmenlerden elde edilen verilerin analizinde, t-testi, tek yönlü varyans analizi, Kruskal Wallis H ve Scheffe testi kullanılmıştır. Araştırmada, matematik öğretmenlerinin öğrenme sürecinde bilgi iletişim teknolojilerini kısmen kullandıkları bulunmuştur. Ayrıca araştırmada, programın genelinin uygulamada kısmen başarılı olduğu ortaya çıkmıştır.

***Anahtar Kelimeler**: Program değerlendirme, matematik öğretim programı, 6. sınıf.*

Abstract

This study aimed to explore mathematics teachers' opinions on the effectiveness of 6th grade mathematics curriculum in practice. The data collection instruments in the study were the 32-item five-point Likert type Mathematics Course Curriculum Scale developed by Bulut (2006) and the 10-item three-point Likert type Scale for Variables Affecting the Learning Process. The study group comprised a total of 135 mathematics teachers from 49 elementary schools located in the center of Diyarbakir, where elementary 6th grade Mathematics Course Curriculum was used. The data were analyzed by using independent samples t test, one way ANOVA, Kruskal Wallis H and Scheffe tests. In the study it has been found that mathematics teachers partially use these information and communication technologies in the learning process. The study also shows that mathematic teachers partially accept the new curriculums success in practice as a whole.

***Key Words**: curriculum evaluation, mathematics course curriculum, 6th grade*

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INTRODUCTION

The importance of *'information'* in the modern world is rapidly increasing. Accordingly, the notions of *'information'* and *'science'* are also undergoing transformation. These changes, along with technological improvements and differing democratic and governing concepts, are placing new expectations on individuals' aptitude from society. Consequently, changes in the area of education have become a must (The Ministry for Education [ME], 2009). The changes in science, technology, democratic and human rights concepts have also forced the reevaluation of teaching programs (Guleryuz, 2001).

In many developed countries as in Turkey, numerous approaches to teaching have been examined, some accepted and some rejected (Gozutok, Akgun, & Karacaoglu, 2005). The programs developed and used so far have not been based on practical applications. They have mostly based on theoretical knowledge. This approach is strict, forcing students to memorize information instead of developing a creative thought process, encourage productivity and apply skills to be used in everyday life. It has been criticized for not progressing as society itself has changed (Kaya, 2009). A system of education, as found in developed countries, where the student is central, a teaching philosophy which is forward thinking, based on cooperation and development, catering to individual differences and capabilities is needed (Gozutok et al., 2005). Due to this need, ME initiated a program in 2004 under the heading 'Supporting Basic Education Programs', where elementary school lessons such as Turkish, math, social sciences and science and technology have been modified to meet modern needs. This curriculum was initiated in 120 pilot schools in Istanbul, Ankara, Diyarbakir, Kocaeli, Izmir, Samsun, Hatay, Van and Bolu, then in 2005 was implemented throughout Turkey. The new mathematics curriculum for grades 6th through 8th was implemented gradually starting from 2006.

The reason of preparing mathematics curriculum is remarkable. Specially, national and international reports have verified Turkish students math scores to be below average (Bulut, 2004). The *Programme for International Student Assessment* (PISA) exam conducted in 2003, which emphasizes mathematic scores, rated Turkish students in 28th place in the OECD countries (DERD, 2003, p. 16-17). With this result, Turkey rated below the OECD average. It can easily be stated, when compared to other countries, that Turkey's international mathematic success is non-existent. However, the importance of understanding and use of mathematics in everyday life is ever-increasing. In this changing world, using mathematics effectively helps shape ones future for the better. With these changes, a re-evaluation of the education system is certainly needed for better schooling (ME, 2009). Due to these circumstances, a New Mathematics Course Curriculum (NMCC) for elementary school, was prepared and implemented for sixth grades for the

2006-2007 academic year. This research is based entirely on elementary 6th grade NMCC.

The NMCC has been prepared taking into consideration national and international studies, mathematic programs in developed countries and education experiences in Turkey. The NMCC includus the four components. *Learning attainments*, *content, teaching-learning activities, and evaluation* (Demir, 2011). *Learning attainments* are desirable characteristics that are planned to be acquired by the learners (Ornstein & Hunkins, 1998). Content means the selection and arrangement of topics to achieve the learning attainment (Charney & Conway, 2005; Erden, 1998). It is the section in which the question "what to teach" is answered in accordance with the learning attainments (Erden, 1998). *Teaching/learning activities* (education status) are regulation and implementation of necessary objectives so as to help students acquire target behaviors (Charney & Conway, 2005; Erden, 1988; Ornstein & Hunkins, 1998). This is the section in which it is planned how to teach topics identified in the content (Demir, 2011; Erden, 1998). Finally, the evaluation component is the section in which it is identified whether or not the target behaviors are acquired or to what extent they have been acquired (Ornstein & Hunkins, 1998). At this stage it is planned how to measure learner's improvement (Demir, 2011; Erden, 1998).

The NMCC's principle is *"Every student can learn mathematics"* (ME, 2009). Not all children with learning disabilities have difficulty learning mathematics and children who have trouble learning math do not all have learning disabilities. Thus, the problem is not the students, but rather the mathematic teaching curriculum (Steedly, Dragoo, Arafeh, & Luke, 2008).

There is no emphasis in the sixth grade NMCC outline on constructivism, however, under the approach, headings such as *"The students of this age form their own ideas through interaction with their environment, tangible objects and peers"*, *"When students are studying mathematics actively"* and *"Forming mathematical awareness through physical experiences and intuition"* (ME, 2009) are used, which is significant. We can also assume the program considers the student a fundamental aspect of the curriculum, as students acquiring basic abilities in math is imperative and the roles of teacher and student are being considered together.

The roots of mathematic formation are abstract in nature. When children's developmental level is considered, it is difficult for them understand these abstract ideas directly, whereas it is the common understanding in math education to '*learn through comprehension'* (Lingefjard, 1998). The National Council of Teachers of Mathematics (NCTM) produced a report in 2000, "Principles and Standards of School Mathematics" (PSSM) stating the importance of learning through comprehension. Due to this notion, the mathematic concepts have been structured using tangible, everyday ideas (ME, 2009). Instead of memorizing rules and definitions, the method in which these concepts are learned is imperative (Usun & Karagoz, 2009). For the learning process in mathematics to be successful, the students' willingness is vital.

According to Jones and Brynes (2006), education motivation is achievement centered. Brigham, Scruggs and Mastropieri (1992), McKinney, Robertson, Gilmore, Ford and Larkins (1984), Patrick, Hisley and Kempler (2000) state that educators have an important role in maintaining this motivation (Cited in Kunter, Tsai, Klusmann, Brunner, Krauss, & Baumert, 2008). Due to this, educators must appreciate and reward the students' efforts during the learning process to increase motivation and self-confidence. Also educators should show how to approach mathematical concepts and encourage the students to use different methods of problem-solving (Stipek, Givvin, Salmon, & MacGyvers, 2001).

Children take great joy in deriving solutions to math puzzles themselves (Altun, 2006). Fennema et al. (1993), Mcleod (1992), Middleton (1995), Resnick, Bill, Lesgold and Leer (1991) state that children with high self-confidence enjoy math activities (Cited in Stipek et al., 2001). Due to this, it is of importance for the curriculum to nurture individuals who can use math in everyday life, have problem-solving capabilities and can share their results and thought processes, whiling to do group activities, having self-confidence and a positive attitude towards mathematics. Also, the program aims to encourage students to obtain and enhance independent thought and decision making processes, as well as self-ordering (ME, 2009).

