ELEMENTARY SCHOOL TEACHERS' VIEWS ABOUT THEIR IMPLEMENTATION OF THE ASSESSMENT TECHNIQUES RECOMMENDED IN THE NEW MATHEMATICS CURRICULUM

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I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science.

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This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

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ABSTRACT

ELEMENTARY SCHOOL TEACHERS' VIEWS ABOUT THEIR IMPLEMENTATION OF THE ASSESSMENT TECHNIQUES RECOMMENDED IN THE NEW MATHEMATICS CURRICULUM

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The purpose of this study was to investigate the views of elementary school teachers about their implementation of assessment techniques recommended in the new mathematics curriculum. The study was conducted with 306 elementary school teachers from 29 public schools in Kırıkkale, Malatya and Ankara in the 2006-2007 academic year. 'Opinions about Assessment Questionnaire' was used as the instrument for assessing the opinions of the teachers about assessment techniques offered in new mathematics curriculum.

The results showed that, teachers did not have negative views towards the implementation of the new assessment techniques in mathematics lessons. However, they needed support from curriculum experts about more suitable implementation of the assessment process.

To assess the effects of teaching experience, class size and grade level they teach on the views of the teachers about their implementation of assessment techniques recommended in new mathematics curriculum, the Univariate Analysis of Variance was used. The results revealed that the opinions of the teachers about their implementation of assessment techniques offered in new mathematics curriculum did not show any significant difference according to the experience of the teachers, class size and grade level teachers teach.

Keywords: Assessment Techniques, Mathematics Education, Mathematics Teachers.

ÖZ

SINIF ÖĞRETMENLERİNİN YENİ MATEMATİK MÜFREDATINDA TAVSİYE EDİLEN DEĞERLENDİRME TEKNİKLERİNİ UYGULAMALARI HAKKINDAKİ GÖRÜŞLERİ

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Bu çalışma sınıf öğretmenlerinin yeni matematik müfredatında tavsiye edilen değerlendirme tekniklerini uygulamaları hakkındaki görüşlerini araştırmayı amaçlamıştır. Çalışma 2006-2007 öğretim yılında Kırıkkale, Malatya ve Ankara illerinde bulunan 29 ilköğretim okulunda bulunan 306 öğretmen ile gerçekleştirilmiştir. Öğretmenlerin yeni matematik müfredatında tavsiye edilen değerlendirme tekniklerini uygulamaları hakkındaki görüşlerini değerlendirmek amacıyla 'Değerlendirme Hakındaki Görüşler Anketi' araç olarak kullanılmıştır.

Sonuçlar göstermiştir ki; öğretmenlerin matematik derslerinde yeni değerlendirme yöntemlerinin uygulanmasına yönelik negatif düşünceleri yoktur fakat daha uygun değerlendirme süreci hakkında müfredat uzmanlarının desteğine ihtiyaç duymuşlardır.

Öğretmen tecrübesinin, sınıf mevcudunun ve sınıf seviyesinin öğretmenlerin yeni matematik müfredatında tavsiye edilen değerlendirme tekniklerini uygulamaları hakkındaki görüşlerine olan etkilerini değerlendirmek için tekli varyans analizi kullanılmıştır. Analiz sonuçları öğretmenlerin yeni matematik müfredatında önerilen ölçme tekniklerini uygulamalarıyla ilgili görüşlerinin tecrübeye, sınıf mevcuduna ve eğitim verilen sınıfa göre istatiksel olarak manidar bir fark göstermediğini ortaya koymuştur.

Anahtar Kelimeler: Değerlendirme Teknikleri, Matematik Eğitimi, Matematik Öğretmenleri.

To My Parents

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CHAPTER 1

INTRODUCTION

Instruction takes place for learning to happen. However, one needs to understand whether instruction reached its aim or not. In order to determine to what extend the learning takes place in the classroom, assessment has to be done. There are psychomotor, cognitive and affective dimensions of learning. Therefore; systematic, planned and professional studies have to be done to identify which purposes have been met, which topics were learned adequately, in which subjects there were deficiencies (EARGED, 2005*).*

According to Gibbs (1995), assessment is undergoing a paradigm shift, from psychometrics to a broader model of educational assessment, from a testing and examination culture to an assessment culture. Clarke (1997) also thought that assessment should measure important classroom objectives; assessment results should represent how students perform on the broad knowledge and the skill domains reflected by those objectives; and classroom instruction should provide students with the opportunity to learn and attain the knowledge and skills. Educational measurement, on the other hand, aims to devise tests which look at the individual as an individual rather than in relation to other individuals and to use measurement constructively to identify strengths and weaknesses individuals might have so as to aid their educational progress (Gibbs, 1995). For this study, measurement and evaluation was taken as a part of assessment process and the following definition of assessment was employed: ‘‘A process for obtaining information that is used for making decisions about students, curricula and programs, and educational policy’’ (Nitko, 2001, p. 4).

Assessment has to support teaching and learning, provide information about students, teachers and schools, act as a selection and certification device, act as an accountability procedure, and drive curriculum and teaching (Herman, Aschbacher, & Winter, 1992). Krajcik, Czerniak and Berger (1999) claimed that assessment results can be used to identify areas where individuals need more help, where additional class instruction is needed, where instructional units can be improved, and where staff development resources need to be targeted. When instruction and assessment are linked to a common set of significant learning goals, assessments make sense and can be used to improve instruction (Korkmaz, 2004).

According to Krajcik, Czerniak and Berger (1999) traditional assessment in most courses of the elementary education was based on paper and pencil tests or essays. They argued that traditional questions generally failed to assess the variety of ideas students have. Traditional questions did not measure students' ability to work as a team. These questions did not show the ways of applications of the knowledge and skills to everyday life. Moreover, traditional questions did not have enough capacity of asking the ways of designing investigations. Niss (1995) acknowledged that;

> Although the question 'who is assessed' seems to have a simple answer as 'the student', in recent decades the group work has been introduced in mathematics education in many of places around the world. This implied that the immediate subject of assessment is now sometimes a working group of students (p. 84).

Turkish Education is in the process of renewing school curricula where curriculum based assessment becomes critical. The idea that assessment can and should contribute constructively to the curriculum is a fairly new phenomenon in schools. Therefore, for realizing the positive potential of assessment in classrooms, one needs a clear idea of why he/she is doing assessment in the classrooms. We need a clear idea of why he/she is doing assessment in the classrooms, what it is we are assessing, and how best to go about it. ''Once we are clear about the why, what, and how to assess, we can move on to the essential step of integrating assessment into our curriculum and our teaching seamlessly, as a part of our daily routine'' (Clarke, 1997, p. 2).

According to Niss (1995) assessment in mathematics instruction is a critical issue which "raises fundamental issues about our beliefs on the nature of mathematics and knowledge in general, teaching and the educational process, and the relationships between the individual, school, and society'' (p. 72). In all parts of instruction, it is important to use a variety of assessment techniques and make them available in all conditions. For this purpose the new Turkish mathematics curriculum put a strong emphasis on variety of assessment techniques (EARGED, 2005). The new curriculum was first implemented in 9 cities in 2004-2005 academic year. With the start of 2005-2006 academic year, the new mathematics curriculum was started to be implemented in all of the elementary schools in Turkey.

For the implementation of the new mathematics curriculum, it was an expectation of the Ministry of Education from the teachers that they understand and use the changes recommended (EARGED, 2005). In the light of the expectations of the Ministry of Education (MEB, 2005), it was found it was worth to be investigated the thoughts of the elementary school teachers about the alternative assessment techniques recommended by the new mathematics curriculum.

1.1 The Purpose of the Study

The purpose of this study was to investigate the views of the elementary school teachers about their implementation of the assessment techniques offered by the new mathematics curriculum. The new mathematics curriculum aimed to turn the teacher-centered learning to the student-centered learning. Therefore some alternative instructional approaches have been suggested by The Ministry of Education. In this study, it was aimed to have an understanding of the critical experiences occurred in the assessment process in the elementary mathematics education and to come up with practical ideas on implementation level for the new-designed elementary mathematics curriculum in Turkey.

1.2 Research Question

The main problems of this study were to investigate (1) the proportion of the uses of different assessment techniques in mathematics lessons, (2) the opinions of the elementary school teachers about the assessment techniques suggested in the new mathematics curriculum, (3) whether the teachers' teaching experience, class size and the grade level they teach have an effect on teachers' opinions about their implementation of assessment techniques recommended in the new curriculum (TONC).

In order to investigate the main problem, the answer to the following research question was developed:

'What are the main effects and interaction effects of teachers' teaching experience, class size they teach, and grade level they teach to their opinions about their implementation of assessment techniques?'

The answers to the following sub-questions were seeked:

1. Is there a significant effect of the teachers' teaching experience on their mean scores of TONC scale?
2. Is there a significant effect of the class size teachers teach on their mean scores of TONC scale?
3. Is there a significant effect of the grade level teachers teach on their mean scores of TONC scale?
4. Is there an interaction effect of the teaching experience and the class size teachers teach on their mean scores of TONC scale?
5. Is there an interaction effect of the teaching experience and the grade level teachers teach on their mean scores of TONC scale?
6. Is there an interaction effect of the class size and the grade level teachers teach on their mean scores of TONC scale?
7. Is there an interaction effect of the class size teachers teach, grade level teachers teach and teaching experience teachers have on their mean scores of

TONC scale?

1.3 Hypotheses of the Study

The following hypotheses were tested to answer the research questions:

Null Hypothesis 1: There will be no significant effect of the teachers' teaching experience on their mean scores of TONC scale.

Null Hypothesis 2: There will be no significant effect of the class size teachers teach on their mean scores of TONC scale.

