ASSESSMENT IN THE 5TH GRADE MATHEMATICS CLASSROOMS: A CASE STUDY OF THE TEACHERS' PRACTICES

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Approval of the Graduate School of Social Sciences

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

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ABSTRACT

ASSESSMENT IN THE 5TH GRADE MATHEMATICS CLASSROOMS: A CASE STUDY OF THE TEACHERS' PRACTICES

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The purpose of this study was to examine the mathematics teachers' assessment practices in the 5th grades. In that manner, it was aimed to figure out the mathematics teachers' classroom assessment procedures and their use of the assessment results. It was also aimed to understand teachers' views about the students' learning of mathematics, the factors affecting teaching mathematics, and their views about assessing students' learning of mathematics.

In order to achieve these purposes, a multiple case study design was used with three mathematics teachers in a public school of Ankara. The data were collected during the spring semester of 2013-2014 academic year in three phases. In the first phase the in-depth and detailed interviews were done with each participant. In the second phase the classroom observations were conducted and videotaped. After each assessment activity, a post-activity interview was made with each participant. Final interviews were also made with the participants at the end of the data collection procedure. In the third phase, field notes and extensive document

collection were completed. The data were analyzed at two levels: within-case and cross-case analysis. The results of the study indicated that, the participants practiced both the formal and informal assessment methods in the 5th grade classrooms. Then they used the assessment results for various purposes such as making adjustments for further assessment, deciding on the suitability of an assessment method, monitoring students' progress, assigning overall grades, giving formative feedback, identifying the areas of strengths and weaknesses, deciding on repeating or teaching a topic, understanding teaching effectiveness, rewarding students, preventing students from feeling anxious, encouraging students to self-study, preventing the students' from cheating. The findings also showed that, the participants' views and their assessment practices showed relations or discrepancies at some points.

Keywords: Classroom assessment, mathematics teaching, mathematics teacher, 5th grades

ÖZ

5. SINIF MATEMATİK DERSLERİNDE ÖLÇME VE DEĞERLENDİRME: ÖĞRETMEN UYGULAMALARIYLA İLGİLİ BİR DURUM ÇALIŞMASI

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Bu çalışma, matematik öğretmenlerinin 5. sınıflardaki ölçme ve değerlendirme çalışmalarını incelemek amacıyla yapılmıştır. Bu anlamda, matematik öğretmenlerinin ölçme prosedürleri ve değerlendirme sonuçlarını nasıl kullandıkları araştırılmıştır. Ayrıca öğrencilerin matematiği nasıl öğrendikleri, matematik öğretimini etkileyen faktörler ve matematik öğrenimini ölçme konularındaki öğretmen görüşleri incelenmiştir.

Bu amaç doğrultusunda, Ankara'da bulunan bir devlet okulunda çalışan üç matematik öğretmeniyle çoklu durum çalışması yapılmıştır. Veri toplama süreci 2013-2014 eğitim-öğretim yılının bahar döneminde, üç aşamada tamamlanmıştır. Birinci aşamada, her katılımcıyla derinlemesine ve detaylı birer görüşme yapılmıştır. İkinci aşamada video kaydı kullanılarak sınıf gözlemleri yapılmıştır. Her ölçme etkinliğinden sonra, katılımcılarla ayrı ayrı etkinlik-sonrası görüşmeleri yapılmıştır. Veri toplama sürecinin sonunda, her katılımcıyla final görüşmesi yapılmıştır. Üçüncü aşama olarak ise saha notları ve kapsamlı dokümanlar toplanmıştır. Toplanan veriler iki aşamada analiz edilmiştir. Birinci aşamada her durum kendi içinde analiz edilmiş, ikinci aşamada ise karşılaştırmalı durum analizi yapılmıştır. Sonuçlar, katılımcıların

5. sınıflarda hem formal hem de informal ölçme metotlarını kullandıklarını göstermiştir. Katılımcılar, ölçme sonuçlarını daha sonra kullandıkları ölçme yöntemlerinde düzenlemeler yapmak, ölçme yöntemlerinin uygunluğuna karar vermek, öğrenci gelişimlerini takip etmek, yılsonu notlarını vermek, biçimlendirici dönütler vermek, öğrencilerin güçlü ve zayıf oldukları alanları belirlemek, bir konuyu tekrar etmek ya da anlatmak için kararlar almak, öğretimin etkinliğini anlamak, öğrencileri ödüllendirmek, öğrencilerin kaygı duymalarını engellemek, öğrencileri bireysel çalışmaya teşvik etmek ve öğrencilerin kopya çekmelerini engellemek gibi amaçlar için kullanmışlardır. Çalışmanın sonuçları, bazı alanlarda, katılımcıların görüşlerinin ve ölçme uygulamalarının arasında ilişkiler ve çelişkiler olduğunu da göstermiştir.

Anahtar Kelimeler: Ölçme-değerlendirme, matematik öğretimi, matematik öğretmeni, 5. sınıflar

This dissertation is dedicated to
my lovely and precious daughter
Bade

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LIST OF ABBREVIATIONS

MoNE	Ministry of National Education
NCTM	National Council of Teachers of Mathematics
NRC	National Research Council
PERDD	Presidency of Educational Research and Development Department
PISA	Programme for International Student Assessment
TIMMS	Trends in International Mathematics and Science Study

CHAPTER 1

INTRODUCTION

More than 30 years ago, Bloom et. al. (1971) pointed out the importance of using classroom assessments as tools. Since then classroom assessment researchers studied the purposes and the procedures for classroom assessment activities. They remarked that ‘‘assessments best suited to guide improvements in student learning are the assessments that teachers administer in their classrooms” (Guskey, 2003, p. 6).

Technological developments and the easy access to a variety of information, also, brought new understandings and quests to the education systems. In that manner education programmes are remodeled or improved according to the personal and social demands (Birgin, 2010). Assessment activities, on the other hand, are parts of education. For instance, teachers may evaluate the learning products and may follow the process of learning by assessment (Anderson, 1998; Shepard, 2000; Stiggins, 2001). Moreover they may use the assessment outcomes to support teaching and learning by identifying areas where individuals need more help (Krajcik, Czerniak, & Berger, 1999). In other words ‘‘assessment of students not only documents what students know and can do but also influences learning’’ (McMillan, 2007a, p. 1).

Researchers state that teachers implement classroom assessments in order to grade, motivate students, detect students’ achievement expectations, identify students with special learning needs, or monitor their own instructional performance (Stiggins, 2001; Ohlsen, 2007). Therefore classroom assessment helps students to set off their understandings of what they learn. Moreover, clarifying the picture of a student’s achievement and learning challenges becomes easier if a teacher gets more

information about students (Stiggins, 2001).