Studies share the common conclusion that, for an effective education, the attributes of the teacher are of utmost importance (Gozutok et al., 2005). The knowledge and belief of the teacher in the curriculum, and the determination and effort with which they implement the program is vital (Gomleksiz & Bulut, 2006) because the success of the changes trying to be realized depends on the teachers implementing it (Cakiroglu & Cakiroglu, 2003). Thus, however well prepared the curriculum is, if the teachers do not have the capacity to implement the program, there is little chance of success. In other words, successfully executing the program depends on teachers effectively performing the requisite activities (Yasar, Gulteki, Turkkan, Yildiz, & Girmen, 2005). Remillard and Geist state that for teachers to perform the necessary tasks and use materials effectively, they require professional support (Cited in Gooya, 2007).

Gooya (2007) asserts that teachers learning the new program and believing in its success are two essential factors. Thus, for the successful execution of the new program, teachers must firstly be well informed about the curriculum. Another vital factor is the belief in the program. Since the 1980s, the components of learning and teaching, as well as the viewpoint of teachers, have been researched (Fang, 1996). Because teacher's beliefs on education play a central role in applying enhancements successfully (Handal & Herrington, 2003; Stemhagen, 2011). Pajares (1992) and Thompson (1985) state that a growing body of literature shows that mathematics teachers' beliefs affect their classroom practices (Cited in Handal & Herrington, 2003). For example, Wilkins (2008) found beliefs to have the strongest relationship to teacher practices and also that they served a mediating role for knowledge and

attitudes related to mathematics. Therefore, "to understand teaching from teachers' perspectives we have to understand the beliefs with which they define their work" (Nespor, 1987, p. 323). As a result, it is imperative to consider math education's vision on the curriculum to propose a comprehensive education program. Thus, if the math teachers' vision of mathematics and views of curriculum are not considered, increasing math education's quality would be deficient (Baydar & Bulut, 2002)

In the current curriculum, certain deficiencies and inconsistencies have been noticed in learning attainments, content, teaching/learning situations and evaluation process. As a result, after implementation, insufficient or unsuccessful aspects of the program were detected. Detecting where the curriculum is ineffective and determining which aspects are problematic, the necessary adjustments must be made (Demirel, 1999). Applied studies done in elementary school mathematic curriculum (Akkaya, 2008; Anilan & Sarier, 2008; DERD, 2006; Erbas & Ulubay, 2008; Gunes, 2008; Sarier, 2007; Usun & Karagoz, 2009) give us the necessary information about the course of the research. A study conducted by Usun & Karagoz established that the teachers of elementary school mathematics looked favorably on the curriculum in general. In a study by Erbas & Ulubay teachers concluded the new program was constructive on students' opinions on math lessons, leading to comprehensive and permanent knowledge in math classes. In the same study, it was also determined the implementation of the new math curriculum was difficult in overcrowded classes, not leaving enough time to fully engage in all the activities. In the study carried out by DERD, having consulted teachers, compiled the following positive data statistics: 95% found unit function focused on structural education, 91.6% found the units being studied were complimented by the previous units, and 93.8% found the units accentuated students' ability to solve problems in other classes as well as everyday life, 86.4% agreed rudimentary learning topics were adequate to compliment the main learning areas of the mathematics curriculum and 84.1% agreed education in the lower learning program was adequate and complimentary to the content of the mathematic curriculum for students. In the same study 59.2% of teachers agreed there was not enough time to implement the learning attainments foreseen by the program for each unit and 63.7% of teachers believed there was not enough time to do all the activities in the units.

According to Varis (1997), the success of this program is based on developing all areas of the program. For it to succeed, the basic outline of the paradigms should be modern teaching methods, fundamental aptitude acquired by students and the tasks of student and teacher. Also, other important factors for the success of this new curriculum rely on the conviction of teachers in the new curriculum and appropriate schooling environment. With this in mind, occupational development, adaptation, communication technologies, physical circumstances, etc. have been evaluated to measure the implementation success of the new program. Accordingly, variables such as the approach to education, easing the learning process, giving responsibility to the student and

the role of the teacher has also been analyzed to predict there effect on the learning process. This study was also conducted in order to see what kind of affect the NMCC would have on developing such elements as learning attainments, content, teaching/learning activities and measurement and evaluation.

It is important to study theoretical findings from the studies, however gathering conclusive findings from these applications is equally vital (Varis, 1997). According to Erden (1998) to develop and analyze the plan the main focus must be on the structure of the plan however, without applications it is not possible to make a comprehensive evaluation. Thus, comprehending the applications is quite important in determining the success of the program. According to the NCTM (2000) mathematical curriculum must be examined and evaluated periodically. Accordingly, elementary 6th grade NMCC must also be reviewed and assessed.

Aim

The main aim of this study is to explore mathematics teachers' opinions on the effectiveness of the elementary 6th grade NMCC in practice. The sub-aims of the study were as follows: (i) What are mathematics teachers' views about professional development, curriculum adoption, communication technologies, physical conditions, equal opportunity in learning, approaches to learning, encouraging students to learn, facilitating learning, giving responsibility to learners, and their new roles? (ii) How effective are learning attainments, content, learning-teaching activities, and evaluation sub-scales found in the NMCC applications, with regards to implementing the overall curriculum mathematic teachers' views? (iii) Is there a statistically meaningful difference between the views of mathematics teachers about learning attainment, content, teaching/learning activities and measurement and evaluation sub-scales of the NMCC, and the overall curriculum with respect to *gender, seniority* and *class size* variables?

METHOD

Research Model

This study is a descriptive model. This model describes a situation which was in the past or still in present as it is. The persons or the events are described in their own situations (Karasar, 1994).

Population and Sampling

The population of the study included 6th grade mathematics teachers from elementary schools in central Diyarbakir in the 2008-2009 academic year. The study sample comprised 135 mathematics teachers, selected randomly from 49 elementary schools in this city. The variable distribution of gender, seniority and class size of the teachers' taking part in the study can be found in Table 1.

Table 1: *Distributions of the variables in terms of teachers' gender, seniority and class size*

	Gender N=135		Seniority N=135				Class size N=135			
	Male	Female	1-5 years	6-10 years	11-15 years	16 and high	21-30 student	31-40 student	41-50 student	51 and high
f	88	47	58	46	18	13	22	45	54	14
%	65.2	34.8	43.0	34.1	13.3	9.6	16.3	33.3	40.0	10.4

Instrument

Two data collection tools were used in the study. The first one was the 10-item three-point Likert type "Scale for Variables Affecting the Learning Process" (SVALP) developed by the researcher. The SVALP Scale has been developed to establish teachers' views on professional development, adaptation to the curriculum, communication technology, physical environment of the school and classroom, equal opportunities, contemporary approaches to learning, encouraging students' in the learning process, facilitate the learning process, give responsibility to the students' during the learning process, and defining the new roles in education.

According to the initial factor analysis, the KMO (Kaiser-Meyer-Olkin) coefficient of the SVALP Scale was measured to be .85 and Bartlett's test value was calculated to be 422.726. Bartlett's test result was meaningful at the level .05 (p= .000). The factor analysis showed that the lowest factor load value was 0.452, and the highest was 0.678. In the initial analyses, all of the 10 items were working and gathered in one single factor. The Cronbach Alpha reliability coefficient of the scale was calculated to be 0.83. These results proved that the SVALP Scale is reliable.

The second data collection tool was a 32-item five point Likert style NMCC Scale developed by Bulut (2006). The scale based on the "Curriculum Elements Evaluation Model" (Erden, 1998). The NMCC Scale has been developed to gauge the teachers' perspective on applicability of the overall curriculum and the curriculum's projected learning attainment, content, teaching/learning activities and measurement and evaluation dimensions.