Null Hypothesis 3: There will be no significant effect of the grade level teachers teach on their mean scores of TONC scale.

Null Hypothesis 4: There will be no interaction effect of the teaching experience and class size teachers teach on their mean scores of TONC scale.

Null Hypothesis 5: There will be no interaction of the teaching experience and the grade level teachers teach on their mean scores of TONC scale.

Null Hypothesis 6: There will be no interaction effect of the class size and the grade level teachers teach on their mean scores of TONC scale.

Null Hypothesis 7: There will be no interaction effect of the class size teachers teach, grade level teachers teach and the teaching experience teachers have on their mean scores of TONC scale.

1.4 Definition of the Important Terms

This section presents the definitions of the important terms that have been used throughout the present study.

Assessment: Process for obtaining information that is used for making decisions about students, curricula and programs, and educational policy (Nitko, 2001).

Traditional Assessment Techniques: Techniques including mostly the paper and pencil tests. Some of the traditional techniques are multiple choice questions, true-

false questions, pair wise questions and short answered written exam.

Alternative Assessment: ‘‘It is an umbrella term that covers a broad range of approaches to assessing what students know and can do’’ (Worthen, White, Fan, & Sudweeks, 1999, p. 282). Some of the alternative assessment techniques are observation forms, drama study, constructed grid study, portfolio and concept map.

There are several assessment techniques that are recommended in the new curriculum and are used in the data collection of this study. The followings are the definitions of these terms:

Observation Form: Forms filled by the teachers, based on observations, in order to follow the changes on the student’s performance.

Project Study: This technique offers to make students study personally or in group in order to solve the problems under the natural conditions (Korkmaz, 2004).

Drama Study: This assessment technique helps the students to learn by animations. They play roles in order to feel the place, time and conditions of the related studies.

Constructed Grid: Students try to place the concepts, photos, definitions, formulas, numbers and equalities in the right boxes constructed or drawn. This assessment technique aims to improve the visual and analytic thinking abilities. Students are also asked to put the knowledge into logical order during this assessment process (Yılmaz, 2006)

Portfolio: Students portfolios give students the chance of demonstrating the evaluation of their mathematical knowledge and performance over the duration of a topic or a course. The power of a portfolio lies in its demonstration of growth or development in a student’s performance. In the clarity of communication, it offers the discussions of progress between teacher and parent, teacher and student, or parent and student (Clarke, 1997).

Portfolios have two valuable components for the assessment of professional abilities. First, they contain naturally occurring, authentic evidence of the work of a professional. They thus have the potential of being highly valid primary evidence of outcomes achieved. Second, they involve the critical

commentary on which the candidate reflects the evidence of the students' presentations.

Peer Assessment: This assessment technique is suitable for the group work. Students fill in the forms in order to assess the performance of their group members. Usage of this technique lets the teachers to realize the personal labor of each student in a group.

Self Assessment: This assessment technique lets the teacher learn the opinions of the students about the studies. After the activities, students fill in the forms which include questions about the activities. The forms include questions about the aims, techniques and results of the related activities.

Concept Map: Concept maps are the tools helping learners to restructure their own knowledge and assisting the researcher to investigate the memorial structure changes of the learners (Yılmaz, 2006).

1.5 Significance of the study

It is essential to monitor assessment applications that teachers carry out in classes. This is also necessary to detect what kind of problems teachers experience in classroom assessments and define teacher needs related with the measurement and evaluation issues (Çakan, 2004). Literature reveals that teachers encounter with many problems during their classroom assessments. Moreover, although they do not have enough skills and knowledge regarding various test techniques, they apply these techniques for classroom assessments (Hills, 1991; Nolen, Haladyna, & Haas, 1992; Stiggins & Conklin, 1992; Plake, 1993). This sutiation has consequenses which negatively affect decisions and feedbacks teachers made regarding their students, plans, and some other educational decisions as well. Teachers should be monitored and trained to improve their knowledge and skills in the field of measurement.

According to the National Council of Teachers of Mathematics in USA (2000), to make efficient assessments, teachers should have the ability of choosing

and constructing the suitable assessment techniques. In addition, teachers should have the abilities of grading and discussing the results of the assessment techniques. Teachers also should have the ability of using the results of the assessments. While the decisions about the students and the education plans of the schools are made, teachers should use the ability of constructing grading systems for assessment techniques. Last of all teachers should have the ability of communicating with parents and students about the results of the assessments.

Having such abilities can not be enough to obtain a sufficient assessment process. According to Taymaz (1997), it is very important for students to have experiences that are in harmony with the principles of assessment. He defended that a decision about an instruction and about the ways of the improvement of instructional methods could only appear by the help of effective assessment. He emphasized that, teachers have problems with using effective assessment techniques because of the lack of seminars or supports.

Worthen, White, Fan and Sudweeks (1999) confirmed that alternative assessment techniques may encourage teachers to become more reflective practitioners. They may help the teachers justify the grades, plan instruction, and identify the difficulties and misconceptions. Students must feel responsibility for the learning process. Engaging students in the assessment process helps them to be self-reflective and self-regulated learners; so, the focus of the alternative assessment techniques must be on the students' improvement rather than on comparison with others.

Clarke (1997) noted that the point is not that alternative assessment techniques are good and the other ones teachers already in use are bad, but drawing conclusions about a student's learning on the basis of a single source of information is to run a high risk of misrepresenting that learning. Classroom observations and examinations are also the two contrasting form of assessment since they have their strengths and weaknesses. Used together, they offer both a richer body of information and a reciprocal validity check. ''Moreover, students whose learning is assessed in multiple ways will have much better view of what learning is than those associating educational success with the assessment techniques which are already

used'' (Clarke, 1997, p. 21).

Classs size, teaching experience and class grade teachers teach are very important in order to apply the assessment techniques. The ideas of the teachers are shaped with the teaching experiences they have. In this manner, class size and grade level are the factors which may effect the teaching experience of a teacher (EARGED, 2005). Unfortunatally, class size in Turkey can be up to 41-88 pupils (Bakioğlu & Polat, 2007). This situation negatively effects the teaching experience of a teacher who is teaching to any grade level.

This study focuses on the views about the implementation of assessment techniques recommended in the new mathematics curriculum. The general aim is to be a guide for realizing the source of the problems occurred in the new mathematics curriculum. It was aimed to investigate the significant effects of the difference in teaching experience, difference in class size, and difference in class grade on the teachers' opinions about the assessment techniques offered with the new mathematics curriculum. Its results could be helpful to the teacher educators who play an important role in improving teacher qualities. Moreover; if a teacher becomes aware of the other teachers' understandings about the assessment dilemmas appearing during the assessment processes, s/he can better choose the appropriate type of assessment technique. In this sense the results of this study may also provide essential information for teachers.

1.6 Limitations

Some limitations of the present study are as following:

1. Sampling of the study was one of the limitations of the study since the accessible population was 306 elementary school teachers working with the Ministry of Education in Turkey.

2. Convenience sampling is a limitation.

3. This study is limited to the participants' understandings of the specific techniques mentioned in the questionnaire.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

This chapter includes a survey of the literature related to (a) assessment and its role in mathematics learning and instruction; (b) assessment in the new mathematics curriculum; (c) teachers' uses of and beliefs about assessment techniques; (d) the effects of experience, class size and the class grade on the views of teachers; and (e) the evaluation report about the new curriculum published by Presidency of Educational Research and Development (2005).

2.1 Assessment and Its Role in Mathematics Learning and Instruction

The mathematical assessment means realizing what mathematics is and understanding the role of mathematics in society. According to Hacısalihoğlu (2003), the ability of using mathematics in communication and in convincing must become active in order to provide the usage of mathematics in daily life. To do this, the history of symbols, concepts and problems should be known and the interaction of mathematics with the cultures, arts, and other school courses should be comprehended.

In a mathematics lesson, the knowledge about the students' needs for education, the level of being prepared for learning, the level of motivation for learning, and the possibilities to gain education can only be understood with the suitable assessment techniques applied effectively (Pilten, 2001).

With the help of assessment results; the degree of effect and success of an education program can be defined, the orientation studies can be organized, and the

reasons of the difficulties in learning can be realized. So, effective assessment tasks have to be constructed. According to Herman, Aschbacher and Winter (1992), answers to the following questions may help the teachers for choosing effective assessment tasks:

1. Does the task match specific instructional intentions?
2. Does the task adequately represent the content and skills you expect from the students to attain?
3. Does the task enable students to demonstrate their progress and capabilities?
4. Does the assessment use authentic, real-world tasks?
5. Does the task lend itself to an interdisciplinary approach?
6. Can the task be structured to provide measure of several goals?

2.2 Assessment in New Mathematics Curriculum

Recent development in the field of education changes the learning, teaching and assessment. These changes suggest assessing the individual and group performance of the students during the instructional process instead of assessing the answers of the multiple choice questions asked to the students in a limited time (Umay, 1996). Therefore, our understanding of teachers' roles about the meanings of learning, teaching and assessment has changed. In the approaches where the learning is subjective and student-centered, the teachers have become a guide instead of being the source and leader (Yılmaz, 2006).

By the National Council of Teachers of Mathematics in USA (2000), it was suggested that assessment techniques which are sufficient for understanding the students' knowledge level must be used. These techniques must be useful for understanding the students' written, oral or active performances. That is why; teachers must use alternative assessment techniques in addition to the traditional ones.

The new mathematics curriculum offered new terms to the assessment techniques used in Education System. One of them was performance-based

assessment. It is defined as a systematic attempt to measure a learner's ability to use previously acquired knowledge in solving novel problems or completing specific tasks. In performance assessment, real life or simulated assessment exercises are used to elicit original responses which are directly observed and rated by a qualified judge (Korkmaz, 2004).