For a right implementation of classroom assessment, the contents of the assessment must be significantly improved and ‘‘...the gathering and use of assessment information and insights must become part of an ongoing learning process” (Shepard, 2000, p. 5). In other words ‘‘assessment is a challenging task and effective classroom assessment requires knowledge of the approaches of assessments and mastery over assessment strategies’’ (Thomas, 2012, p. 1). For this reason, new comprehensions on learning theories may sometimes affect the assessment approaches (Birgin & Baki, 2007). The approaches such as, multiple intelligences or project-based learning, on the other hand, improved traditional learning, teaching, and assessment activities (Birgin & Baki, 2007). Moreover, changes in the field of education suggest assessing the individual and group performance during the instructional process instead of assessing by multiple choice questions in a limited time (Umay, 1996).

Then, how does assessment take place in the mathematics classrooms? According to Niss (1993) “assessment in mathematics education is taken to concern the judging of the mathematical capability, performance, and achievement of students” (p. 3). In order to make judgments, on the other hand, assessment practices in mathematics classrooms have changed in years. For instance, more than thirty years ago multiple choice or short answer questions were very popular among other assessment methods in too many nations (Wolf, 1995). Teachers who internalized the traditional approaches to teaching and learning, preferred to use paper and pencil tests or essays in most courses of the elementary education (Krajcik, Czerniak, & Berger, 1999). Today, in the approaches where the learning is subjective and student-centered, teachers have become a guide instead of being the source and leader (Yılmaz, 2006). Using only tests and essays, on the other hand, generally failed to assess the variety of ideas students have (Krajcik et al., 1999).

In parallel with the changes in the assessment process, mathematics teachers’ roles in the sense of learning, teaching or assessment have changed (Stiggins & Conklin, 1992). ‘‘Accurate and appropriate student assessment provides the information to help teachers make better decisions’’ (McMillan, 2007a, p. 5), so mathematics teachers should take the assessment as a part of instruction that

persistently activate students' mathematical thinking and should be the ones who listen and respond to that thinking (Suurtamm, Koch, & Arden, 2010). They, also, should understand the weaknesses and the strengths of the assessment methods deeply and choose the suitable assessment method for different targets (Stiggins & Conklin, 1992). In addition, they should become more sophisticated about explaining assessment results effectively to the students (Suah & Ong, 2012).

In the manner of the teachers' role in mathematics assessment, National Council of Teachers of Mathematics published an evaluation report about the new approaches on mathematics education (NCTM, 1995). According to the report, an assessment system has to reveal what students know and not know; or what students can do, and can not do. Teachers, on the other hand, may carry out such an assessment system by blending existing methods together with the alternative methods, such as project-study, performance-tasks, portfolio evaluations, etc (NCTM, 1995). As a result of that, mathematics teachers need to use various assessment methods so that the students can have the chance of displaying their performance by written, oral, or actual activities (NCTM, 1995).

Assessment methods, which are sufficient for understanding students' knowledge level, should also help to comprehend students' written, oral or active performances in mathematics (NCTM, 2000). Therefore teachers would have the chance of identifying students' mathematical thinking by using different assessment methods (Niss, 1993). However classroom achievement tests including multiple choices, true/false or fill-in-the-blanks type items provide an assessment system which only focuses on the products of the learning, not the process of learning (Henning-Stout, 1994). Using a variety of assessment methods is important in the development of students' understanding (Henning-Stout, 1994). Therefore, teachers need different assessment methods including performance-based assessments such as observation, student self-assessment, and portfolios (Bol, Stephenson, O'Connell & Nunnery, 1998).

Classroom observations, paper-and-pencil exams, project studies, and performance-task implementations can be contrasting forms of assessment since they have their own strengths and weaknesses (Clarke, 1997a). However when they are used together, they suggest a richer body of information and a mutual validity check

(Clarke, 1997a). For instance, in problem solving processes, classical methods became inadequate to assess students' higher order thinking skills (Anderson, 1998). On the other hand, ''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 methods which are already used'' (Clarke, 1997a, p. 21). Therefore, in order to assess students' problem solving skills, both the summative and the formative assessment procedures can be beneficial (Anderson, 1998).

In Turkey, elementary school mathematics curriculum is designed to help students make meaningful connection between mathematics concepts and their daily life experiences (MoNE, 2013c). During this process it is expected that students would seek, be active physically and mentally while learning mathematics, ask questions, explain their own ideas, form and solve problems, use technology, like mathematics and be active in group works (MoNE, 2013c). As a result of the new approach, it is offered to assess both learning outcomes and learning processes (MoNE, 2013c). In that manner, Ministry of National Education implies that assessment outcomes should be collected regularly. In order to make realistic evaluations about the process, on the other hand, mathematics teachers should analyze the assessment outcomes sufficiently (MoNE, 2013c). Therefore they need to produce activities and be guides in the classrooms (MoNE, 2013c).

In order to monitor students' learning of mathematics in the international arena, on the other hand, Turkey attended in the international assessment practices. For instance, the international practice called Trends in International Mathematics and Science Study (TIMSS) was one of them. Presidency of Educational Research and Development Department [Eğitim Araştırma ve Geliştirme Dairesi Başkanlığı] reported the 8th grade mathematics achievement results of TIMSS 1999. In the report, it was stated that Turkey was 31st among 38 countries (PERDD, 2003). In 2007, on the other hand, 49 countries attended on this international scaled mathematics examination and Turkey was the 30th of these countries (PERDD, 2011). In 2011, Turkey attended TIMSS with 4th and 8th grades. The results were like the previous ones. In the 8th grade examinations, Turkey was 24th among 42 countries whereas it was 35th among 50 countries in the 4th grade examination (Mullis, Martin, Foy & Arora, 2012). Although it is a criticism that the number and the quality of the

participating countries changed in each examination, TIMSS results detected that mathematics achievement of Turkey was behind many countries (Mullis et al., 2012).

Apart from TIMSS results, The Presidency of Educational Research and Development Department [Eğitim Araştırma ve Geliştirme Dairesi Başkanlığı] published a report about the 2003 results of ‘‘The Programme for International Student Assessment (PISA)’’, too. It was stated in the report that, 50 % of the participant Turkish students have difficulty in reading and writing mathematics (PERDD, 2005). It was also stated in the report that, there were big differences between the achievement levels of the schools. Moreover it was recommended in the report that, there was a need to clarify the aims of the education system.

Similar with the recommendations in the reports of TIMSS and PISA studies, Ministry of National Education of Turkey emphasizes on putting clear aims in education system. They do not only emphasize on the consequences of learning, but also on the process of learning (MoNE, 2005). Some of the problems of the previous curricula, on the other hand, still exist because of the inadequate education of teachers, lack of materials or technology, increase in the number of schools, inadequate physical conditions, and inadequate counseling services at schools (Birgin, 2010).