Before being administered on the main research group, the scale was piloted on 124 primary school teachers who used the new curriculum and a factor analysis of the data was performed. According to initial analyses, the KMO coefficient of the NMCC Scale was measured to be .94 and its Bartlett's test value 4093.373. Bartlett's test result was meaningful at the level .05 (p= .000). The scale includes four sub-scales. The sub-scales were named as

learning attainment, content, teaching/learning activities and measurement and evaluation. The teachers who participated the pilot procedure were not included in the study later. They were not the participants of the study.

The reliability of the total scale was measured by the Cronbach Alpha reliability coefficient, Spearman-Brown correlation coefficient and Guttman split-half reliability formula. Its Cronbach Alpha value was measured to be .98, Spearman-Brown was found to be .87 and Gutmann split-half was calculated to be .93. These results proved that the scale is reliable. Factor analysis results proved that the NMCC Scale was valid and reliable.

Some of the items of the NMCC Scale are as follows: **Some items regarding learning attainment sub-scale:** "How relevant are learning attainments to students' cognitive developmental characteristics?"; "How relevant are learning attainments to students' emotional development characteristics?"; "How clear and comprehensible are learning attainment expressions?"; "How consistent are learning attainments with regards to one another?"; "How applicable are learning attainments in current conditions?". **Some items regarding the content sub-scale:** "How consistent is the content with the general aim of the curriculum?"; "How inclusive is the content in encompassing rudiments such as concepts, principles, methods, process, etc.?"; "How appropriate is the content to contemporary scientific knowledge?"; "How suitable is the order of subjects within the content to learning principles?". **Some items regarding the teaching/learning activities sub-scale:** "How effective (suitable) are the programs configuration through learning areas (such as numbers, geometry, measurement, etc.) on education?"; "To what degree do students' learn the projected skills (problem solving, reasoning, communication, etc.) in the curriculum?"; "To what extent would the Theory of Multiple Intelligences be used in activities?"; "To what degree would the programs projected activities be applied?". **Some items regarding the measurement and evaluation sub-scale:** "How appropriate are the curriculum's projected measurement and evaluation techniques (such as performance evaluation, portfolio, etc.) in assessing the learning attainments?"; "To what extent would multiple assessment techniques (performance exams, projects, interviews, etc.) be applied to enhance learning attainments?"

Collecting Data and Analysis

The Instrument was administered to mathematics teachers in 49 elementary schools within Diyarbakir city in spring of 2009. The Instrument was distributed to the teachers by hand and they were given a certain amount of time to complete them. They were later collected individually from the teachers. In total 136 mathematics teachers were polled; one answer was void, so 135 answers were used in this research.

Data are analyzed by SSPS program. The data from the SVALP Scale were analyzed by using means score and standard deviations, while the personal data of teachers were analyzed by using frequency and percentage

values. The data from the NMCC Scale were analyzed by using frequency and percentage values. Furthermore, independent samples t-test was used to examine whether a meaningful difference existed between male and female teacher views. On the other hand, one way analysis of variance was performed to investigate whether there was a meaningful difference between teacher views with respect to seniority and class size variables. Where there was a difference, the Scheffe test was used to reveal the groups that differed. In addition, the Levene test was used prior to the analysis of variance and the t-test in order to test the homogeneity of the variances. When a meaningful difference was displayed by the Levene test, analysis of variance was replaced by the non-parametric Kruskal Wallis-H (KWH) test (Sumbuloglu & Sumbuloglu, 2000).

In order to assess the realization level of each item on the SVALP Scale which was included in the first form of the data collection tool, the following were used: "Completely (3)", "Partially (2)" and "Never (1)". The mean scores were classified into 3 interval scales which were calculated as follows: The interval level=[Max-Min]/n=[3-1]/2=0.67 (Tekin, 1996). Therefore, means score between 1.00-1.66 were accepted to correspond to "Never", those between 1.67-2.33 to "Partially" and those between 2.34-3.00 to "Completely". The following was used in order to determine the level of realization for each item on the NMCC Scale: "Completely (5)", "Mostly (4)", "Moderately (3)", "Rarely (2)" and "Never (1)". The mean scores were classified into 5 interval scales which were calculated as follows: The interval level=[Max-Min]/n=[5-1]/5=0.80 (Tekin, 1996). Therefore, means score between 1.00-1.80 were taken to correspond to "Never", those between 1.81-2.60 to "Rarely", those between 2.61-3.40 to "Moderately", those between 3.41-4.20 to "Mostly", and those between 4.21-5.00 to "Completely".

FINDINGS

In this section, the findings of this study are sorted by considering lower categories instead of the general purpose.

Table 2 displays the means score and standard deviations of mathematics teachers' views on the SVALP Scale.

Table 2. *Means score and standard deviations of mathematics teachers' views on the SVALP Scale*

Item	$\overline{X}$	SD
1- To what extent have the new mathematics course curriculum seminars contributed to your professional development?	1.79	.616
2- To what extent do you embrace the new mathematics course curriculum?	2.05	.551
3- How much do you use IT technologies in the instructional process?	1.85	.567
4- How adequate are the schools and classes physical environment for teaching and learning?	1.77	.572

5- How well does the curriculum provide equal opportunity between students?	1.87	.591
6- How much do you use modern learning approaches (research, projects, cooperative and problem based learning) in the instructional process?	2.21	.401
7- How much do you encourage your students to effectively participate in the instructional process?	2.61	.561
8- How much do you facilitate the instructional process?	2.20	.583
9- How much responsibility do you give your students in the learning process?	2.19	.525
10- Despite the curriculum change, do you believe that your role has changed in practice?	1.84	.633

The means score in Table 2 show that teacher views about professional development ($\overline{X}$ = 1.79), program embracing ($\overline{X}$ = 2.05), IT technologies ($\overline{X}$ = 1.85), physical conditions ($\overline{X}$ = 1.77), equal opportunity ($\overline{X}$ = 1.87), modern learning approaches ($\overline{X}$ = 2.21), facilitating the learning process ($\overline{X}$ = 2.20) and giving responsibility to students ($\overline{X}$ = 2.19) and new roles ($\overline{X}$ = 1.84) were ***"partially"*** actualized, while that about encouraging students ($\overline{X}$ = 2.61) was ***"completely"*** actualized.

Table 3 displays the frequency and percentage of mathematics teachers' views on the NMCC Scale.

Table 3. *The results of NMCC's effectiveness on implementation*

		Completely	Mostly	Moderately	Rarely	Never
Learning Attainment	f	7	35	59	24	10
	%	5.1	25.9	43.7	17.7	7.4
Content	f	9	32	64	19	11
	%	6.7	23.7	47.4	14.1	8.1
Teaching/Learning Activities	f	11	27	76	11	10
	%	8.1	20	56.3	8.1	7.4
Measurement and Evaluation	f	13	37	58	17	10
	%	9.6	27.4	43	12.6	7.4
The Overall Curriculum	f	8	35	67	15	10
	%	5.9	26	49.6	11.1	7.4

When Table 3 is examined, teachers' views on the effectiveness of the implementation of NMCC applications was found to be *"moderately"* in the following percentages: 43.7% of learning attainment, 47.4% of content, 56.3% of learning-teaching activities, and 43% of evaluation dimensions. Also according to Table 3, almost half the teachers' (49.6%) found the curriculum to be *"moderately"* effective during the general application.

Table 4 shows the t-test results of teacher views on the outcomes of NMCC, learning attainment, content, teaching/learning activities and measurement and evaluation sub-scales and the overall curriculum with respect to *"gender"* variable.