With the new approaches, the new mathematics curriculum in Turkey offered some new assessment techniques in addition to the traditional ones. The assessment techniques recommended in the curriculum are summarized in the table 2.1 (MEB, 2005):

Table 2.1 Assessment Techniques Recommended in new Curriculum

Alternative Assessment Techniques
Observation Form
Project Study
Presentation
Constructing Graph or Poster
Drama Study
Oral Exam
Written Exam
Constructed Grid
Portfolio
Peer Assessment
Self Assessment
Concept Map

In the table 2.1, alternative assessment techniques recommended by the new mathematics curriculum are listed.

When the assessment process in the old mathematics curriculum and assessment process in the new mathematics curriculum are compared, some

differences seem to be occurred. Kıroğlu (2006, p. 68) compared these differences and designed a table to show his thoughts about these comparisons:

Table 2.2 Comparisons between the Old and the New Mathematics Curriculums (Kıroğlu, 2006, p. 68).

Assessment in old Mathematics Curriculum	Assessment in new Mathematics Curriculum
Includes less emphasis on variety of assessment techniques	Includes more emphasis on variety of assessment techniques
Traditional Assessment Techniques	Alternative Assessment Techniques
Dependent on only learning and teaching	A part of learning and teaching
Assessing the memorized or easily learned knowledge	Assessing the meaningful or permanent knowledge
Assessing the knowledge independent from each other	Assessing the strongly connected knowledge
Assessing scientific knowledge	Assessing the scientific understandings and scientific logic
Assessing to learn whether the student knows or not	Assessing to learn what the student understood
Assessment activities applied at the end of a term	Assessment activities lasted during the term
Assessment done only by the teacher	Assessment is a connected work done by the teacher, by the group members, and by the student.

Source: Yeni İlköğretim Programları, Matematik Programı 1-5.

2.3 Teachers' Uses of and Beliefs about Assessment Techniques

There are many factors affecting mathematics teaching and learning. Among them, teachers' beliefs play important roles for mathematics teaching and learning. Researches indicate that teachers' beliefs directly affect pupils' behavior. Therefore, if teachers have positive views on mathematics assessment, students in their classes might have positive views towards mathematics assessment. Therefore, what teachers do in the classrooms is very important in this sense (Çakmak & Ercan, 2003).

Most of the studies showed that teachers' knowledge of and abilities regarding assessment is generally insufficient (Bıçak & Çakan, 2004; Daniel & King, 1998; Güven, 2001). Some studies have been done in order to define the assessment abilities and knowledge of the teachers.

First of all, Pilten (2001) made a study in order to investigate an answer to the question ''what are the assessment practice of elementary school teachers, their problems and questions?''. For this purpose, he employed questionnaires to 211 teachers and made interviews with 35 teachers. The results of his study showed that the information about assessment given at the universities was not enough and most of the elementary school teachers thought the purpose of assessment with one dimension. Moreover, the elementary school teachers did not have enough knowledge about preparing, using and applying the equipments needed for assessment.

In another study, Çakan (2004) compared the elementary and the secondary school teachers in terms of their classroom assessment activities and teacher perceptions towards their qualification levels related with the assessment knowledge and skills. Twenty-five item survey was administered to 260 elementary and 244 secondary school teachers in summer of 2004. The results indicated that most of the teachers perceived themselves as unqualified in terms of assessment applications. Based on the findings of the study, it was suggested that teachers should be trained to improve themselves in coping with the new developments in assessment. It was also suggested that measurement courses taught in faculties of

education should be reconsidered in terms of measurement and evaluation knowledge and skills they consist of, and should be improved to provide teacher candidates with more adequate assessment skills and fulfill the needs of teachers.

Yılmaz (2006) conducted a study in order to validate the thoughts of primary school teachers of 5th year about new mathetamatics curriculum. Questionnaires were administered to 200 teachers teaching to 5th grade students in Sakarya. Teachers stated that the program evaluation forms caused problems in application. The steps of assessment were too many to complete in limitted time. In addition to this, it was observed that teachers could not overwhelm the customs of old programs and they could not adapt into contents of the new program.

2.4 The Effects of Teaching Experience, Class Size and Grade Level on the Views of the Teachers

Several studies have been conducted in Turkey and other countries in order to determine the effects of teaching experience, class size or class grade on the assessment process.

Cizec, Fitzgerald and Rachor (1996) made a study with 143 elementary and secondary teachers in order to examine the reliability of the assessment activities applied in the classrooms. They found that the teaching experience, grade levels teachers taught or class size teachers taught did not have negative effects on the reliability of the assessment activities. Similar results were found by Daniel and King (1998). They conducted a study with 95 elementary and secondary school teachers. Their study showed that, the assessment knowledge of the teachers did not change significantly according to the difference in teaching experience or difference in grade level teachers taught. The results of the study supported the findings of the study done by Cizec, Fitzgerald and Rachor (1996).

Kaynak (2000) made a study in order to learn the opinions of the teachers about preparing the assessment equipments, application of assessment techniques and defining the assessment results. With his study, he tried to find whether there were significant differences among teachers according to the faculties they were

graduated, the schools they were working with, their gender, the experiences they had or the kind of the department they were graduated. He found that, the comments about assessment showed difference among the teachers with different teaching experiences. For instance, teachers with 10 years or more teaching experience preferred to assess students' performance individually in group works.

Bakioğlu and Polat (2002) made a study in order to investigate the effects of class size on a sample of a large school. In order to understand how class size influenced the education, a primary school was selected and some questions were asked to 44 teachers and 362 students. After analysing responses, it appeared that neither teachers nor students were happy with large classes. Teachers mostly complained about the difficulties in establishing motivation, getting feedback, establishing control, low student achievement and the difficulties in keeping school clean and tidy. Students expressed their opinions as difficulty in settling on the desk as three pupils and communication difficulties with teachers.

In her study, Türnüklü (2003) focused on finding out how mathematics teachers collect information about their students, how teacher record and use these information in Turkey and England. The study was carried out with 12 maths teachers of 11-14 year olds in Turkey and England. With her study, it was understood that crowded classrooms negatively effected the assessment process. With results of her study, Türnüklü (2003) suggested that the communication of student and teacher, the activities performed during the lessons should be big parts of the assessment process in mathematics lessons. Moreover, she suggested that the assessment techniques like observations, asking short questions, analyzing the student works or constructing exam questions should be skills to be covered in the preservice teacher's education courses.

Uslu (2003) explored Private High School teachers' ideas about measurement and evaluation in İzmir. The purpose of the research was to discern whether the private school teachers' ideas about measurement and evaluation vary significantly in terms of age, experience and presence/absence of a measurement and evaluation unit at school. Personal Information Form and a scale were used to collect the data. The sample consisted of 139 teachers working at six private

schools in İzmir. The results of the study verified that, the teachers' ideas about measurement and evaluation vary significantly in terms of teaching experience. Having more experience in teaching positively affect the teachers' ideas about the assessment process.

Bulut (2006) made a study in order to determine the effectiveness of the New Primary Education Curricula (Turkish Language, Mathematics, Teaching Life, Science and Technology and Social Studies) in practice. The research was conducted in the pilot schools in İstanbul, Ankara, İzmir, Kocaeli, Van, Hatay, Samsun and Bolu. The new elementary education curricula was piloted in these cities in 2004-2005 academic year. The results of his study showed that, the assessment techniques offered by the new mathematics curriculum could be effective with the class sizes between 21 and 30 students.

Toprak (2000) investigated the opinions of the academicians working in Hacettepe University about assessment. By the results of his study, it was showed that the academicians' opinions about assessment did not differ among their denotations. Moreover, there was not a significant difference between the opinions of the academicians got any seminar about assessment with the ones who did not get any seminar about assessment. However, there was a significant difference between the opinions of the academicians among the faculties they were working in.

2.5 The Evaluation Report Published by The Presidency of Educational Research and Development.

Educational Research and Development Division in Ministry Education (2005) conducted a study in the pilot schools in which the new curriculum was started to be implemented. In this study, the purpose was to understand positive and negative aspects of the new curriculum. Questionnaires were administered to the teachers working in the pilot schools in İstanbul, Ankara, İzmir, Kocaeli, Samsun, Van, Hatay, Diyarbakır and Bolu. Parents, school managers and inspectors were also the participants of the study.

A comprehensive report including different reports was published (MEB, 2005). In these reports the data collected from the teachers, school administrators, inspectors and parents were presented. For each lesson a different report was constructed. In the reports of a lesson; the outline of the program, the units of the lessons, the education, the applications of assessment techniques, the observations of the inspectors about the classroom activities done by the teachers were evaluated, respectively.

The study showed that, elementary school teachers' thoughts about the new mathematics curriculum were partially positive. However, they were thinking that assessment part of the mathematics curriculum was very complex and much time was needed to execute an accurate application of the assessment methods.

The results of the study (EARGED, 2005) showed that there were powerful parts of the assessment section of the new mathematics curriculum. First of all, the curriculum was student centered, so the assessment activities encouraged the students through investigations. Investigating the happenings in real life, improved the personal abilities of the students so the students were encouraged to learn and use the nature of the society they were belonging to. The assessment techniques offered with the new mathematics curriculum was helpful for the lessons to become more enjoyable. Students got the chance of group work and communication between students became stronger.

Second, teachers needed to improve themselves for implementing the new curriculum better. In addition, the new assessment techniques offered a strong coordination between the courses, so the communication and coordination between teachers were increased. For the teachers, a chance to realize the powerful and weak parts of their students occurred.

According to the report (EARGED, 2005), the assessment process caused some problems, too. Turkey has crowded classrooms in elementary schools. Therefore, impossibility of having one to one connection was a reality during the assessment activities. The materials and source books were not prepared completely before the application of the new assessment techniques. Lack of technical materials and insufficient physical conditions of the classrooms caused motivation

problems for the teachers.