In order to evaluate the students’ learning of mathematics, teachers need to understand and apply the assessment methods efficiently in their classrooms (MoNE, 2005). In that sense Kubiszyn and Borich (2003) offered teachers to consider the suitability of the assessment methods, to decide the targets which will be assessed, to have knowledge to develop tests, tasks, etc., to establish the methods for validity-reliability issues, to learn basic statistics, to choose the domains for which the assessment results will be used, and to have efficient methods about the communication of the students’ progresses and achievements with parents and students. Stiggins (2008) also mentioned that teachers may improve students’ achievement with a combination of well-made, balanced assessment system (Stiggins, 2008). This balance can be accomplished by using both summative and formative assessments together, so one kind of assessment should not be used exclusively in the evaluation of students’ knowledge (Stiggins, 2008). Each should be effective in the overall grades of the students (Stiggins, 2008).

1.1 The Purpose of the Study

The purpose of this study was to examine mathematics teachers' assessment practices in the 5th grades. In that manner, it was aimed to figure out the mathematics teachers' classroom assessment procedures and their use of the assessment results. It was also aimed to understand teachers' views about the students' learning of mathematics, about the factors affecting teaching mathematics, and their views about assessing students' learning of mathematics.

The study depended on five main research questions and related sub-questions. Each of them was constructed to reach the aims of the study. At the end of the study, it was aimed to figure out how assessment took place in 5th grade mathematics classrooms.

1.2 Research Questions

In the light of the purpose of the study, the research questions of the study were:

1. What assessment procedures do the participating mathematics teachers use in the 5th grade classrooms?
2. In what ways are the participating mathematics teachers' formal and informal assessments related with their use of assessment results in 5th grade classrooms?
3. How do the participating mathematics teachers use the results of their assessment practices formatively in 5th grade classrooms?
4. To what extent are the participating mathematics teachers' classroom assessment procedures related to their views about the students' learning of mathematics, about the factors affecting teaching mathematics, and about assessing students' learning of mathematics?

5. What are the discrepancies between the participating mathematics teachers' views about assessing the 5th grades' learning of mathematics and their perceived classroom assessment practices?

1.3 Significance of the Study

Teachers do not only observe the complex cognitive understandings but also the social abilities of the students by using variety of assessment methods. Students get a chance to present what they have learned in real situations. They can relate their academic knowledge with real life problems and can apply this relationship on a problem. The students' understanding and reasoning are directly assessed since the work can be explained and justified by students (McMillan, 2007a). Therefore teachers may use various assessment methods for assessing both the classwork and the homework of the students (Acar & Anıl, 2009).

The middle school system in Turkey has changed in the beginning of 2012-2013 academic year (MoNE, 2012). Before 2012, 5th grades were in the elementary school system together with 1st, 2nd, 3rd, 4th, 6th, 7th, and 8th grades. Moreover they had only one teacher, their primary school teacher. The primary school teachers taught lessons to a group when they were in the 1st, 2nd, 3rd, 4th, and 5th grades. Then they continued in the middle school for the 6th, 7th, and 8th grades. During their elementary education, on the other hand, all of the students used the same physical school environment. Since 2012, the students have been going to primary school when they are in the 1st, 2nd, 3rd, and 4th grades (MoNE, 2012). Then they start middle school and continue for their 5th, 6th, 7th, and 8th grade classes. The mathematics teachers, on the other hand, have been teaching to 5th grades since 2012. During the change process, and for only two years, Ministry of National Education stated that if the physical conditions of a school building was not suitable for seperating the buildings of the primary and the middle school, then the middle school students would go to school in the morning and the primary school students would go to school in the afternoon (MoNE, 2012). In other words, 5th grades and their mathematics teachers come up against too many changes because of the new education system.

The focus of this current study, on the other hand, is specifically on classroom assessment in mathematics lessons. It can be done before, during, or after instruction and clearly defines what students learn (McMillan, 2007a). Teachers make decisions according to their classroom assessment results (McMillan, 2007a). These decisions can either be about the effectiveness of their teaching strategy or about the needs of the students (Abdul Rahim, 2012). Marzano (2006) defines classroom assessment as ‘‘...a form of feedback to students regarding their progress, and it stands to reason that feedback will enhance learning’’ (p. 5). Although he offers that classroom assessments should be formative in nature, researchers point out the importance of using different kinds of classroom assessment methods together (Angelo & Cross, 1993; Nitko & Brookhart, 2007).

According to The Ministry of National Education, assessment is important since it provides information about the students’ knowledge and attitudes expected by the objectives (MoNE, 2013c). Therefore, The Ministry offers both the traditional and the performance-based assessment methods (MoNE, 2013a). The traditional methods were defined as the paper-and-pencil activities. In order to implement the performance-based assessment, on the other hand, The Ministry offered the methods such as self-assessment; group works; problem solving; portfolios; classroom observations; and performance-task (MoNE, 2013a).

Literature reveals that although teachers implement most of the assessment methods recommended by the curriculum, they come up against some problems during their assessment procedures in mathematics classrooms (Çakan, 2004; Pilten, 2001; Tienken & Wilson, 2001). In that maanner, the findings of this study may contribute to the teachers’ assessment practices in the mathematics classrooms. For instance, they may rethink their implementations and question whether there is a disconnection between their views about the assessment process and their actual assessment practices. Moreover realizing the importance of getting an organized, balanced assessment data; evaluating it objectively; and using these evaluations in a systematic way for both themselves and students, may have beneficial effects on teachers’ classroom implementations.

Each student is different. In order to know, educate, and assess a student’s individual work, on the other hand, a well-designed, suitable curriculum is needed

during the development of curricula, the needs of the teachers, the students, and the nations are taken into consideration. Then curriculum developers may need help to understand what is going on in a teacher's mind and in a classroom. The current study can provide such a source including observations and interviews for curriculum developers, too.

Last of all, the faculties of education can utilize from the findings of the current study. For instance, assessment is an inseparable part of education, so learning how to assess can be more permanent when preservice teachers come up with the empirical results of the related field. Academic community can discuss the results of the study judgmentally, so that they can make improvements on the education of preservice teachers. Moreover they can conduct similar studies in the primary or secondary schools to improve mathematics assessment.

In summary; understanding and implementing changes may be permanent for a mathematics teacher, if she/he internalizes these offers by giving meanings to them. However lots of mathematics teachers have been teaching to 5^{th} grades in Turkey for only two years. Therefore teachers, mostly in the 5^{th} grade groups, may have problems in teaching to or communicating with that age group. The students may also have problems to be new in middle school. In order to be helpful in the improvement of mathematics learning and teaching in 5^{th} grades, it can be beneficial to indicate the incentive and compulsive properties of mathematics classroom assessment. Besides, for making efficient assessments, it is essential to monitor assessment practices that teachers carry out in classes (National Council of Teachers of Mathematics, 2000). Therefore investigating teachers' assessment implementations in mathematics classrooms may be helpful for scaffolding a balanced assessment system in mathematics classrooms. In order to take attention to this necessity, teachers' classroom assessment activities are thought to be worthy for examining. Moreover the results of the study may indicate the probable hitches of the 5^{th} grade mathematics programme to the teacher educators and curriculum developers since it is aimed to analyze the assessment practices of the teachers.