Table 4. *T-test results of teacher views on sub-scales and the overall curriculum with respect to gender variable*

Sub-Scales	Gender	N	$\overline{X}$	SD	Levene F	Levene p	t	p
Learning Attainment	male	88	2.96	.741	.036	.849	0.248	.804
	female	47	3.00	.752				
Content	male	88	2.98	.809	.234	.629	1.077	.284
	female	47	3.14	.821				
Teaching/Learning Activities	male	88	3.11	.784	.007	.932	0.092	.927
	female	47	3.12	.810				
Measurement and Evaluation	male	88	3.08	.844	.025	.875	0.347	.729
	female	47	3.13	.866				
The Overall Curriculum	male	88	3.02	.735	.000	.984	0.466	.642
	female	47	3.08	.740				

Table 4 shows that gender of teachers did not cause a meaningful difference between their views on the *learning attainment* [$t_{(133)}$=0.248, p>.05], *content* [$t_{(133)}$= 1.077, p>.05], *teaching/learning activities* [$t_{(133)}$= 0.092, p>.05], *measurement and evaluation* [$t_{(133)}$=0.347, p>.05] sub-scales and *the overall curriculum* [$t_{(133)}$=0.466, p>0.05]. The means score of groups revealed that both male and female teachers stated that the learning attainment, content, teaching/learning activities and measurement and evaluation sub-scales as well as the overall curriculum were ***"moderately"*** effective.

Table 5 presents the KWH results of mathematics teachers' views on the learning attainment, content, teaching/learning activities and measurement and evaluation sub-scales, and overall curriculum with respect to "*seniority*" variable.

Table 5. *KWH test results of teacher views on sub-scales and the overall curriculum with respect to seniority variable.*

Sub-Scale	Seniority	N	Mean Rank	SD	KWH	p
Learning Attainment	1-5 years	58	69.93	3	4.941	0.176
	6-10 years	46	60.08			
	11-15 years	18	68.69			
	16 and high	13	86.46			
Content	1-5 years	58	71.36	3	3.802	0.284
	6-10 years	46	60.35			
	11-15 years	18	66.86			

	16 and high	13	81.65			
Teaching/Learning Activities	1-5 years	58	74.30	3	5.948	0.114
	6-10 years	46	56.82			
	11-15 years	18	70.28			
	16 and high	13	76.31			
Measurement and Evaluation	1-5 years	58	70.92	3	5.694	0.128
	6-10 years	46	61.91			
	11-15 years	18	59.75			
	16 and high	13	87.92			
The Overall Curriculum	1-5 years	58	71.28	3	4.672	0.197
	6-10 years	46	59.17			
	11-15 years	18	69.17			
	16 and high	13	82.96			
	Total	135				

Table 5 reveals that teacher views about *the learning attainment* [$KWH_{(3)}$=4.941, p>.05], *content* [$KWH_{(3)}$=3.802, p>.05], *teaching/learning activities* [$KWH_{(3)}$=5.948, p>.05] and *measurement and evaluation* [$KWH_{(3)}$=5.694, p>.05] sub-scales and *the overall curriculum* [$KWH_{(3)}$=4.672, p>.05] of the 6th grade NMCC did not vary meaningfully by ***"seniority"*** variable. Thus, it seems that seniority variable does not have a significant effect on teacher views about the learning attainment, content, teaching/learning activities and measurement and evaluation sub-scales and overall curriculum the of the new 6th grade NMCC. When considering the mean ranks of groups based on foreseen learning attainment, content, teaching/learning activities, and measurement and evaluation of the lower categories compared to the general standing, teachers with education experience of 16 years or more have looked upon the program more favorably.

Table 6 presents the KWH results of mathematics teachers' views on the learning attainment, content, teaching/learning activities and measurement and evaluation sub-scales, and overall curriculum with respect to "*class size*" variable.

Table 6. *KWH test results of teacher views on sub-scales and the overall curriculum with respect to class size variable*

Sub-Scale	Class Size	N	Mean Rank	SD	KWH	p
Learning Attainment	21-30 between	22	63.39	3	0.813	.846
	31-40 between	45	71.18			
	41-50 between	54	66.33			
	51 and high	14	71.46			
Content	21-30 between	22	62.98	3	0.706	.872
	31-40 between	45	66.78			
	41-50 between	54	69.99			

	51 and high	14	72.14			
Teaching/Learning Activities	21-30 between	22	73.09	3	0.771	.856
	31-40 between	45	67.78			
	41-50 between	54	65.19			
	51 and high	14	71.54			
Measurement and Evaluation	21-30 between	22	67.59	3	0.101	.992
	31-40 between	45	67.01			
	41-50 between	54	68.30			
	51 and high	14	70.68			
The Overall Curriculum	21-30 between	22	63.61	3	0.523	.914
	31-40 between	45	68.32			
	41-50 between	54	68.19			
	51 and high	14	73.14			
	Total	135				

KWH test results in Table 6 indicate no statistically significant differences among mathematics teachers' views toward *the learning attainment* [$KWH_{(3)}$=0.813, p>.05], *content* [$KWH_{(3)}$=0.706, p>.05], *teaching/learning activities* [$KWH_{(3)}$=0.771, p>.05], *measurement and evaluation* [$KWH_{(3)}$=0.101, p>.05], and *the overall curriculum* [$KWH_{(3)}$=0.523, p>0.05] in terms of class size variable. In other words, math teachers have stated class size has no effect on the learning attainment, content, teaching/learning activities and measurement and evaluation sub-scales, and overall curriculum.

DISCUSSION

This study has tried to evaluate the opinions of mathematics teachers on the effectiveness of the application of the NMCC in the sixth grade classes.

Professional Development

According to the findings of the study, the in-service seminars conducted to publicize the new sixth grade MCC were not found to be satisfactory in progressing the mathematic teachers' professional development. Directory of Educational Research and Development (DERD) conducted a questionnaire amongst mathematic teachers on this subject in 2006. They were asked the question, *"To what extent have the new mathematics course curriculum seminars contributed to your professional development?"* 25.3% answered ***yes***, 30.7% answered ***partially*** and 32.5% answered ***no.*** In the same study 91.4% of administrators stated that their teachers needed this in-service seminar. A study conducted by Bal (2008) found that most of the teachers confirmed they did not receive adequate information on the program during these seminars. Another study conducted by Erbas and Ulubay (2008) found

more than half of the mathematic teachers stated needing to be better informed on 6th grade the NMCC.

According to two important studies, an interesting detail has been discovered. The study conducted by Usun and Karagoz (2009) revealed teachers found *participation in in-service seminars* had little affect on the curriculums preparation process, general characteristics, content, teaching/learning activities and evaluation; another study done by Sarier (2007) confirmed the same finding when evaluating the lower dimensions such as learning attainments, content, teaching/learning activities, and evaluation. Usun and Karagoz (2009) concluded there was no measurable difference between teachers who had taken the in-service training and those who hadn't, the probable reason being the training not sufficient to positively affect the teachers views of the new curriculum. Thus, teacher participation in conducting in-service training may be advised (DERD, 2006).

Embracing The NMCC

In this research, teachers were asked, *"To what extent do you embrace the new mathematics course curriculum?"* and the answer was *"partially"*. This response is in accordance with the findings of Anilan and Sarier (2008). The researchers found the teachers ***"partially"*** believed in the curriculum includes constructivism. This result confirms that teachers do not completely relate to the new curriculum. However, Ercan and Altun (2005) believe the success of the curriculum depends upon the enthusiasm and effort of the implementers of the curriculum. In future, a study could be conducted to determine why mathematic teachers have not sufficiently embraced the NMCC.