The report also revealed that, introducing with only the technical part of the new mathematics curriculum caused some problems, too. Concepts like multiple intelligence, active learning, concept map, portfolio, time assessment, drama application, efficient questioning or being questioning, project designing, and personal development were not defined to or discussed with the teachers. This caused lack of understanding of the assessment techniques offered with the new mathematics curriculum. The evaluation part of the assessment process seemed to be complex where application part seemed to be waste of time.

2.6 Summary

Related studies showed that there were many perspectives about the assessment process. In this manner, teachers sometimes need to get seminars, guide books or material supports. Either in the past or in the present, teachers had opinions about the assessment. These opinions may differ according to the teaching experience, class size or class grade teachers taught.

The new mathematics curriculum offered new and alternative techniques such as drama, portfolio, grid or concept map for the assessment of student learning. These new techniques were different from the old ones in terms of application, evaluation and grading. Therefore, different ideas have been grown in the teachers' and researchers' minds. The studies showed that these ideas pointed out the courses in the universities and the improvement practices in the Ministry of Education. These courses and the practices were thought to be insufficient because of the reasons like lack of time, materials, or information sources.

CHAPTER 3

METHOD

This chapter has six main parts. The first part explains the overall research design; the second part explains the characteristics of the participants of the study; the third part explains the variables of the study; the fourth part explains the construction and development processes of the instrument; the fifth part explains data collection procedure and the sixth part explains analysis of data.

3.1 Research Design

This was a cross-sectional survey study designed to collect information from elementary school teachers. With the direct administration of a survey which is prepared by the researcher, teachers' views about their implementation of assessment techniques recommended in the new mathematics curriculum were investigated. Table 3.1 is a visual representation of the research design for the study.

Table 3.1 Overall Research Design

1. Research Design	Cross Sectional Survey
2. Sampling	Convenient Sampling
3. Variables	Independent Variables: Teaching experience, class size and the grade level Dependent Variable: The mean scores of the teachers' opinions about their implementation of assessment techniques recommended in the new mathematics curriculum (TONC).
4. Instrument	The Opinions about Assessment Questionnaire (OAQ)
5. Data collection procedure	Direct administration of the survey to 306 elementary school teachers at twenty nine elementary schools from three cities in one month.
6. Data analysis procedure	SPSS software program for Descriptive Statistics and Univariate Anova

3.2 Population and Sample

The target population of this study consisted of all elementary school teachers from public elementary schools in Kırıkkale, Malatya and Ankara. There were approximately 2500 elementary school teachers working in these regions (MEB, 2007). The study was conducted with 306 elementary school teachers of 29 public schools. Therefore, 306 elementary school teachers working in these cities were determined as the sample of this study. 211 elementary school teachers were selected from Kırıkkale, 63 elementary school teachers were selected from Malatya and 32 elementary school teachers were selected from Ankara.

The sample chosen from the accessible population was determined based on convenient sampling. It was convenient in terms of ease of access and ease of getting official permission from school administration. The sample of the study included the teachers who happened to be accessible to reach. The tables 3.2, 3.3, 3.4, 3.5, 3.6 and 3.7 present the summary of the number of elementary school teachers in terms of the cities they are working in, gender, educational backgrounds, grade levels they teach, sizes of the classes they teach, and teaching experiences they have.

Table 3.2 Distribution of the number of the participants among the cities

Cities	Frequency	Percent (%)
Kırıkkale	211	69
Malatya	63	21
Ankara	32	10
Total	306	100

From table 3.2 it can be seen that most of the participants were from Kırıkkale. The least of the participants were from Ankara.

Table 3.3 Gender of the Participated Teachers

Gender	Frequency	Percent (%)
Male	167	54.6
Female	139	45.4
Total	306	100

Table 3.3 presents the gender of participants. It can be seen that the number of male teachers was more than female teachers in the sample size.

Table 3.4 Participants' Educational Background

Graduation	Frequency	Percentage (%)
Teacher Education Program	105	34
Any other programs that do not give teaching certification	201	66
Total	306	100

From the table 3.4, it can be seen that 34 % of the participants were graduate of the Education Faculties; 66 % of the participants, on the other hand, were graduate of any other faculties such as art and science, economic and administrative sciences, engineering and foreign languages.

Table 3.5 Grade Levels Participants Teach

Grade Level	Frequency	Percent (%)
First, Second and Third Grades	180	58.8
Fourth and Fifth Grades	126	41.2
Total	306	100

From table 3.5, it can be seen that most of the participants were working with the first, second or third grade students.

Table 3.6 Class Sizes Participants Teach

Class Size	Frequency	Percentage (%)
25 or below	67	21.9
26 and above	239	78.1
Total	306	100

From table 3.6, it can be seen that most of the participants were working with the class sizes of 26 students or more.

Table 3.7 Teaching Experiences of the Participants

Years of Teaching Experience	Frequency	Percent (%)
10 or below	79	26
11 and above	226	74
Total	306	100

Table 3.7 shows that most of the participants had teaching experience of 11 or more years.

3.3 Variables

This study has three independent variables (IVs) and one dependent variable (DV). The independent variables are teaching experience, class size and the grade level, whereas the dependent variable is the mean scores of the teachers' opinions about their implementation of assessment techniques recommended in the new mathematics curriculum (TONC). Table 3.8 summarizes the variables of the

study.

Table 3.8 Variables of the study

Name of the variable	Kind of the Variable	Summary of the Variable
The Scale for teachers' opinions about their implementation of assessment techniques recommended in the new mathematics curriculum	Dependent Variable	Continues variable ranging from 1 to 5 (1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree).
Teaching Experience	Independent Variable	It is a categorical variable with two levels (1 = 10 years or below and 2 = 11 years and above)
Class Size	Independent Variable	It is a categorical variable with two levels (1 = 25 students and below and 2 = 26 students or above)
Grade Level	Independent Variable	It is a categorical variable with two levels (1 = First, Second and Third Grades, 2 = Fourth and Fifth Grades).

3.3.1 Dependent Variable

The dependent variable of the study was the mean scores of the teachers' opinions about their implementation of assessment techniques recommended in the new mathematics curriculum (TONC). The mean scores of the responses were calculated in order to create the scale. The higher the score, the stronger beliefs elementary school teachers had about the positive implications of new assessment techniques in schools.

3.3.2 Independent Variables

One of the independent variable was teaching experience. Experience of the teachers was defined as the years teachers worked for their teaching career (Uslu, 2003). It was a categorical variable with two levels. Experience variable was designed into two groups: Teachers having teaching experience with 10 years or below was the first group since the ten year period thought to deduce a significant difference in experience (Nitko, 2001). Therefore the first group formed the group of the low experience. The other group included the teachers having 11 years and above teaching experience. The teachers working with these numbers of the years with experiences thought to have clear principles about teaching individually.

Another independent variable was the class size. The term class size was used as the number of students in a classroom. Class size was a categorical variable with two levels. The accessible population of the study was not teaching to the crowded classrooms and the class size of 25 was usually considered ideal by Ministry of National Education (EARGED, 2005). Therefore, the first group was formed to include classrooms with the class sizes 25 students or below where the second group was formed to include the class sizes with 26 students and above.

Last independent variable was the grade level and was used for the class grades participants teach. It was a categorical variable with two levels. During the study it was observed that teaching to 1^{st} , 2^{nd} and 3^{rd} grade students needed different performance than teaching to 4^{th} and 5^{th} grades according to the assessment techniques used or teaching strategies preferred. Therefore, the teachers were grouped as ‘‘1’’ if they were teaching to 1^{st}, 2^{nd} or 3^{rd} grade students, and ‘‘2’’ if they were teaching to 4^{th} or 5^{th} grade students.

3.4 Data Collection Instrument

In the present study, ‘The Opinions about Assessment Questionnaire’ (OAQ) was used as the data collection instrument. The instrument was constructed

by the researcher by modifying an instrument developed by EARGED (2005). The questionnaire consisted of three parts as follows: (1) Demographic Information; (2) Teachers' tendency on the usage of the assessment techniques offered by the new curricula; (3) The Scale for teachers' opinions about their implementation of assessment techniques recommended in the new mathematics curriculum. It took nearly 2 minutes to fill the personal information and 10 minutes to fill the questionnaire items. Thus a total of approximately 12 minutes was needed to fill the questionnaire.

After constructing the questionnaire, a pilot study was conducted by 20 elementary school teachers from Kırıkkale for improvement. The teachers were selected conveniently for this pilot study. The pilot study was convenient in terms of ease of access. Results of the pilot study lead to some changes. These changes took place mostly in the explanation parts of the questions. Before the pilot study, most of the questions did not specifically ask the assessment activities in mathematics lessons. They were only about assessment. After the pilot study, each of the items changed to the ones asking only the assessment activities done in mathematics lessons. After the pilot study, it was realized that there was no question about the group work activities, so a question was added in order to learn the opinions of the participants about the group works. Last of the changes occurred in the demographic information part of the questionnaire. The questionnaire did not have enough choices about the education level of the participants. It was realized after the pilot study that, only graduate and undergraduate choices were included in the education level part of the demographic information. But, some of the teachers were graduates of Institutes of Education or Teacher Schools. Therefore, the education level part was divided into four choices after the pilot study.