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: ‘‘A process of collecting, synthesizing, and interpreting information to aid in decision making’’ (Airasian & Russell, 2008, p. 9). These decisions can be about students, curricula and programs, or educational policy (Nitko, 2001; Pellegrino, Chudowsky, & Glaser, 2001). In the current study “assessment” is taken as a concept including also the “measurement” process.

Measurement: It is ‘‘the process of quantifying or assigning a number to a performance or trait’’ (Airasian & Russell, 2008, p. 9).

Evaluation: It is ‘‘a judgment regarding the quality or worth of the assessment results’’ (Butler & McMunn, 2006).

Classroom Assessment: It is a systematic process that is carried out within the classroom (Buhagiar, 2007). This process includes obtaining evidences which are used to support classroom instruction and to understand and improve the knowledge and ability level of the students on assessment tasks (Kulm, 1994; Shepard, 1989).

Summative Assessment (Assessment of Learning): It is the assessment method done in the classrooms at the end of a unit, a course, a program, a key stage, etc. (Earl, 2003). It can be in the form of tests or exams that include items drawn from the material studied during that time (Earl, 2003). “The results of summative assessment are expressed symbolically, generally as marks or letter grades, and summarized as averages of a number of marks across several content areas to report to parents” (Earl, 2003, p. 22).

Formative Assessment (Assessment for Learning): It is a classroom assessment including ‘‘a set of skills and activities that are undertaken by teachers to provide feedback to students to enhance their motivation and learning by designing instruction to meet student needs’’ (McMillan, 2007b, p. 1).

Diagnostic Assessment: It is another purpose for assessment ‘‘designed to determine a student’s knowledge, skills, or misconceptions prior to planning instruction’’ (Butler & McMunn, 2006, p. 3).

Balanced Assessment: It is an effective classroom assessment model offered as a union of balanced formative and summative assessments (Stiggins, 2008).

Performance Assessment: It is ‘‘a general term used to describe assessments that require students to demonstrate skill and knowledge by producing a formal product or performance’’ (Airasian & Russell, 2008, p. 201). Students can demonstrate their knowledge, skills, and strategies by creating a product or a response during the performance-tasks and activities (Rudner & Boston, 1994; Stiggins, 2005; Wiggins, 1989). It can also be called as authentic or alternative (Airasian & Russell, 2008; Butler & McMunn, 2006; Hibbard, 2000). Stiggins (2005) also states that teachers should get information about the way students learn and the way they use any information by performance assessment.

Formal Assessment: It is the name of assessments which involve standardized tests, examinations, studies, etc. (Wragg, 2001). In order to implement them, teachers plan and determine specific instructions, a fixed schedule and fixed amount of time (Wragg, 2001).

Informal Assessment: It is less structured than formal assessments and put into practice during the lessons (Wragg, 2001). Asking questions in order to understand whether students are following the lesson; or walking around the classroom to monitor students when they are studying on mathematics questions are kinds of informal assessment and they provide momentary feedback (Wragg, 2001).

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

Performance-Task: A performance-task is ‘‘a task that requires students to use content knowledge, thinking skills, problem-solving skills, and work habits to produce a product or performance’’ (Hibbard, 2000, p. 41).

Rubrics (Scoring-guide): “A type of matrix that provides scaled levels of achievement or understanding for a set of criteria or dimensions of quality for a given type of performance” (Allen & Tanner, 2006, p. 197). It is a reliable guide which is handed out before the assignment begins (Mertler, 2001). Students develop their tasks according to the directions identified by these criteria and the teachers use these criteria in evaluating the products of the students (Mertler, 2001; Moskal,

2000b). Rubrics are also named as "scoring guides" in the literature (Butler & McMunn, 2006).

Formative feedback: Information given to the students to help them modify their thinking or behaviour for the purpose of improving their learning (Shute, 2007).

5th Grades: The students who are in their first year of the middle school.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

Assessment tools are not new in education systems. Teachers use written or oral exams, observation forms, anecdotal notes, checklists, rubrics, peer and self evaluation forms for assessing student performances. Besides supporting such assessment methods, use of projects are recommended in middle school mathematics curriculum, too (MoNE, 2013b). Teachers, on the other hand, are the ones who prepare, implement and evaluate all the assessment studies. Thus, by the current study, it was aimed to examine how mathematics teachers complete the assessment process of 5th grade students in one semester.

As the focus of the research was classroom assessment and implementation of the assessment by teachers, first, the teachers' classroom assessment implementation will be explained with a conceptual framework. Second, the chapter will be completed by a survey related to (a) the history of assessment; (b) the discussions about the curriculum, textbook, and assessment relation; (c) the role of assessment in teaching; (d) the research on the teachers' classroom assessments; (e) teachers' views, thoughts, knowledge, and their relations with classroom assessment.

2.1 Conceptual Framework

Assessment is not a 'stand-alone' part of education; it has a significant effect on both instruction and curriculum (National Research Council, NRC, 2001). Teachers' assessment practices, on the other hand, take form by four essential components (McMillan, 2007a). These are purpose, measurement, evaluation and use. These components form a connection with each other by creating a chart. However, according to the literature related with this study, elements are added to the purpose and measurement parts of the chart of McMillan (2007a). To begin with, the

purpose of assessment can be summative, formative, or diagnostic (Airasian & Russell, 2008; Deneen & Deneen, 2008; Hackling, 2004; Popham, 2011). The measurement step, on the other hand, can be carried out by formal and informal assessments (Airasian & Russell, 2008; McMillan, 2007a; Wrag, 2001). Therefore, the summative, formative, diagnostic, formal and informal assessment concepts are added under the categories that they are belonged to. Moreover, since "assessment" is taken as a concept including also the "measurement" process during the current study, "measurement" concept is changed with "assessment" concept in the framework.