IT technologies

To create a learning environment where an individual can be enticed to study, an appropriate learning-teaching environment must be obtained (Akinoglu, 2003) because, according to the studies, for learning to be permanent, it should be varied with different tools and methods (Ozden, 1999). According to Dede (2007), using different materials and resources when teaching mathematics is the basis of effective teaching. Using fewer materials in the learning process has a negative effect on the learning environment, thus reducing interest and participation in the class (Charalambous & Hill, 2012; Remillard, 2000; Stein et al. 2008). This also may affect the learning-knowledge acquiring process (Unal & Basaran, 2010). The new sixth to eight grade mathematics course curriculum learning attainments for students to learn using information technologies (ME, 2009). For such skills to be properly applied by students, first teachers must be able to utilize these information technologies in their teaching methods. In this respect, Celen, Celik, and Seferoglu (2011) point out an important point. According to authors making effective use of information technologies in education and diffusion of those technologies may have contributed to the improvement in the test scores of PISA 2009.

In this research, it has been found that teachers partially use these information and communication technologies in the learning process. This result is similar to Erbas and Ulubay's (2008) findings. In the research, it was found that the teachers used the necessary materials and equipment to only a mediocre level. This reveals that the research results support one another. However, it is also possible to find results to the contrary in some literature. For example, a study conducted by DERD (2006) found that 66% of mathematic teachers said they used information communication technologies during their classes. Yet, another study conducted in nine cities (Diyarbakir, Istanbul, Ankara, Hatay, Izmir, Bolu, Kocaeli, Van and Samsun) done by Bulut (2006), revealed only 13.8 % of teachers participating had access to a mathematics laboratory, where 86.2 % had not. Taking this result into account, as it is difficult to use information technologies without math laboratories, it could be said that the administrators answers on the subject are somewhat overstating the case. In the same research (DERD, 2006) visiting inspectors points of view were similar to the research findings. According to the visiting inspectors, almost half of the classes inspected did not have the specifications for an adequate learning environment. The percentage of inspectors stating this fact was found to be close to 64% (DERD, 2006). The results of a study done by Gunes (2008) also verify this studies finding. These results showed none of the teachers in the research utilized technologies for a constructive learning environment. As a result, it could be stated that not having the necessary equipment hinders the learning attainments the curriculum needs to accomplish.

Physical Environment

In this study, teachers were asked, *"How adequate are the schools and classes physical environment for teaching and learning?"* and the answer was "*partially adequate"*. Another study conducted by Anilan and Sarier (2008) also concluded that teachers found the foundation and facilities in the schools to be only partially adequate. Also, a study conducted by DERD (2006) noted that, after visiting the classrooms, administrator found the environment to be insufficient. All the afore mentioned studies appear to support one another. With these analyses in mind, it can be stated that the physical foundation of the schools and classes for the new curriculum will be established in, has been found inadequate. The all in all conclusions: For the Elementary School Mathematic Class Curriculum to be effective, resources, materials, medium and means, as well as needed technologies to be present in the schools. Also, the schools infrastructure and resources must be made sufficient for the implementation of the curriculum (Usun & Karagoz, 2009).

Equal Opportunity

It has also been found that the curriculum only partially provides equal opportunity to students in the teaching and learning process. A study conducted by DERD (2006) showed only half of the inspectors thought the teachers lectured the class considering fast learning and slow learning students.

Thus, it is possible conclude not all students have the benefit of the same conditions and activities in the general learning process. One of the six principles of PSSM is equality and the basis of equality must be the expectation of all students to have equal and high access education (Umay, Akkus, & Duatepe Paksu, 2006). According to Guven and Sozer (2007), it is essential for the programs visualized activities to fit individual students' needs thus being able to provide equal opportunity education. Teachers must present ample options to enhance students' personal aptitude and diversity and supply appropriate opportunities in the learning process. Researchers could investigate the reasons why mathematic teachers' have not been able to achieve equal opportunity amongst their students during the learning process.

Modern Learning Approaches

In the elementary school curriculum, emphasis is on student based approaches like cooperation, problem solving, and discovery amongst others, in the teaching and learning process (Gunes, 2008). Thus, teachers participating in the study were asked the question *"How much do you use modern learning approaches (research, projects, cooperative, and problem based learning) in the instructional process?"* and 86 teachers answered *"partially"*. In the study by Anilan and Sarier (2008), most teachers (75%) preferred the straight forward teaching method, compared to cooperation based method (52.9%), problem-solving based method (48.6%) and project based method of education. In this aspect, the two studies correspond with each other. As a result, it could be stated mathematic teachers partially utilize a student centered education system where students can actively participate, such as research, projects, cooperative, and problem solving in the teaching and learning process. However, it has been found that students prefer a learner based education system as it meets their needs for active participation (As quoted by Acat, 2005 from Peke, 1993; Felder & Brent, 1996; Lea, Stehanson, & Tray, 2003). Due to these reasons, it is of utmost importance to the effectiveness of the program for teachers to use modern teaching methods such as actively involving the student, compelling students to reason and question and be responsive to individual differences.

Encourage Students

From this research, it seems clear that teachers actively encourage students to participate in the teaching-learning activities. It was also determined by DERD (2006) that investigators found 77.8% of teachers believed they encouraged students to be active in class. This shows DERD's results correspond with this study's findings.

Facilitate The Instructional Process

This study asked teachers, *"How much do you facilitate the instructional process?"* and was answered *"partially"*. According to this result, it could be stated that teacher do little to simplify the learning progression, even though a learning environment which accounts for

individual differences would certainly abridge the process. Furthermore, teaching the mathematics class in a mathematics laboratory may be beneficial to the learning process. At this point, teachers have a very important role to play. According to Sahinel (2010), teachers should not just be providers of information. They must also make the learning process easier for the student, be a guide to education, adapting the environment to meet the students' needs. Another role for the teacher must be taking in hand personal and environmental effects such as self-doubt, failure and discord and using problem-solving based method to resolve the situation and help the student.

Responsibility

Students should be given responsibility during their learning process (Yurdakul, 2010) because when given the responsibility to learn, the students' motivation will increase dramatically (Alderman, 1990). This responsibility does not necessarily have to be exclusively for class exercises, it can also be applied to homework. Thus, Reynolds and Muijs (1999) states learning opportunities arise from homework as well. In this study, teachers were asked *"How much responsibility do you give your students in the learning process?"* and the answer was *"partially"*, however, according to the findings of DERD (2006), when inspectors were asked a similar question, the answers were more positive. The inspectors answered *"Teachers give responsibility to students"* portion of the questionnaire as 58% ***"yes"***, 40.9% ***"partially"*** and 1.1% ***"no"***.

The Teachers' Roles

The teachers' roles in implementing the new curriculum's philosophies, as well as reaching the desired level of success and quality and the education program's transition into the classrooms, is of utmost importance (DERD, 2006). Thus explicitly predetermining the roles of teachers will certainly affect the success of the curriculum. In the study done by DERD (2006), 70% of teachers thought that in the sixth grade mathematics curriculum outline, the role of teachers was comprehensive and clearly defined. In the same study, administrators expressed teachers' belief in the new curriculum. This can be seen as a positive result, however in this study when teachers were asked, *"Despite the curriculum change, do you believe that your role has changed in practice?"* most answered *"partially"*. As a result, this impression might not be enough for the curriculum's success. In a study by Erbas and Ulubay (2008), 72.6% of mathematic teachers expressed the belief that previous methods and techniques were almost the same as the new programs forecasted system. In another study by Gunes (2008), some teachers had embraced the traditional method of education. Anilan and Sarier (2008) found the same results in their research. In their study, the answers to the questions, *"Sometimes I revert back to the old curriculum while I'm teaching"* and *"The habits of the previous curriculum makes the implementation of the new curriculum difficult"* were ***"I concur"***. Thus, this finding appears to support the results of Gunes, Erbas and Ulubay and Anilan and Sarier. According to these results, it could be deduced that teachers can

not fully implement their anticipated roles in the new curriculum. The reason for this could be lack of information about the curriculum, poor education environment and not embracing the new curriculum sufficiently. Researchers can investigate why mathematic teachers have not been able to adapt fully to their new roles in the learning process.