To satisfy the validity of the instrument; opinions of an academician who was an expert in mathematics education at METU Department of Elementary Education and the views of a mathematics teacher working in an elementary school in Ankara were taken into consideration. A combination of the literature review study, and the views of these experts were considered while the items for OAQ were being selected. Also, a questionnaire administered in 2004-2005 school year

by The Presidency of Educational Research and Development was taken as reference. That questionnaire was administered in the pilot schools in which the new curriculum was practiced in 2004-2005 academic year and with that study, it was aimed to investigate the general implications about all the courses in the new curriculum (MEB, 2005). The items related with the mathematics assessment part of this questionnaire were considered as reference while the items of the instrument (OAQ) were being constructed.

In the demographic information sheet of OAQ, there were several questions related to the participants' personal information such as gender, the city they lived in, schools in which they were working, number of teaching experience, the faculty they graduated from, the grade level they teach and the class sizes they were working with. In the second part of the questionnaire, there were eleven items about several assessment techniques offered by the new mathematics curriculum. In this part, it was aimed to understand whether the elementary school teachers used the assessment techniques or not. If they were using any of those techniques, then they were asked to indicate the frequency of the usage of the assessment techniques. Furthermore, it was also asked to the teachers that whether they graded the whole group's work or individual students and it was asked for which purposes they were using the assessment results. It was also aimed to learn the teachers' comparisons about the new assessment techniques offered by the curriculum and the assessment techniques they routinely used. The degree of the answers gained by three categories ranged from 1 to 3: 1 indicated 'Never ', 2 indicated 'Sometimes' and 3 indicted 'Always'. In the last part of the questionnaire, there were 12 items related with teachers' opinions about their implementation of assessment techniques recommended in the new mathematics curriculum. Among these items, 8 of them were positively stated and 4 of them were negatively stated. The negatively stated items were reversely scored. Respondents were asked to indicate their agreements or disagreements with these statements on a five-point Likert Scale ranged from 1 to 5; Here, 5 indicated "strongly agree", 4 indicated "agree", 3 indicated "neutral", 2 indicated "disagree", and 1 indicated "strongly disagree". At the end of the questionnaire, an open ended question was asked to state additional comments

about assessment in the new curriculum. The answers of this question were used while discussing the results of this study.

3.4.1 Internal Consistency Reliability Measures

''Internal consistency is the degree to which the items that make up the scale are all measuring the same underlying attribute'' (Pallant, 2001, p. 6). The scale of the questionnaire was consisted of 12 items. These questions were the 12^{th}, 13^{th}, 14^{th}, 15^{th}, 16^{th}, 17^{th}, 18^{th}, 19^{th}, 20^{th}, 21^{st}, 22^{nd} questions of the questionnaire. To check the reliability of the scale, the Cronbach's alpha coefficient was calculated. It was found to be 0.732 which was an acceptable value (Pallant, 2001); Therefore, the teachers' opinions about their implementation of assessment techniques recommended in the new mathematics curriculum (TONC) scale had a reasonable internal consistency. A reliability coefficient of 0.73 means that 73% of the variance depended on true variance in the construct measured, and 27% depended on error variance.

3.5 Procedure

The research investigated the views of the elementary school teachers about the assessment techniques suggested in the new elementary mathematics curriculum in Turkey. During the research, the ideas of the elementary school teachers who have implemented the new mathematics curriculum were taken.

The permission for the administration of the questionnaires was taken from the Ministry of National Education. Then, the questionnaire was administered to the Elementary School Teachers who were from different Elementary Schools in Kırıkkale, Ankara and Malatya. These cities were chosen since the administration would be convenient in terms of communication with the teachers.

The administration of the questionnaire was completed nearly in one month. The questionnaires were administered to the teachers by two ways. First, the questionnaires were given to the school principals and they gave them to the

teachers. After one week, the administered questionnaires were collected from the principals again. Second, the questionnaires were administered to the teachers during the meetings they attended in the syndicate centers.

The data for the study was collected on the first semester of the 2006-2007 academic year. In September the questionnaires were administered and in October the results were organized and discussed. SPSS software program was used for data analysis.

3.6 Analysis of Data

After data were checked for accuracy, scores for negatively worded items (12-15) were reversed and scale scores were generated by taking sum of scores. Frequency distributions were constructed in a tabular form for demographic variables. Next, descriptive statistics (means and standard deviations) were generated. Reliability of the scale was established using Cronbach's alpha coefficient. Finally, to answer the main research question, a Univariate Anova Test was generated to explore differences in elementary school teachers' views by teaching experience, class size, and grade level. The analyses were performed with SPSS software.

CHAPTER 4

RESULTS

In this chapter, the results obtained from the data analysis are presented. It begins with the review of the purpose of the study. Then the descriptive test results, test results about assumption check, and findings related to Hypotheses Testing are explained.

4.1 Purpose of the Study

The purpose of the study can be summarized as following:

1. To investigate the tendencies of the elementary school teachers about the assessment techniques offered by the new mathematics curriculum.

2. To determine the details teachers needed to learn for the mathematics lessons.

3. To investigate the effects of class size, teaching experience, and the grade level they teach on the teachers' opinions about their implementation of assessment techniques recommended in the new curriculum.

4.2. Descriptive Results

In this part, descriptive results of the study are presented. First, the descriptive results related with the tendencies to use the different assessment techniques are given. Second, the descriptive results related with the details teachers needed to learn for the mathematics lessons are given. Last of all the descriptive results of Univariate ANOVA test are given.

4.2.1 Descriptive Results Related to the Tendency of the Uses of Different Assessment Techniques

In this section, descriptive results of tendencies about the uses of different assessment techniques are presented. The results are given in the tables 4.1, 4.2, 4.3, 4.4 and 4.5.

Table 4.1 Usage percentage of the assessment techniques in mathematics lessons

	Never		Sometimes		Always	
Assessment Techniques	f	Percent (%)	f	Percent (%)	f	Percent (%)
Observation Form	101	33	191	62.4	12	3.9
Project Study	41	13.4	227	74.2	38	12.4
Presentation	15	4.9	152	49.7	139	45.4
Constructing Graph or Poster	32	10.5	204	66.7	69	22.5
Drama Study	14	4.6	157	51.3	134	43.8
Oral Exam	20	6.5	157	51.3	129	42.2
Written Exam	20	6.5	153	50.0	133	43.5
Constructed Grid	135	44.1	131	42.8	34	11.1
Portfolio	34	11.1	175	57.2	96	31.4
Coequal Assessment	40	13.1	206	67.3	60	19.6
Self Assessment	32	10.5	182	59.5	91	29.7
Concept Map	60	19.6	180	58.8	62	20.3

In table 4.1 the descriptive results for the usage frequencies of the assessment techniques are given. It was observed that, except constructed grid, the usage percentage of the assessment techniques were in the ‘‘sometimes’’ category. On the other hand, ‘‘Always’’ frequency seemed to be very low (3.9%) for the observation forms.

Table 4.2 Grading choices for the group works in mathematics lessons.

Grading type	Never		Sometimes		Always	
	f	Percent (%)	f	Percent (%)	f	Percent (%)
Work of each member	25	8.2	107	35.0	174	59.6
Only group work	88	28.8	161	52.6	54	17.6

Table 4.2 summarized the descriptive results related with the second question of the questionnaire. The question was asking the teachers' grading methods about the group works in mathematics lessons. It was observed that 59.6 % of the participants always graded the work of each member. On the other hand, teachers sometimes graded only the group work.

Table 4.3 Grading choices for individual works in mathematics lessons

Grading Individual Work	Never		Sometimes		Always	
	f	Percent (%)	f	Percent (%)	f	Percent (%)
Results and Solution	9	2.9	97	31.7	200	65.4
Only results	157	51.3	130	42.5	14	4.6

Table 4.3 gave the descriptive results related with the teachers' grading techniques about the individual works in mathematics lessons. It was observed that 65.4% of the participants always graded the results with solution during an individual work. 2.9 % of the participants never graded the results with the solutions.

Table 4.4 Teachers' choices for the usage of the assessment results

Usage of Assessment Results	Never		Sometimes		Always	
	f	Percent (%)	f	Percent (%)	f	Percent (%)
Choosing new teaching method	80	26.1	181	59.2	45	14.7
Constructing alternative materials	59	19.3	179	58.5	68	22.2
Repeating misunderstood issues	35	11.4	130	42.5	141	46.1
Doing additional studies for hardly taught students	54	17.6	142	46.4	110	35.9
Doing additional studies for easily taught students	56	18.3	152	49.7	98	32.0

It was understood by the table 4.4 that, about half of the participants used the results of the assessment techniques for choosing new teaching method, for constructing alternative materials, for doing additional studies for hardly taught students and for doing additional studies for easily taught students. The number of the participants who always used the results for repeating the misunderstood issues (N=141) was more than the number of the participants who sometimes used it (N=130).

Table 4.5 Comments of the teachers about the assessment process in mathematics lessons.

Teachers' comments	Never		Sometimes		Always	
	f	Percent (%)	f	Percent (%)	f	Percent (%)
Q 6	35	11.4	228	74.5	43	14.1
Q 7	25	8.2	185	60.5	96	31.4
Q 8	71	23.2	206	67.3	29	9.5
Q 9	15	4.9	220	71.9	70	22.9
Q 10	2	0.7	125	40.8	179	58.5
Q 11	15	4.9	164	53.6	127	41.5

Q 6: I can implement the assessment techniques suggested by the new curriculum for the mathematics lessons in the way they are intended

Q 7: The assessment techniques I already use are more efficient than the ones suggested by the new mathematics curriculum

Q 8: My students are anxious about the assessment techniques suggested by the new mathematics curriculum

Q 9: I construct the materials needed for the assessment in the mathematics lessons, myself

Q 10: I chose and used the suitable materials for mathematics lessons

Q 11: I used back the old assessment techniques when the new-offered assessment techniques seemed to be insufficient for the mathematics lessons.