Last of all, the chart represented in Figure 2.1 is constructed. In other words, Figure 2.1, as developed by McMillan (2007a, p. 9), clearly emphasizes the four main components of assessment, sub-elements of these components, and their interaction mechanism:

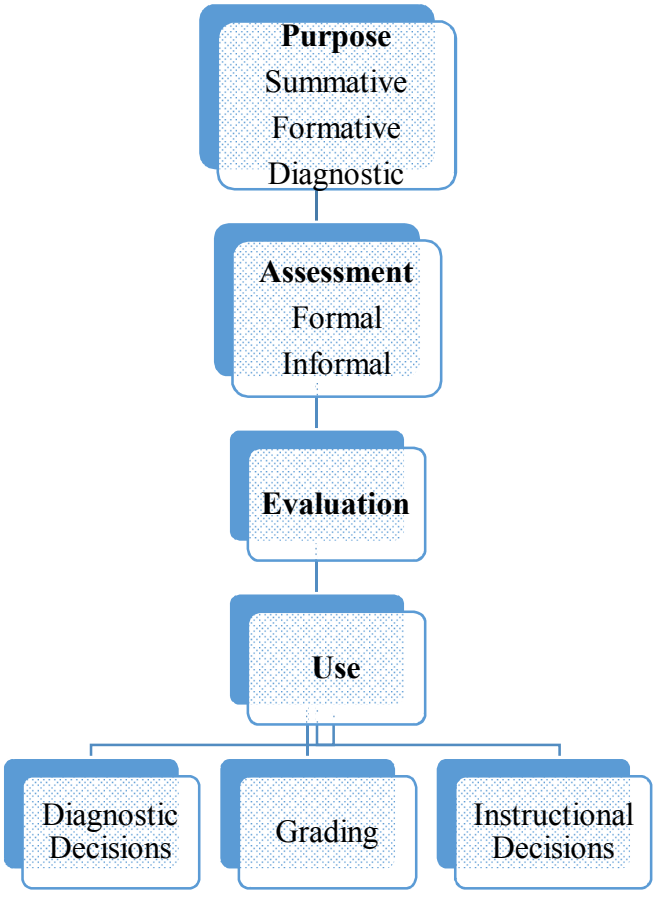


Figure 2.1 A classroom assessment framework adapted from McMillan (2007a, p. 9)

The researcher of this study decided to use the framework, visualized by figure 2.1, to analyze in which context teachers' assessment implementations for the 5th grade mathematics classrooms address the research questions. Therefore it is necessary to explain the related stages of that schema.

2.1.1 The Purpose Stage

Suah and Ong (2012) defines classroom assessment as ''a broad spectrum of activities which include constructing paper-and-pencil tests and performance measures, grading, interpreting test scores, communicating assessment results and using assessment results in decision-making'' (p. 92). Moreover, Kulm (1994) states that teachers observe, classify, and evaluate students' total performance during the classroom assessment period. He advocates that, teachers ''find out what we know, do not know, and might like to know about our students'' by assessment (p. 11).

It can be seen in Figure 2.1 that, the first step of any assessment process is to clarify the purpose of the assessment activity. At that stage teachers decide the reasons of gathering information (McMillan, 2007a). In that manner, there are many questions that the teachers ask themselves in order to fully integrate assessment with instruction: Why am I doing that assessment? What will I get from it? Is it designed to be suitable with the topic? Will the results of it be helpful to improve students' performances? Will the assessment results give information about students' progress about that mathematics topic? Can I give feedback to the students by this activity? Is it possible to guess what the students are able to do outside the classroom? Does the assessment tool communicate my expectations to the students, etc. (McMillan, 2007a).

It was stated in the literature that, assessment serves a variety of purposes for learning and teaching (Clarke, 1992; Earl, 2003; Natriello, 1987). For instance, Earl (2003) underlines the guiding purpose of assessment whereas Natriello (1987) treats the certification and motivation purposes of assessment. Herman, Aschbacher and Winter (1992), on the other hand, advocate that, students should demonstrate their progress and capabilities by the assessment tasks. The assessment methods, the

content of the assessment task, and the skills expected from the students should match with the specific instructional intentions (Aschbacher & Winter, 1992).

The activities may occur for formative, summative, or diagnostic purposes (Airasian & Russell, 2008; Black & Wiliam, 1998; Deneen & Deneen, 2008; Hackling, 2004; Popham, 2011). For formative purposes (assessment for learning), assessors monitor and guide the process while it is still in progress. Different from formative assessment, summative assessment is put into practice for the purpose of informing the achievement of a student at a particular time (Earl, 2003; Harlen, 2007). For summative purpose, assessors judge the success of the process at its completion (Airasian & Russell, 2008). As the term 'summative' suggests, these information can be concluded with a finding, a judgment, or a decision (Deneen & Deneen, 2008). For diagnostic purpose, on the other hand, Popham (2011) suggests assessors to determine a student's weaknesses and strengths at the beginning of an instructional sequence. In relation with these statements, Hattie (2003) indicates that it is not the instrument that is formative, summative, or diagnostic, ''it is the timing of the interpretation and the purpose to which the information is used'' (p. 4).

In the context of the classroom assessment, Sadler (1989) defines the summative and formative assessments as follows:

> *Formative* assessment is concerned with how judgments about the quality of student responses (performances or works) can be used to shape and improve the student's competence by short-circuiting the randomoness and inefficiency of trial-and-error learning.
> *Summative* contrasts with formative assessment in that, it is concerned with summing up or summarizing the achievement status of a student, and is geared towards reporting at the end of a course of study especially for purposes of certification. It is essentially passive and does not normally have immediate impact on learning, although it often influences decisions which may have profound educational and personal consequences for the student (p. 120).

For *diagnostic* purposes, however, teachers gather data in order to identify, understand, and address students' knowledge, misconceptions and learning difficulties (Airasian & Russell, 2008; Butler & McMunn, 2006). In literature, diagnostic purpose is also defined as a form of formative assessment in which assessment is used to obtain detailed information about individual students' prior knowledge, ways of reasoning, use of strategies, and misconceptions (Crisp, 2012; Keeley & Tobey, 2011; Sach, 2012). Moreover diagnostic assessment is defined as

early assessment (Airasian & Russell, 2008) or pre-instructional assessment (McMillan, 2007a). McMillan (2007a) emphasizes on the importance of diagnostically purposed assessment with saying that ‘‘...if you cannot identify what specific knowledge, skills, attitudes, and other learning targets are important, it is unlikely that students, parents, or the teacher will know when they have been successful’’ (p. 5).

During the instruction, on the other hand, teachers make ongoing assessments in order to respond students properly and make them concentrate on the tasks (McMillan, 2007a). During that process, teachers’ decisions mostly form by their informal observations and perceptions (Airasian & Russell, 2008). Teachers use these observations and perceptions in order to control the class, to make momentary decisions about student problems, to take the next step in a lesson, and to understand the way students are reacting to instruction (Airasian & Russell, 2008). Since ‘‘such informal assessments are used primarily to form or alter ongoing classroom processes or activities, they are called *formative assessments*’’ (p. 124). Deneen and Deneen (2008), likewise, defines formative assessment as ‘‘informative assessment’’ since ‘‘its purpose is to help students and teachers understand what students have learned and what they need to study next.’’ (p. 49). Moreover they indicate the qualities of formative assessment as follows: it occurs every day in any classroom and should give rapid results; it remarks a teacher’s understanding of student learning, not a specific grade; it does not detect grades or reports to school, city, or country authorities; it can be used to modify a lesson, a content, or a teaching method of a complete curriculum; and it underlines assessment for learning, not assessment of learning (Deneen & Deneen, 2008).