To determine how effectively sixth grade NMCC is implemented, the study consulted teachers on the following subjects: anticipated learning attainment, content, teaching/learning activities, and measurement and evaluation. In the research, anticipated learning attainments of the application implementation were not changed by gender, seniority, and class volume. This result shows corresponding conclusions with Usun and Karagoz (2009) "The Evaluation of Elementary School Mathematics Curriculum Based on Teachers Observations".

Learning Attainment

Another finding of the research is math teachers' views that the new curriculum application effecting learning attainment is at a *"moderately" level.* Gunes' research (2008) determined one of the biggest problems verbalized by teachers was math class timetables. They stated class time was insufficient to implement the learning attainments. The research concluded the teachers knew class time was limited for the implementation of the sixth grade NMCC's learning attainments to the students. In fact some teachers admitted to abandoning the required exercises do to this reason. However it is also possible to find contradictory results in the literature. For example, the research by DERD (2006) shows more than 70% of sixth grade math teachers stated the section on learning attainment in the outline program was sufficiently explained. In the same study, 81.9% of teachers stated learning attainments were compatible with the class goal, 66.9% stated learning attainments were enough to realize class goals and 47.6% stated the sample exercises in the goals section of the outline program was partially sufficient to implement these learning attainments. Also, Sarier (2007) found that teachers thought the learning attainments were clearly stated in the curriculum and that it was compatible with the general purpose of the curriculum. Usun and Karagoz (2009) found that most teachers thought the goals were direct, understandable and in sync with the general purposes of the math curriculum, meeting the needs and developmental characteristics of the students', also encouraging communication and problem solving abilities. It is interesting to find the same researchers also stated, *"The learning attainments considered in the curriculum must be adequate to meet the needs of society and contribute to the readiness status of the student. The curriculum must be reorganized after taking into consideration the teachers views."*

Content

Choosing *the content* and coordination during education program's design is of utmost importance for the success of the curriculum. As a result, it is necessary to gather data on the function of the operation and interpret these

facts, which will lead us to a clear conclusion on how effective the content of the curriculum will be (Erden, 1998). According to the study, teachers' statements concluded gender, seniority, and class size had little effect on the function of the content. In other words, mathematic teachers agreed there were no effects from gender, seniority and class size on the content. This result is in parallel with the results of the study by Usun and Karagoz (2009).

Teachers also stated the content of the program's effect on the application of the curriculum is *"moderately"*. On this subject, Usun and Karagoz (2009) found that most teachers agreed that content was suitable for students' developmental needs and abilities, encouraging problem-solving, compatible with learning attainment, adaptable to other classes and good enough to meet the students' needs. The study Sarier (2007) conducted showed that teachers agreed the content of the curriculum was consistent with education topics, geared to realize the learning attainments, complimentary to the students' everyday life, supported by adequate exercise materials and developed a positive outlook towards the subject in students. However, it was also stated by teachers that there was insufficient time to apply the content of the curriculum and it was "***partially"*** appropriate for students' level of education.

Teaching/Learning Activities

Teaching/learning activities contains the whole of the students and teachers instruction during the learning and teaching process. There are many factors that effect students' success during the education undertakings, the main ones being (Erden, 1998): (i) Teachers attitude to teaching, (ii) the students' in-class and outside activities according to the curriculum, (iii) the scientific and emotional properties of students before stating the program and (iv) teaching methods and techniques. When evaluating the curriculum all these factors must be considered.

In this study, teachers' stated that teaching/learning activities influence on the outcome of the curriculum was hardly affected by gender, seniority and class size. In other words, math teachers' views on the influence of teaching/learning activities are not affected by gender, seniority, and class size. The study done by Gomleksiz and Bulut (2007) found teachers thought gender, seniority, and class size had little effect on the NMCC's *teaching/learning activities* influence on application. The conclusion reached by this study is parallel to the study conducted by Gomleksiz and Bulut.

The study found teachers stated teaching/learning activities effect on the curriculum application was *"moderately"*. However, after examining the literature, it is possible to find more optimistic points of view by teachers in some other studies. For example, in a study conducted by Usun and Karagoz (2009) teachers found the learning and teaching process in the elementary school mathematics curriculum to be optimistic. Another study conducted by Sarier (2007) found mathematic teachers learning and teaching program adopted a student based learning strategy, allowing for an environment for

teamwork, coaxing students to learn and use investigative methods of learning. In the study conducted by DERD (2006) 71.7% of teachers thought elementary school sixth grade math class outline program had enough examples in the required units to effectively apply the student based education system. On the other hand, a study conducted by Akkaya (2008) found results to the contrary. In this study, when the guide books were evaluated by teachers, they were not found to be satisfactory. The deficiencies in the text books troubled the teachers and they continually reiterated the revisal of these books. They stated the theoretic information is short and inadequate and the subjects do not complement each other (Akkaya, 2008). Thus the guide books deficiencies may adversely effect the programs application.

According to the teachers who are applying it, the deficiencies in utilizing the new program are as follows; the crowded classrooms, the inadequate predicted time of the class (Anilan & Sarier, 2008; Akkaya, 2008) and having too many exercises to be completed (Anilan & Sarier, 2008). A study conducted by Erbas and Ulubay (2008) found 70.1% of teachers concluded class size was a hindrance to the structuring approach of teaching. In the same study, it was also found 86.3% of math teachers concluded there was not enough time to fully conduct all the exercises foreseen in the curriculum. In conclusion, it is essential for the curriculum experts to reorganize the predicted time needed for all the exercises. Actually Reynold and Muijs (1999) states learning mathematics corresponds to how much time is spent on education.

Another reason for the programs malfunction could be students' pessimistic attitudes towards education. The students' attitude towards education influences preparation and contribution to the class, as well as determination to learn and ambition to succeed (Alomar, 2006; Bloom, 1976; Donlan, 1998; Ma, 1999; Townsend & Wilton, 2003). Thus, for the curriculum to succeed, it is essential for the students to have a positive outlook on the lesson (DERD, 2006), however it has been determined by DERD that most sixth grade students had a negative approach to the new math class being taught by applying the new curriculum. Students' unenthusiastic attitude towards the class may cause a negative impact on the learning process. As one of the goals of the curriculum is to foster affirmative attention and interest in education, it is obvious that this goal is not being met in class (DERD, 2006).

Measurement and Evaluation

The concept of evaluation is to support the learning process and regard the students' progress (ME, 2009). Evaluating the learning process in this sense of the word is important to show the advancement of the student as well as the teacher (DERD, 2006). Evaluation and assessment in the learning and teaching process help us determine the students' progress, become aware of the deficiencies, and establish the effectiveness of teaching methods, and find the failings and strengths of the curriculum (ME, 2009). When evaluating the students', the following points must be considered: How effectively does the

child use mathematics in everyday life, how well developed are her problem solving capacity, what is the level of applying logic, attitude towards mathematics in general and level of self-confidence in oneself towards mathematics, degree of self-organization and social skills, development of esthetic perception, degree of communication and interaction with mathematics (ME, 2009).