In table 4.5 the comments of the teachers about the assessment process in mathematics lessons were presented. The table showed that all the participants answered the questions related to the comments about the assessment process in mathematics lessons. Most of the participants (74.5 %) occasionally implemented the assessment techniques suggested by the new curriculum for the mathematics lessons in the way they were intended. In addition most of the participants (58.5 %) thought they have always chosen and have used the suitable materials for

mathematics lessons. Two of the participants, on the other hand, said that they never chose and used the suitable materials for mathematics lessons. Participants sometimes thought that assessment techniques they have already used were more efficient than the ones suggested by the new mathematics curriculum (60.5 %) and students were anxious about the assessment techniques suggested by the new mathematics curriculum (67.3 %). Last of all, teachers sometimes construct the materials needed for assessment in the mathematics lessons, themselves (71.9 %) and they sometimes used back the old assessment techniques when the new-offered assessment techniques seemed to be insufficient for the mathematics lessons (53.6 %).

4.2.1.1 Chi-Square Results

In this part, chi-square test results are given. The test was used to understand whether the tendency of the uses of different assessment techniques showed difference according to the grade levels teachers taught. The related results were given with the tables 4.6, 4.7, 4.8, 4.9 and 4.10.

Table 4.6 Results for the Grade Level and Usage of Assessment Techniques Relation

Assessment Techniques	Pearson Chi-Square Value	Significant Value
observation form	1.79	0.41
project study	13.96	0.00
presentation	1.54	0.46
constructing graph or poster	3.35	0.19
drama study	1.34	0.51
oral exam	0.85	0.65
written exam	11.63	0.00
constructed grid	0.84	0.66
portfolio	7.10	0.03
coequal assessment	1.18	0.56
self assessment	3.93	0.14
concept map	3.22	0.20

It was seen from the table 4.6 that the significant values of the project study (sig. = 0.00), written exam (sig. = 0.00) and portfolio (sig. = 0.03) were smaller than 0.05. Therefore it was concluded that there was a relationship between the grade level teachers teach and the usage proportion of the project study, written exam and portfolio techniques.

The chi-square test results also showed that 85 % of the participants who did not use the project study were teaching to first, second or third grade. 85 % of the participants who did not prefer written exams were also teaching to first, second or third grade. Last of all 79 % of the participants who did not use the portfolio study were teaching to first, second or third grade students.

Table 4.7 Results for the Grade Level and the Group Work Grading Relation

Grading Group Work	Pearson Chi-Square Value	Significant Value
Work of each member	1.48	0.48
Only group work	1.70	0.43

The table 4.7 showed that the significant values of the grading work of each member (sig. = 0.48), and the grading only group work (sig. = 0.43) were not significant. This meant that; there was not a relationship between the grade level and the grading choices for the group works.

Table 4.8 Results for the Grade Level and the Individual Work Grading Relation

Grading Individual Work	Pearson Chi-Square Value	Significant Value
Results and solution	0.81	0.67
Only results	7.20	0.03

It was seen from the table 4.8 that the significant value of grading only the results was 0.03. This was a significant value. Therefore, it was concluded that the proportion of the teachers grading only the results for an individual work showed difference according to the grade levels they taught. Furthermore, the first, second or third grade teachers mostly (56, 1 %) preferred not to grade only the results.

Table 4.9 Results for the Relationship between the Grade Level and the Teachers' Choices for the Usage of the Assessment Results

Usage of Assessment Results	Pearson Chi-Square Value	Significant Value
Choosing new teaching method	0.25	0.88
Constructing alternative materials	3.11	0.21
Repeating misunderstood issues	0.05	0.98
Doing additional studies for hardly taught students	3.14	0.21
Doing additional studies for easily taught students	0.40	0.82

It was seen from the table 4.9 that, the results were not significant. This meant that there was not a relationship between the class grade and the usage proportion of the assessment results in mathematics lessons.

Table 4.10 Results for the Relationship between the Grade Level and the Comments of the Teachers about the Assessment Process in Mathematics Lessons

Teachers' comments	Pearson Chi-Square Value	Significant Value
Q 6	1.25	0.54
Q 7	0.10	0.95
Q 8	3.03	0.22
Q 9	0.24	0.89
Q 10	0.17	0.92
Q 11	0.33	0.85

Q 6: I can implement the assessment system suggested by the new curriculum for the mathematics lessons in the way they are intended.

Q 7: The assessment techniques I already use are more efficient than the ones suggested by the new mathematics curriculum.

Q 8: My students are anxious about the assessment techniques suggested by the new mathematics curriculum.

Q 9: I construct the materials needed for the assessment in the mathematics lessons, myself

Q 10: I chose and used the suitable materials for mathematics lessons.

Q 11: I used back the old assessment techniques when the new-offered assessment techniques seemed to be insufficient for the mathematics lessons.

It was seen from the table that the results were not significant. Therefore, it was concluded that the comments of the participants about the assessment process occurred in the mathematics lessons did not have a relationship with the grade level they teach.

4.2.2 Descriptive Results of the Details Teachers Needed to Learn

In this section, descriptive test results about the teachers needs to learn in order to improve the assessment techniques they used for the mathematics lessons were given. The results were presented by table 4.5. Eighty-two of the participants

answered the open ended question ‘‘what are the details you need to learn in order to improve the assessment techniques you use for the mathematics lessons?’’

Table 4.11 List of Details Teachers Needed to Learn

Teachers’ Needs	f	Percent (%)
To use and construct alternative assessment techniques and materials sufficient for crowded classrooms	32	11.5
Seminars about new assessment techniques suggested in mathematic lessons	14	4.6
Ways of having much hours for mathematics lessons	13	4.3
Other alternative assessment techniques which will be helpful for students in real life	10	3.3
Ways of filling less observation forms	9	3.0
Mathematics Laboratories	2	0.7
Assessment Techniques which encourage students to practice also handwriting	1	0.3
Support to improve foreign language	1	0.3

It was seen from the Table 4.11; most of the participants who answered the open ended question needed to use and construct alternative assessment techniques and materials sufficient for crowded classrooms (N=32).One participant thought that assessment techniques helpful for practicing handwriting was a need. One participant, also, needed supports to improve foreign languages.

4.2.3 Descriptive Results of Univariate Anova Test

Descriptive statistics collected on the data were summarized in Table 4.12. The total number for each subgroup, mean scores and standard deviations of them were designed in the table 4.12:

Table 4.12 Descriptive Results of Univariate Anova Test

Independent Variables	N	Mean	SD
Teaching Experience			
Group 1: 10 or below	79	2.91	0.41
Group 2: 11 years or above	225	3.03	0.49
Class Size			
Group 1: 25 or below	67	3.09	0.45
Group 2: 26 or above	239	2.98	0.48
Grade Level			
Group 1: First, Second and Third	180	2.98	0.50
Group 2: Fourth and Fifth	126	3.03	0.44

From the table 4.12 it was understood that, most of the participants had experience more than 11 years in teaching with a mean of 3.03 and standard deviation of 0.49. Most of the participants, also, were working with class size 26 or above with a mean of 2.98 and standard deviation of 0.48. Last of all, it was understood from the table 4.12 that most of the participants were teaching first, second or third grade level in their schools with a mean of 2.98 and standard deviation of 0.50.

4.3 Assumptions of Univariate Anova

Univariate Anova was constructed in order to figure out the results. First of all, the assumptions of the test were checked. In analysis of Univariate Anova there are three assumptions needed to be verified (Pallant, 2001):

1. Independency of observations
2. Normality of the distribution
3. Homogeneity of variance

The observations that make up the data of the study were all independent of one another. That is, it was assumed that the participants' answers to the instrument of the study were not influenced by any other answers.

To assess the normality of the distribution of scores for TONC scale, Kolmogorov-Smirnov tests were administered. Table results for the tests were summarized by the table 4.13.

Table 4.13 Results of Normality Testing

Independent Variables		Statistic	Significant Value
Teaching Experience			
	10 years or below	0.09	0.20
	11 years or above	0.06	0.05
Class Size			
	25 or below	0.07	0.20
	26 or above	0.06	0.02
Grade Level			
	First, Second or Third Grade	0.07	0.04
	Fourth or Fifth Grade	0.09	0.02

*Normality is significant at the 0.05 level (2-tailed)

As implied in Table 4.13 the first group of the teaching experience (sig.=0.20), and the first group of the class size (sig.=0.20) had the significant values greater than 0.05. So, it can be said that the population of the sample had a normal distribution among these groups of the variables (Pallant, 2001). The significant values of the groups of the grade level variable, the second group of the teaching experience variable and the second group of the class size variable were all smaller than 0.05. With large enough sample sizes (e.g., 30+), the violation of the normality assumption should not cause any major problems (Gravetter and Wallnau, 2000, p. 302). So, it was concluded that the population of the sample had a normal distribution among the teaching experience, class size and among the

grade level.

To test the homogeneity of variances, the variability of scores for each group was checked. The variability scores for each group must be similar in order to make the analysis for UNIVARIATE ANOVA (Pallant, 2001). To test this, The Levene's Test for Equality of Variances was used. The significant value gotten by the Levene's Test was 0.08. This was greater than the critical limit 0.05. Therefore, the homogeneity of variances assumption was not violated.

4.4 Findings Related to Hypotheses Testing

In this section, findings related to the hypotheses were presented. Hypotheses related to the study were

Null Hypothesis 1: There will be no significant difference among the teachers having different teaching experience regarding their mean scores of TONC scale.

Null Hypothesis 2: There will be no significant difference among the teachers working with different class sizes regarding their mean scores of TONC scale.

Null Hypothesis 3: There will be no significant difference among the teachers teaching different grade levels regarding their mean scores of TONC scale.

Null Hypothesis 4: There will be no interaction effect of the teaching experience and class size teachers teach on their mean scores of TONC scale.