Black and William (1998) imply that, the formative assessment is composed of two parts: carrying out activities to gather information about students’ understandings and progress; and using this information to modify both teaching and learning. These two parts can be undertaken by either the teachers or the students. Teachers’ role in formative assessment, on the other hand, can be explained with a feedback loop (Sadler, 1983): attending to goals, devising strategies to reach the goals, and monitoring the discrepancy between actual and desired performance (p. 63).

Besides using for monitoring or grading, classroom assessment process and results can be used for supporting student achievement, too (Stiggins, 2007). Well-developed assessment strategies such as oral questioning, writing prompts, and short quizzes are carried out in the classrooms for the purpose of formative assessment (Fisher & Frey, 2007). These basic strategies help a teacher if s/he wants to gather detailed information about the students' understandings and misunderstandings (Davidheiser, 2013). In that manner Stiggins (2007) states that, building assessment environments with a mission of maximizing student achievement and making assessments (e.g. daily in the classrooms to support learning) which give dependable results about students' achievement are important to make formative assessments more efficient. The understandings and policy arrangements of the school administrations for the classrooms, buildings, or districts, on the other hand, can be helpful to develop and implement sound formative assessment practices in the classrooms (Stiggins, 2007).

Butler and Winne (1995), distinctively, emphasize the cognitive and motivational factors of formative assessment. Therefore students can either realize their learning level (cognitive factor) or they can develop feelings of control for their own learning (motivational factor). McMillan (2007b), also, tells that teachers intend to improve students' motivation and learning by formative assessment. To reach this goal he offers a formative assessment cycle. This cycle represents a continuing process including teachers' evaluations of students work and behavior, feedback to students, and instructional correctiveness. In Figure 2.2 this formative cycle is visualized:

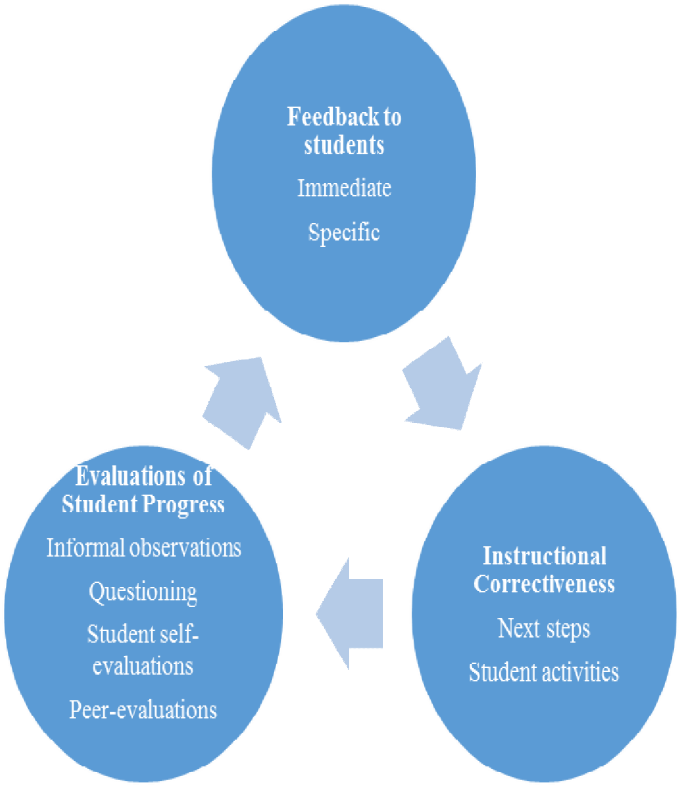


Figure 2.2 Formative Assessment Cycle (McMillan, 2007b, p. 3)

McMillan (2007b) states that teachers get feedback about what students can or cannot do by informal observations, asking questions or monitoring students. Then they use this specific feedback to broaden students' current understandings, improve their learning or correct their misunderstandings. This is the instructional correctiveness stage of the formative assessment cycle (McMillan, 2007b). The cycle is repeated in such a system. In each of the stages student engagements also take place.

For summatively purposed assessment, teachers conduct tests or summarize the achievement of students across a period of time up to the reporting date (Harlen, 2007). Moreover teachers use the data of summative assessments for grading, keeping records, reporting to parents or other teachers, or following the progress (Harlen, 2007).

Unlike formative assessment implementations, teachers may conduct more complex exams on larger scales for summative assessment purposes (McMillan, 2007b). This is because of the fact that summative exams usually measure a large swath of the curriculum, sometimes an entire course (Deneen & Deneen, 2008). "For purposes of both validity and reliability, test questions should touch on most of the important learning that's being tested'' (Deneen & Deneen, 2008, p. 52).

2.1.2 The Assessment and Evaluation Stages

''Teachers need to know about their students' learning, their progress, and the level of formality they are operating at so that they can adapt their teaching strategies to meet the pupils' needs'' (De Lange, 1999, p. 4). Moreover, they can determine the differentiation of the traits, behavior or academic performances by using measurement methods for assigning numbers to students' behavior or performances (Airasian & Russell, 2008). These methods, on the other hand, can take form of a variety of ways that range from ''observations and discussions to multi-step tasks and projects, from self-assessment and homework to oral presentations'' (De Lange, 1999, p. 4). Gallagher (1998) asserts that such implementations would be more helpful for teachers to give detailed feedback to students, educators, parents, and policy makers about how well students are learning.

Assessment can be formal or informal (Marsh, 2009). Informal assessment can be done through day-to-day practice such as asking questions during the lessons or classroom observations (Atkin, Black, & Coffey, 2001; Marsh, 2009; Yorke, 2003). Formal assessments, on the other hand, are more planned practices which are conducted after a lesson, a unit or end of a course (Firestone, Schorr & Monfils, 2004; Marsh, 2009).

In the evaluation process, on the other hand, McMillan (2007a) underlines the use of criteria. He claims that using criteria provides teachers certain guidelines for unbiased and consistent judgments. In education, criteria are named as rubric, scoring criteria, or scoring guidelines and defined as the ''descriptions of facets or dimensions of student performance that are used for judging the level of achievement'' (McMillan, 2007a, p. 36). It has also other names such as ''rating

instruction'', ''basic criterion assessment'', ''assessment form'', ''assessment criterion'' (Butler & McMunn, 2006; Stiggins, 2005). Teachers may evaluate students' quantitative performances with some words like good, average, or poor (McMillan, 2007a), too. If they have a well-defined, clear criteria, then they can tell what they mean by ''good'', ''average'', ''poor'', or ''excellent'' during the evaluation process (Stiggins, 2005). Moreover they can easily communicate their instructional goals and way of making judgments to parents and students by using these criteria (McMillan, 2007a).