It is advised in the NMCC that aside from having written evaluation techniques, it is also suggested debating, presentations, experiments, exhibitions, projects, observation, materials folder, self and peer assessment, exc. should be used during the appraisal process. In the study, it has been stated by teachers that gender, seniority, and class size had little or no effect on the evaluation process of the new curriculum. In other words, mathematic teachers agreed gender, seniority, and class size had no effect on the evaluation process in the new curriculum. This finding is compatible to the findings of Usun and Karagoz (2009), who found that mathematic teachers thought gender and seniority had little effect on the evaluation and assessment process.

In the study, teachers stated the evaluations effect on the curriculums process would be *"moderately"*. The study done by Usun and Karagoz (2009) found teachers' general view on the subject of the curriculums evaluation and assessment process to be "undecided". The study conducted by DERD (2006) showed teachers views on the clarity and comprehensiveness of the assessment and evaluation process in the new curriculum to be; 33.7% "yes", 45.8% "partially" and 17.5% "no". In the same study, only 46.4% of teachers' found the details and explanations of the new curriculums assessment and evaluation process satisfactory. The study Gunes (2008) conducted established that teachers did not find the explanations of the alternative method of evaluation were satisfactory. According to the study, this lack of information has led to teachers' falling back to the traditional ways of assessing and evaluating students. Thus, instead of assessing students' materials folder, projects, performance, research and exploration work, teachers have evaluated students' on their own observations, tests and written exams. Furthermore, Gunes (2008) concluded in that no matter how enthusiastic the teachers were, due to class size, it was not possible to use the evaluation forms suggested by NMCC. The conclusions of DERD's study conducted, supports these findings. It has been found that most teachers in the sixth grade math classes ***"usually"*** use oral and visual (posters, graphics') works, oral and written exams and students portfolio for evaluation, where as they ***"sometimes"*** use project evaluation, performance, presentation homework, group and peer assessment and self-assessment. It has also been found that teachers "***never"*** used grid concept maps, behavior scales or control lists to evaluate students. Therefore, it can be stated that mathematic teachers can not utilize the new evaluation structure adequately, thus using the traditional assessment system instead. Thus, it could be stated, mathematic teachers may not be able to reach their learning attainments put forth in the curriculum. Due to this reason, teachers should be

given in-service training on alternative evaluation techniques, and class hours for mathematics course per week should be increased.

In this research, mathematics teachers evaluated the general curriculum and stated gender, seniority, and class size did not have an effect on the overall performance. Mathematic teachers also stated in the general appraisal of the curriculum, the application degree as *"moderately"*.

The most important contributors to the success of the NMCC are the teachers themselves because the most influential factor in the student becoming actively involved depends on the teachers. For the learning principle to be completely effective, the teacher must have supplied a supportive and active class environment. To accomplish this, the teacher ought to be renewing themselves (Umay et al. 2006). We have found that this study has especially emphasized the need for in-service training for mathematic teachers to learn the learning attainment, content, teaching/learning activities, and measurement and evaluation process. Thus, mathematics teachers must be given a comprehensive and systematic in-service training.

From this research, it seems clear that mathematic teachers partially accept the new curriculums success as a whole; the ME (Ministry of Education) must address this issue. By giving significance to the new curriculum, the ME can show the teachers through example the necessity and importance of the new curriculum. Thus, the teachers' determination to apply the curriculum may be improved.

For the sixth grade NMCC's envisaged new activities to be performed and that the absence of the physical foundations and equipment must be consolidated. The research shows most of the activities do not take place due to lack of foundation and material deficiency. The ME must also take the necessary precautions to address this issue. Reassessment of the effects of the new programs *learning attainment, content, teaching/learning activities,* and evaluation process must be taken under consideration. When doing so the students' technical and emotional characteristics should be measured as well. *Another important problem is the teachers not finding the learning-teaching process in the new curriculum to be adequate.* The difficulties could be linked to math teachers not having enough information, the lack of equipment or the curriculum itself. To consolidate the situation The ME must reevaluate and make the necessary changes to The NMCC's educational environment, then give in-service training about the learning-teaching process to teachers.

Researchers may study why mathematic teachers have not been able to implement the overall curriculum and the learning attainments, content, teaching/learning activities and evaluation dimension found within the NMCC through classroom observation.

REFERENCES

Acat, B. (2005, September). *Öğrenci merkezli eğitimde öğrenme ortamı boyutlarının düzenlenmesi.* V. International Educational Technology Symposium, Sakarya, Turkey.

Akkaya, A. O. (2008). *6. Sınıf matematik ders programının uygulanabilirliğine ilişkin öğretmen görüşleri.* Yayımlanmamış Yüksek Lisans Tezi. Osmangazi Üniversitesi, Eskişehir.

Alderman, K. M. (1990). Motivation for at-risk students. *Educational Leadership, 48(1),* 27-30.

Alomar, B. O. (2006). Personel and family paths to pupil achievement. *Social Behavior and Personality, 34 (8),* 907–922.

Altun, M. (2006). Matematik öğretiminde gelişmeler. *Uludağ Üniversitesi Eğitim Fakültesi Dergisi*, *19 (2),* 223-238.

Anilan, H., & Sarier, Y. (2008). Altıncı sınıf matematik öğretmenlerinin matematik dersi öğretim programının uygulanabilirliğine ilişkin görüşleri. *Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi, 16,* 128-141.

Bal, A. P. (2008). Yeni ilköğretim matematik öğretim programının öğretmen görüşleri açısından değerlendirilmesi. *Ç.Ü. Sosyal Bilimler Enstitüsü Dergisi*, *17 (1),* 53-68.

Bloom, B. J. (1976). *Human Characteristics and School Learning.* New York: McGraw-Hill.

Baydar, S. C., & Bulut, S. (2002). Öğretmenlerin matematiğin doğası ve öğretimi ile ilgili inançlarının matematik eğitimindeki önemi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 23,* 62-66.

Bulut, I. (2006). *Yeni ilköğretim birinci kademe programlarının uygulamadaki etkililiğinin değerlendirilmesi*. Yayımlanmamış Doktora Tezi. Fırat Universitesi, Elazığ.

Bulut, S. (2004). İlköğretim programlarinda yeni yaklaşımlar matematik (1-5. sınıf). *Bilim ve Aklın Aydınlığında Eğitim,* Retrieved from http://dhgm.meb.gov.tr/yayimlar/dergiler/B ilim_Dergisi/sayi54-55/bulut.htm

Cakıroglu, E., & Cakıroglu, J. (2003). Reflections on teacher education in turkey. *European Journal of Teacher Education*, *26(2),* 253-264.

Celen, F. K., Celik, A., & Seferoglu, S. S. (2011, February). *Türk eğitim sistemi ve PISA sonuçları.* Akademik Bilişim 2011 Konferansı, Malatya, Türkiye.

Charney, C., & Conway, C. (2005). *The Trainers Toolkit.* New York: Amazon.

Dede, Y. (2007). Teachers' views about ways of teaching mathematics. *Hacettepe University Journal Education, 33,* 99-107.

Demir, S. (2011). Two inseparable facets of technology integration programs: Technology and theoretical framework. *Eurasia Journal of Mathematics, Science & Technology Education, 7(2),* 75-88

Demirel, O. (1999). *Eğitimde Program Geliştirme: Kuramdan Uygulamaya.*. Ankara: PegemA.

DERD (2006). *Education programs, the evaluation report (mathematics lesson).* Retrieved from http://earged.meb.gov.tr/dosyalar/dokumanlar/mufredat_degerlendirme/degerlen dirme_raporu6/matematik.pdf

DERD (2003). *The final report of the national, project of the PISA 2003.* Retrieved from http://earged.meb.gov.tr/dosyalar%5Cdokumanlar%5Culuslararasi/pisa_2003_ulusal_raporu.pdf

Donlan, C. (1998). *The Development Of Mathematical Skills*. Hove, Sussex: Taylor & Francis.