Null Hypothesis 5: There will be no interaction effect of the teaching experience and grade level teachers teach on their mean scores of TONC scale.

Null Hypothesis 6: There will be no interaction effect of the class size and grade level teachers teach on their mean scores of TONC scale.

Null Hypothesis 7: There will be no interaction effect of the class size teachers teach, grade level teachers teach and the teaching experience teachers have on their mean scores of TONC scale.

Table 4.14 Test Results of Between-Subject Effects

Dependent Variable: Mean score for TONC

Independent Variables	df	F	Significant Value	Eta Squared
Teaching Experience	1	3.38	0.07	0.011
Class Size	1	2.09	0.20	0.007
Grade Level	1	0.02	0.90	0.000
Teaching Experience*Class Size	1	0.09	0.76	0.000
Teaching Experience*Grade Level	1	1.68	0.20	0.006
Class Size*Grade Level	1	2.13	0.15	0.007
Teaching Experience*Class Size*Grade Level	1	1.65	0.20	0.006
Error	296			

* Between-Subject Effect is significant at the 0.05 level

In summary, a Univariate Anova was conducted to explore the effects of the teaching experience, class size and the grade levels on the opinions of the teachers about their implementation of assessment techniques recommended in the new mathematics curriculum scale. None of the independent variables has significant value less than 0.05. In other words, all of the null hypotheses were failed to reject.

When the interaction effects of the subjects were checked; There was not an interaction effect of teaching experience and class size [F (1, 296) = 0.09, p = 0.76], there was not an interaction effect of teaching experience and grade level [F (1, 296) = 1.68, p = 0.20]. Also; there was not an interaction effect of class size and

grade level [F (1, 296) = 2.13, p = 0.15]. And last of all it was seen that the interaction effect between teaching experience, class size and grade level [F (1, 296) = 1.65, p = 0.20] did not reach a statistical significance.

To determine whether there was a main effect for each independent variable (teaching experience, class size, and grade level), the significant values of them were checked from the table 4.14. Experience subject was divided into two groups (Group 1: 10 years and below; Group 2: 11 years and above). There was not a statistically significant main effect for experience [F (1, 296) = 3.38, p = 0.07]. Class size subject was divided into two groups (Group 1: 25 students or below; Group 2: 26 students and above). There was not a statistically significant main effect for class size [F (1, 296) = 2.09, p = 0.20]. Also, there was not a statistically significant effect for the grade level subject [F (1, 296) = 0.02, p = 0.90].

So it was understood that, teachers' opinions about their implementation of assessment techniques recommended in the new mathematics curriculum did not show a significant difference with respect to their teaching experience, class size they teach and grade level they teach.

CHAPTER 5

CONCLUSIONS AND DISCUSSION

The implications of the findings related with the study are discussed in this chapter. In addition, recommendations for the improvement of the assessment practices are given. This chapter also ties the research questions and the literature review presented in chapters 1 and 2 with the methods and results presented in chapters 3 and 4.

The purpose of this study was to investigate the opinions of the elementary school teachers about their implementation of the assessment techniques offered by the new mathematics curriculum. Furthermore, it was aimed to have an understanding of the critical experiences occurred in the assessment process in the elementary mathematics education and to come up with practical ideas on implementation level for the new elementary mathematics curriculum in Turkey.

The results of the study showed that teachers opinions about their implementation of the assessment techniques recommended in the new mathematics curriculum did not show a significant difference based on their teaching experiences, grade level or class size they teach. On the other hand, the project study, written exam study and portfolio study usage proportion seemed to be related to the grade level. These assessment techniques were mostly preferred to be used by the first, second or third grade teachers. Furthermore, teachers of fourth and fifth grades were more likely to grade only the results in the individual works than the teachers teaching to first, second or third grades.

The results of the study were similar with the ones showed by The Presidency of Educational Research and Development (2005). Both studies showed

that the opinions of the elementary school teachers did not differ according to their teaching experience, class size they teach, and the grade level they teach. Furthermore, teachers mostly preferred to use presentations in order to assess the students in mathematics lessons. On the other hand teachers complained about the lack of time in both of the studies.

The results of this study showed that lack of time caused problems in using alternative assessment techniques. For instance, filling observation forms and preparing the materials requires much time. The studies of Pilten (2001) and Çakan (2004) showed that teachers did not have enough practice to prepare the materials. Yılmaz (2006), also, found in her study that filling the observation forms was a problem for the teachers. Having seminars may be beneficial in this manner. Teachers may learn to be more practical with the related seminars (Bıçak & Çakan, 2004; Daniel & King, 1998; Güven, 2001; Toprak, 2000).

Since time is not enough, teachers sometimes turn back to the old assessment techniques. Yılmaz's (2006) study revealed that having less time may be the reason of not always implementing the assessment system suggested by the new mathematics curriculum.

Students learn to read and to write in their first year at school. Therefore, in the first, second and third grades oral assessment may be more efficient. The results revealed that, the usage proportion of the project study, written exam and portfolio study showed difference among the grade level. With this result it can be understood that teachers prefer to use written exams, portfolio studies and project studies in the fourth and fifth grades. This opinion may also explain the proportion difference about the individual work grading choices. The study showed that there is a relationship between the grade level and the individual work grading. The issues of the mathematics curriculum become harder in the fourth and fifth grades, so teachers may concentrate on grading the results. In the first, second and third grades teaching is emphasized more on the solution processes rather than the results. Choices for grading the individual work may change according to the grade levels.

It was found in this study that teachers sometimes constructed the

materials needed for the assessment techniques themselves. The reports about the study conducted by Presidency of Educational Research and Development were published in June of 2005. The new mathematics curriculum started to be implemented in the elementary schools starting from the 2005-2006 academic year. Such a short time can not be enough for the discussion of the implications. Therefore, the schools may not be ready for the application of the assessment techniques. If the time was enough, schools would have mathematics laboratories and teachers would have more resources for constructing the materials. Although the lack of time caused difficulties, most of the participants always chose and used the suitable materials for mathematics lessons. Yılmaz (2006) argued that if time was enough, teachers would not turn back to the old assessment techniques.

With the results of the study it was understood that the teachers who had ten years teaching experience or less did not have different opinions than the ones who had more experience in teaching. Cizec, Fitzgeral and Rachor (1996) and Daniel and King (1998) also showed that teaching experience did not have a significant effect on the opinions about the assessment process.

Kaynak (2000), on the other hand, found out that 1-5 years experienced teachers had more positive opinions than the teachers with more experience. Uslu (2003) also showed that teaching experience had a significant effect on the opinions about the assessment process. Since the new curriculum is quite recently started to be implemented, most of the participants of this study did not have a chance of getting practical experiences about the assessment techniques recommended for the new mathematics curriculum. Therefore, the studies done in the past may have different results with this study.

Different from the study, Bakioğlu and Polat (2002) and Türnüklü (2002) pointed out that class size negatively affected the assessment process. But these studies were for the previous curriculum. 78 % of the participants in this study had class sizes with 26 or more students. Bulut (2006) proved with his study that class size with 21-30 students is ideal for the right applications of the new mathematics curriculum.

With this study, it was clearly understood that, elementary school teachers

graded the group works of the students both individually and as a group. Most of the participants did not have the idea of ‘‘only group work has to be graded’’. In new mathematics curriculum, on the other hand, the aim of the group work defined as ‘‘the group work is a unity of aims and unity of aims can be possible by the unity of destinies. The group members put as good job as possible for a study. Therefore, all of the group members should be assessed with same grade’’ (MEB, 2006). As the answers to the open-ended question asserted, the reason of this dilemma could be lack of seminars about the grading part of the assessment process offered with the new mathematics curriculum.

Routine seminars may be effective for increasing the usage frequency of the constructed grid. Although such seminars were offered by the Ministry of Education, teachers did not prefer using alternative assessment techniques. This may be because teachers did not understand the basics of some of the assessment techniques. For instance, both in the pilot study and in the present study, teachers asked to learn the definition of grid.

Participants of this study mostly used the results of the assessments for repeating the misunderstood issues. In order to repeat the misunderstood issues, teachers may try to find new teaching methods. Finding new teaching methods may be useful for constructing alternative materials and for doing additional studies for the students. Open-ended question revealed that this difference could be because of the fast transition from the old assessment techniques to the new ones within lack of seminars about the aims of the new assessment techniques suggested in mathematics lessons. Teachers knew to change something in mathematics lessons and they had guidebooks but they could not have practice and they could not be introduced with the experienced pilot school teachers. So, they did not have the chance of getting feedbacks about the application of the new assessment strategies in mathematics lessons.

To sum up; although there seemed to be differences with other study results, this study showed that teachers’ opinions about their implementation of assessment techniques recommended in the new mathematics curriculum were not negative according to their teaching experience, grade levels they teach and class

sizes the study with. Their tendency on the usage of the alternative assessment techniques may become more positive if the teachers become more professional in the usage of the assessment techniques recommended by the new mathematics curricula. Constructing mathematics laboratories may also be constructed in the schools. By these supplies, the assessment techniques would not take much time and both teachers and students should be away of being anxious about the assessment techniques suggested by the new mathematics curriculum.

5.1 Recommendations for Practice

The study showed that, in mathematics lessons, difference in class size, grade level and teaching did not affect teachers' opinions about the assessment application or grading offered by the new mathematics curriculum. With the help of these results, some suggestions can be made for the teachers and for the researchers. By combination of the presented results and discussions, some additional studies listed below may be constructed by the school administrations in order to make the application of the assessment techniques better:

- Teachers may get seminars once or twice in a month from the experts about the new mathematics curriculum and about the new assessment techniques of the curriculum. In these seminars; cassettes or videos showing the application of the new assessment techniques may be helpful.
- Teacher and the school administration may work together in planning the curriculum in order to find ways of using classroom time more efficient in a way that each student studies during the assessment process.
- Some of the assessment techniques may be modified in order to become more sufficient for the crowded classrooms.
- Teachers and administration may work together for producing ways of using observation forms more effectively.
- Assessment Units may be constructed in the schools in order to give advice to the teachers about the applications of the assessment techniques.