Stiggins (2005), on the other hand, emphasizes the use of scoring-guides in performance assessment. He states that, in contrast with other assessment methods, there is not a definite right or wrong answer of performance assessment (Stiggins, 2005). Instead, there are degrees of being successful or unsuccessful. In order to identify these degrees, on the other hand, performance-tasks are evaluated by using scoring-guides (Stiggins, 2005). With the rating criterion, the teachers can understand the qualification degree of the students about a given task. In brief, using rubrics provide two advantages: a support to reach the defined criteria of the task, and feedbacks to improve students' performances (Stiggins, 2005).

McMillan (2007a) acknowledges that such evaluation method occurs according to the performance standards. He also states that, the decisions are changeable according to the teachers' point of view. For instance, a teacher may determine average for a student score of 60 points from a test, while another teacher may interpret it as 'poor' (McMillan, 2007a).

2.1.3 Use of Evaluation Results Stage

It is a need to be careful about the way assessment is used because incorrect assessment of achievement may prevent students from attaining their academic potential (Stiggins, 2001). According to the classroom assessment chart of McMillan (2007a), on the other hand, teachers use the evaluation results for three main purposes: for making diagnostic decisions, for grading the students' work, and for making instructional decision.

First of all the diagnostic and grading uses of the assessment can be explained. For instance, for diagnostic decisions, teachers use the assessment results in order to understand the students' strengths, weaknesses, and needs (Popham, 2011). After diagnosing the specific data, teachers can carry out supplemental activities to the students (Airasian & Russell, 2008). During the grading process, on the other hand, teachers assign a grade to the students. For that aim they are mostly adhered to grading measures (Butler & McMunn, 2006). Grading is helpful for motivating the students, for rewarding them, or for giving feedback to their parents (McMillan, 2007a).

Ussher and Earl (2010) stated that a teacher may choose to use assessment results for a variety of purposes. In other words it is not a rule that a teacher can use a summatively purposed assessment only for grading. In that manner they claim that information gathered by the assessment tools could be used both formatively and summatively (Ussher & Earl, 2010). Teachers may set out to give children an assessment task such as a test. They may intend to use the evidence in their overall grading process (Ussher & Earl, 2010). However, it may be clear that some of the assessment evidences should be used formatively as well (Ussher & Earl, 2010).

Lastly, the evaluations give teachers clues about the quality of their own instructional efforts (Popham, 2011). They understand the ongoing process of a topic and the planning framework of that topic (McMillan, 2007a). Thus they may decide to end a lecture or continue with different type of questions; or may give extra time to implement worksheets, to review a topic, or to observe students in a group work according to the evaluations (Airasian & Russell, 2008). McMillan (2007a) states that after instruction, teachers gather information for grading students' studies and for evaluating teaching, curriculum, or school programs. In Figure 2.3, as developed from McMillan (2007a), how assessment is related with each stage of instruction is visualized:

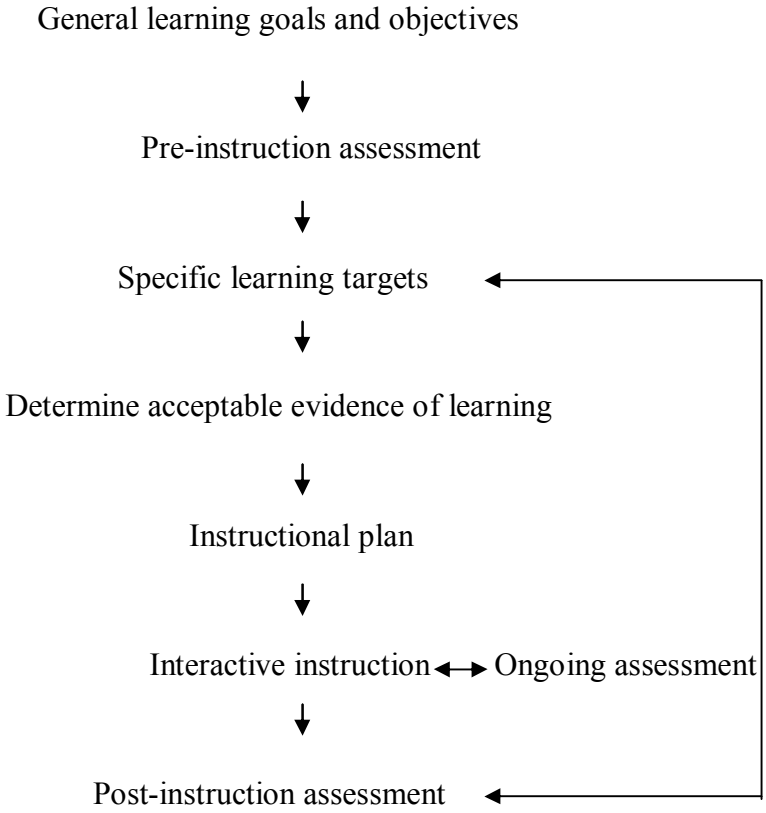


Figure 2.3 Relationships between Instruction and Assessment (McMillan 2007a, p. 7)

2.2 A Brief History of Assessment

Although the term 'assessment' is relatively a recent word in the field of education, formal and informal assessment of learning has existed for centuries (Earl, 2003). In other words ''the process of gathering information about student performance and using it in schools has had a long and contentious history'' (Earl, 2003, p. 5). Although testing was started as a policy mechanism in 210 B.C.E (Before the Christian Era) in China, there were only four kinds of assessment methods (Madaus & O'Dwyer, 1999). These were; giving written or oral answers to a series of questions; producing a product; acting a performance; and answering multiple choice or true-false questions (Madaus & O'Dwyer, 1999). However short answer or multiple choice questions were not common until 1920s (Earl, 2003).

Instead teachers were grading students' performances by grading their products and by oral exams. Wolf (1995) emphasized that teachers started to apply the multiple choice or short answer questions after a need is emerged for broadening the subject matter domain achievements of the students. Needs on the extremely subjective evaluations on students' performances, also, forced the teachers to use such classical assessment methods (Wolf, 1995).