Erbas, A. K., & Uubay, M. (2008). Implementation of the new turkish primary education mathematics curriculum in the sixth grade: A survey of teachers' views. *The New Educational Review, 16 (3-4),* 51-75.

Ercan F., & Altun, S. A. (2005, November). *İlköğretim fen ve teknoloji dersi 4. ve 5. sınıflar öğretim programına ilişkin öğretmen görüşleri*. Eğitimde Yansımalar: VIII Yeni İlköğretim Programlarını Değerlendirme Sempozyumu, Kayseri, Türkiye.

Erden, M. (1998). *Eğitimde Program Değerlendirme.* Ankara: Anı.

Fang, Z. (1996). A review of research on teacher beliefs and practices. *Educational Research, 38,* 47-65.

Gomleksiz, M. N., & Bulut, I. (2006). Yeni fen ve teknoloji dersi öğretim programına ilişkin öğretmen görüşleri. *Fırat Üniversitesi Sosyal Bilimler Dergisi, 16 (2),* 173-192.

Gomleksiz, M. N., & Bulut, I. (2007). An evaluation of the effectiveness of the new primary school mathematics curriculum in practice. *Educational Sciences: Theory & Practice*, *7 (1),* 41-94.

Gooya, Z. (2007). Mathematics teachers' beliefs about a new reform in high school geometry in iran. *Educational Studies in Mathematics, 65*, 331-347.

Gozutok, F. D., Akgun, O. E., & Karacaoglu, O. C. (2005, November). *İlköğretim programlarının öğretmen yeterlilikleri açısından değerlendirilmesi*. Eğitimde Yansımalar: VIII Yeni İlköğretim Programlarını Değerlendirme Sempozyumu, Kayseri, Türkiye.

Guleryuz, H. (2001). *Eğitim Programlarının Dili ve Yaratıcı Öğrenme.* Ankara: PegemA.

Gunes, G. (2008). *Yeni ilköğretim matematik dersi öğretim programının öğretme öğrenme ortamına yansımaları*. Yayımlanmamış Doktora Tezi. Karadeniz Teknik Üniversitesi, Trabzon.

Guven, B., & Sozer, M. A. (2007). Views of teacher candidates toward individualized instruction. *Hacettepe University Journal Education, 32,* 89-99.

Handal, B., & Herrington, A. (2003). Mathematics teachers' beliefs and curriculum reform. *Mathematics Education Research Journal, 15,* 59–69.

Jones, K. K., & Byrnes, J. P. (2006). Characteristics of students who benefit from high-quality mathematics instruction. *Contemporary Educational Psychology, 31,* 328-343.

Karasar, N. (1994). *Bilimsel Araştırma Yöntemi.* Ankara: 3A Araştırma Eğitim Danışmanlık Ltd.

Kaya, Y. K. (2009). *İnsan Yetiştirme Düzenimiz (Politika-Eğitim-Kalkınma).* Ankara: PegemA.

Kunter, M., Tsai, Y. M., Klussman, U., Brunner, M., Krauss, S., & Baumert, J. (2008). Students' and mathematics teachers' perceptions of teacher enthusiasm and instruction. *Learning and Instruction, 18,* 468-482.

Lingefjärd, T. (1998). *The Conception-Design-Implementation-Operation Project: Assessment and Mathematics Examinations In The CDIO Project.* Retrieved from http://www.cdio.org/files/document/file/assessing_exams.pdf

Ma, X. (1999). A meta-analysis of the relationship between anxiety toward mathematics and achievement in mathematics. *Journal for Research in Mathematics Education*, *30(5),* 520-540.

ME (2009). *İlköğretim Matematik Dersi 6-8. Sınıflar Öğretim Programı ve Klavuzu.* Ankara: Milli Eğitim.

NCTM (2000). *The Standards 2000 Project*. Retrieved from http://www.nctm.org/standards/ overview.htm#project

Nespor, J. (1987). The role of beliefs in the practice of teaching. *Journal of Curriculum Studies, 19(4),* 317–328.

Ornstein, A. C., & Hunkins, F. P. (1998). *Curriculum Foundations, Principles, and Issues.* Boston: Allyn and Bacon.

Ozden, Y. (1999). *Öğrenme ve Öğretme.* Ankara: PegemA.

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

Reynolds, D., & Muijs, D. (1999). The effective teaching of mathematics: A review of research. *School Leadership and Management, 19,* 273–288.

Sahinel, M. (2010). Active learning. In Ö. Demirel (Ed.), *New directions in education* (pp. 149-165). Ankara: PegemA.

Sarier, Y. (2007). *Altıncı sınıf matematik öğretmenlerinin matematik dersi öğretim programına ilişkin görüşleri.* Yayımlanmamış Yüksek Lisans Tezi. Eskişehir Osmangazi Üniversitesi, Eskişehir.

Steedly, K., Dragoo, K., Arafeh, S., & Luke, S. D. (2008). Effective mathematics instruction. *Evidence for Education, 3(1),* 1-12.

Stein, M. K., Engle, R. A., Smith, M. S., & Hughes, E. K. (2008). Orchestrating productive mathematical discussions: Five practices for helping teachers move beyond show and tell. *Mathematical Thinking and Learning, 10,* 313–340.

Stemhagen, K. (2011). Democracy and school math: Teacher belief- practice tensions and the problem of empirical research on educational aims. *Democracy & Education, 19(2),* 1-13.

Stipek, D. J., Givvin, K. B., Salmon, J. M., & MacGyvers, V. L. (2001). Teachers' beliefs and practices related to mathematics instruction. *Teaching and Teacher Education*, *17*, 213-226.

Sumbuloglu, K., & Sumbuloglu, V. (2000). *Biyoistatistik.* Ankara: Hatiboğlu.

Tekin, H. (1996). *Eğitimde Ölçme ve Değerlendirme.* Ankara: Yargı.

Townsend, M., & Wilton, K. (2003). Evaluating change in attitude towards mathematics using the 'then-now' procedure in a cooperative learning programme. *British Journal of Educational Psychology, 73*(4), 473–487.

Umay, A., Akkus, O., & Duatepe Paksu, A. (2006). Matematik dersi 1-5. sınıf öğretim programının NCTM prensip ve standartlarına göre incelenmesi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 31,* 198-211.

Unal, C., & Basaran, Z. (2010). Yeni program çerçevesinde sosyal bilgiler öğretmenlerinin sorunları (Erzurum). *Milli Eğitim Dergisi, 186*, 291-309.

Usun, S., & Karagoz, E. (2009). İlköğretim II. kademe matematik dersi öğretim programının öğretmen görüşleri doğrultusunda değerlendirilmesi. *Muğla Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 22,* 101-116.

Varis, F. (1997). *Eğitimde Program Geliştirme "Teoriler ve Teknikler" [Curriculum Development "Theories and Techniques"]*. Ankara: Alkım.

Wilkins, J. (2008). The relationship among elementary teachers' content knowledge, attitudes, beliefs, and practices. *Journal of Mathematics Teacher Education*, *11*(2), 139– 164.

Yasar, S., Gulteki, M., Turkkan, B., Yildiz, N., & Girmen, P. (2005, November). *Yeni ilköğretim programlarının uygulanmasına ilişkin sınıf öğretmenlerinin hazirbulunuşluk düzeylerinin ve eğitim gereksinimlerinin belirlenmesi (eskişehir ili örneği)*. Eğitimde Yansımalar: VIII Yeni İlköğretim Programlarını Değerlendirme Sempozyumu, Kayseri, Türkiye.

Yurdakul, B. (2010). Constructivism. In Ö. Demirel (Ed.), *New directions in education* (pp. 39-65). Ankara: PegemA.