In addition to the studies done by the school administrator, supports of the

Ministry of National Education may be helpful. Most of the teachers were complaining about the missing of time during the assessment application. Ministry can do the following:

- Kinds of multiple choice questions or more practical problems may be added at the end of the mathematics issues.
- Seminars may be given to inform the teachers about the practical ways of filling the observation forms.
- In the future, the hours for the mathematics lessons may be increased from 4 hours to 5 hours: 2+2 hours for routine studies and 1 hour for discussing the assessment results with the students.

5.2 Recommendations for Further Researches

According to the results of the study some recommendations for further studies can be given. First of all, this study was administered to the teachers only at the beginning of a school year. In the future, the research can be administered both at the beginning and at the end of an academic year with some changes. So, the change in the opinions of the teachers about the application of the assessment techniques can be realized. The study can also be modified to administer to the middle school teachers in order to learn the opinions of the teachers about the applications of the new mathematics curriculum in middle schools.

The developed countries plan their education system with the results they get from the assessment processes, so for these countries techniques used for assessment have great importance (Nitko, 2001). The studies advised to school administrations and ministry may sometimes not be enough for reaching the aims in Turkish Education System.

For a hundred years; it was an obligation for the teachers to be a guide to the society, to plan teaching, and to prepare materials for assessment. In addition, teachers had to know construction and application of the assessment materials and they had to construct an assessment unit. Today, however, the construction and presentation of assessment techniques and materials by the experts seem to be an

obligation for education system. The same is necessary for both grading and application concepts. If such a service could be supplied to the teachers; the complaints, which are discussed today, become extinct completely.

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APPENDICES

APPENDIX A

Permission Document gotten from Ministry of Eduaction

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

Sayı : B.08.0.EGD.0.33.05.311-1034/3755 04./07/2006
Konu : Araştırma İzni

ORTA DOĞU TEKNİK ÜNİVERSİTESİ REKTÖRLÜĞÜNE

İlgi : 12.07.2006 tarih ve B.30.2.ODT.0.70.72.00-6063/10780 sayılı yazınız.

Üniversiteniz İlköğretim Fen ve Matematik Alanları Eğitimi Ana Bilim Dalı yüksek lisans öğrencisi Nihan UÇAR'ın "İlköğretim Matematik Eğitiminde Ölçüm ve Değerlendirme" konulu araştırmada veri toplama aracı olarak kullanılacak anketlerin, Ankara İli Çankaya İlçesi ve Kırıkkale il merkezindeki ilköğretim okullarında görevli sınıf öğretmenlerine uygulama izin talebi incelenmiştir.

Üniversiteniz tarafından kabul edilen onaylı bir örneği Bakanlığımızda muhafaza edilen (3 sayfa - 24 sorudan oluşan) anketin belirtilen okullarda uygulanmasında bir sakınca görülmemektedir.

Araştırmanın bitiminde sonuç raporunun iki örneğinin Bakanlığımıza gönderilmesi gerekmektedir.

Bilgilerinizi ve gereğini rica ederim.

Cevdet CENGİZ
Bakan a.
Müsteşar Yardımcısı

APPENDIX B

Opinions About Assessment Questionnaire

Değerli Katılımcı

Aşağıda sunulan ve yüksek lisans tez çalışmamın bir parçasını oluşturan anket, 2005-2006 öğretim yılında ilköğretim okulları birinci kademede uygulamaya konulan yeni matematik öğretim programının önerdiği ölçme ve değerlendirme uygulamalarına ilişkin görüşlerinizi almayı amaçlamaktadır. Bu ankette belirteceğiniz görüşleriniz doğrultusunda süregelen ölçme ve değerlendirme yöntemlerine olumlu alternatifler sunmak hedeflenmektedir.

Ankete vereceğiniz cevapların değerlendirilmesinde kişisel bilgilerinizin ve okul isimlerinin gizliliğine hassasiyet gösterilecektir.

Lütfen soruları sınıfınızda uyguladığınız ölçme-değerlendirme tekniklerini ve yeni programın önerdiği ölçme-değerlendirme tekniklerini dikkate alarak ve şahsi görüşlerinizi gözönünde bulundurarak cevaplayınız.

Katkılarınız için Teşekkür ederim

Nihan Uçar
ODTÜ Sosyal Bilimler Enstitüsü
İlköğretim Fen ve Matematik Eğitimi Yüksek Lisans Öğrencisi

ANKET SORULARI

İL/İLÇE:			**OKUL:**	
Bay ( ) **Bayan ( )**			**Kıdem Yılı:**	
Eğitim Düzeyi: **( ) Önlisans** **( ) Diğer** **( ) Lisans** **( ) Lisans Üstü**			**Mezun Olduğu Okul:**	
Okuttuğu Sınıf:	**Şube:**	**Toplam Öğrenci Sayısı:**	**Kız Öğrenci Sayısı:**	**Erkek Öğrenci Sayısı:**

	Hiç bir zaman	**Ara sıra**	**Her zaman**
1. Aşağıda sıralanan ölçme ve değerlendirme yöntemlerini matematik dersinde hangi sıklıkta kullandığınızı uygun kutuya X işareti koyarak belirtiniz:			
a. Laboratuar, atölye ve diğer çalışmalar için yapılandırılmış gözlem formu			
b. Proje çalışmaları			
c. Sözlü sunum			
d. Poster ve grafik hazırlatma			
e. Drama çalışmaları			
f. Sözlü sınavlar			
g.Yazılı sınavlar			
h.Yapılandırılmış grid			
ı. Ürün seçki dosyası (Portfolyo oluşturma)			
j. Grup ve akran değerlendirmesi			
k.Öğrenci özdeğerlendirmesi			
l. Kavram haritaları			

	Hiç bir zaman	Ara sıra	Her zaman
2. Matematik derslerinde grup çalışmaları için not verirken;			
a. Her grup üyesinin performansını ayrı değerlendiriyorum			
b. Sadece grup çalışması ürününü notlandırıyorum			
3.Öğrencilerin çalışmalarını değerlendirirken çözüm yollarını da notlandırma kapsamına alıyorum			
4. Sadece sonuçlar için not veriyorum			
5. Değerlendirme sonuçlarımı matmatik derslerinde aşağıda belirtilen şekilde kullanmaktayım:			
a. Yeni bir öğretim yöntemi seçmek için			
b. Kullandığım materyallere alternatifler oluşturmak için			
c. Anlaşılamamış konuları tekrar etmek için			
d.Öğrenme hızı yavaş olan öğrencilere alternatif öğretim teknikleri uygulayabilmek için			
e.Öğrenim hızı yüksek olan öğrencilerle ek çalışmalar yapabilmek için			
6.Yeni müfredatın matematik dersleri için içerdiği ölçme sistemini öngörüldüğü şekliyle bire bir uygulayabilmekteyim			
7.Kendi uyguladığım ölçme tekniklerinin yeni müfradatın matematik alanında öngördüklerinden daha etkin olduğunu düşünüyorum			
8.Öğrencilerim yeni müfredatın matematik dersleri için öngördüğü ölçme şekillerinden rahatsız			
9.Matematik derslerinde ölçme amaçlı kullanılması gereken materyalleri kendim geliştiriyorum			
10.Matematik dersinin amacına uygun materyalleri seçtim ve kullandım			
11.Yeni ölçme tekniklerinin matematik derslerinde yetersiz kaldığı yerlerde eski tekniklere tekrar geri dönüyorum			

	Kesinlikle katılıyorum	Katılıyorum	Emin Değilim	Katılmıyorum	Kesinlikle katılmıyorum
12. Matematik dersleri için uygun görülen ölçme yöntemleri müfredat programında yeterince anlaşılır ifade edilmemiş					
13. Ölçme yöntemlerinin uygulanması matematik derslerinde çok zaman alıyor					
14. Matematik dersleri için uygun görülen değerlendirme bölümü yeni müfredat programında yeterince açık ifade edilmemiş					
15. Matematik dersleri için yeni müfredata uygun değerlendirme yapmak çok zaman alıyor					
16. Matematik derslerine uygun bir ölçme ve değerlendirme ortamı için sınıflar yeterli donanıma sahiptir					
17. Yeni ölçme teknikleri uygulanmaya başlandığından beri öğrenciler matematik derslerinde daha fazla soru soruyorlar					
18. Matematik dersleri için öğrenciler çoğu zaman yardım almadan da kendi ürün seçki dosyalarını (portfolyo) hazırlayabiliyorlar					
19. Matematik derslerinde yapılan grup çalışmaları öğrenci iletişim becerilerine olumlu katkıda bulunmuştur					
21. Matematik derslerinde yapılan drama ve grup çalışmaları öğrencilerimin ses, jest ve mimiklerini, hitap şekillerini geliştirmiştir					
22. Yeni müfredatta matematik dersleri için uygun görülen ölçme teknikleri öğrencilerin teknolojik araçları kullanabilmesini de ölçmektedir					
23. Matematik derslerinde yeni müfredatla birlikte öğrencilere uygulanan ölçme teknikleri amacına hizmet etmektedir					

24. Matematik derslerinde uyguladığınız ölçme ve değerlendirme tekniklerini geliştirmek için öğrenme ihtiyacı duyduğunuz ayrıntılar nelerdir? Lütfen yazınız.
1..... **2.....** **3.. .....**