In the pre-modern period, assessment implementations of China outshine the other nations (Kilpatrick, 1993). China assessed the performance of the candidates in order to select the most skillful personnel for military and civil service (Kilpatrick, 1993). Such a system was used to create a meritocratic social society in government (Madaus & O'Dwyer, 1999). In meritocracy, people can get status according to their achievements rather than according to their social positions or prosperities (Madaus & O'Dwyer, 1999). In order to get a civil degree, a person had to achieve some goals based on Confucian classics like memorizing poetry, discussing any passage, or making comments about Confucian classics (Madaus & O'Dwyer, 1999). Then, in some cases, China government came to the point that some steps of these assessments were very subjective, so they preferred to assess a person's reasoning ability, too (Madaus & O'Dwyer, 1999). To become a member of the military service, on the other hand, the assessment was carried out again by memorized military classics and by physical military performances (Madaus & O'Dwyer, 1999). In addition to these two ways, the candidates had to pass a job related test (Wilbrink, 1997). According to their success, they got points from 2 to 0 and the total score was their assessment score about that test (Wilbrink, 1997). China has been criticized because of its selection-based education system. For instance, Wilbrink (1997) emphasizes that since it is not productive, a selection can be effective only it is in balance with education and assessment.

In Europe, quantifying an achievement was started by performance assessment (Madaus & O'Dwyer, 1999). Until 14th century, qualitative methods such as oral exams were used commonly because of the high cost of paper. In 12th century, University of Paris and University of Bologna were the first in using examinations (Madaus & O'Dwyer, 1999). These were oral exams assessing the students' knowledge on a fixed canon. Madaus and O'Dwyer (1999) tell that there were three levels for the members of craft guild, in the 14th century. These were apprentices,

journeymen, and masters. A child was trained to become a master man and he was an apprentice at first (Madaus & O'Dwyer, 1999). Then he was taking a simple and practical examination. In this examination, his mission was to produce a masterpiece which was related to the apprentice's or journeyman's craft. The candidate's conscious about what he experienced during his task was the evaluation criteria of the assessment experts. Such assessment methods were used in lots of areas. People were assessed in order to become a priest, to become a member of any guild, to get a graduate degree from arts faculty, or to get a proficient degree on grammar by similar assessment methods (Madaus & O'Dwyer, 1999).

By the time 1845, written exams started to be used in Boston instead of oral exams (Madaus & O'Dwyer, 1999). Horace Man, an education reformist, was the leader of this change. It was understood that under the same conditions with oral exams, written exams took less time (Madaus & O'Dwyer, 1999). Moreover, comparing the achievement of the schools became easier. The discussions on the effectiveness of the teachers and schools were made by the authorities. In addition, students started to pass their classes by the evaluations of their performances on the short-answer and essay type written exams (Madaus & O'Dwyer, 1999).

Wundt and Cattell established mental and psychology testing labs in the end of 19th century (Baştürk, 2005). It was the time that the individual differences between the species were accepted as the materials for natural selection. Their studies highlighted the development of the tests assessing individual differences (Baştürk, 2005). The first successful intelligence test was developed by Alfred Binnet in order to distinguish the students who could engage in classroom activities from the ones who could not (Drummond, 1996). In the first world war, identifying the positions of the soldiers were also done by tests (Baştürk, 2005). In 1940s and 1950s, statistics became popular in social science (Baştürk, 2005). In the middle of the 20th century, on the other hand, the rise in the middle class and capitalism made schools become the key to social mobility (Earl, 2003). Moreover ''there was considerable pressure to ensure that decisions about access to advanced schooling were made based on merit, rather than social status'' (Earl, 2003, p. 6). After then the development of the tests got a different meaning. In 1960s and 1970s, for instance, computers made the item analysis become easier (Baştürk, 2005). From the

beginnings of 1980s, constructing and evaluating tests have been easier and faster since the personal computers became popular (Sampson, 1992).

Throughout centuries, teacher-centered education took place (Earl, 2003). It was thought that learning can take place in a situation where teachers tell and demonstrate the rules or information, and the students practice them, after. In order to assess the students' achievement, they preferred using multiple-choice questions but the education authorities thought that multiple-choice tests were unable to assess students' abilities for producing answers (Earl, 2003). Teachers, also, needed to restrict the classroom activities since testing was the basic aim of the education (Earl, 2003). Thus educators wanted to solve the stranglehold of multiple-choice tests on education (Earl, 2003). They thought that teachers need to implement more authentic assessments. For instance in the end of 1980s, performance-based assessment is offered for creating a realistic basis for the learning-teaching process (Baker, O'Neill & Linn, 1993).

Today, with the help of assessment methods other than multiple-choice tests teachers can directly observe and evaluate a student's problem solving process, decisions, group work, presentations, and portfolios by the tasks and situations composed in the assessment period (Kubiszyn & Borich, 2003). Sometimes abilities of the teachers may not be enough to obtain a sufficient assessment process. At that point Taymaz (1997) points out that the preferences of teachers play important role in establishing the right instructional method-effective assessment connection. Thompson (1984), also, emphasizes that a teacher's behaviors in the classroom are reflections of his/her beliefs, roles, and priorities. In that manner, Worthen et. al., (1999) confirmed that in order to create a consistent environment between the assessment methods and implications, assessment methods may encourage teachers to become more reflective practitioners. They may help teachers advocate grades, organize instruction, and realize the difficulties and misconceptions.

2.3 Curriculum, Textbooks and Classroom Assessment

In United States, curriculum reforms are developed in the light of the studies conducted by National Council of Teachers of Mathematics (NCTM, 1989; 2000). It

was claimed by the studies that, in order to encourage learning, curriculum, instruction, and assessment activities should be connected (NRC, 2001).

In order to investigate how curriculum, instruction, and assessment are connected, some arguments have been put forward. Popham (2011) advocates that curriculum influences teachers' classroom instructions, and thereafter teachers' assessment practices occurs. Harlen (2007), on the other hand, represented the relationship of assessment, curriculum, and teaching methods by a triangle. Sireci (2008), also, disputed a cyclic relationship between the assessment process, instruction and curriculum.

Curriculum materials, mostly the textbooks, are the physical resources which are used to support teacher planning and enactment of the lesson during the implementation of the curriculum content (Lloyd, 2009). The textbooks, workbooks, manipulatives, posters or figures are the kinds of curriculum materials which are used in the classrooms (Ball & Cohen, 1996). They provide activities and instructional opinions such as lesson plans, sample mathematics problems, assignments, and tasks (Davis & Krajcik, 2005). Therefore ''the textbook stimulates teachers' thinking'' (Elsaleh, 2010, p. 178) and teachers rely on textbooks since they are easy to use and efficient in planning (Elsaleh, 2010).

Teachers use the curriculum materials for guiding students' gaining, academic tendencies, and reasoning abilities (Battista & Clements, 2000). Studies, also, showed that the reflection on students' work with curriculum materials can be helpful for mathematics teachers to determine and solve the problems of their teaching practices (Clarke, 1997 & Wood et. al., 1990).

Lloyd et. al. (2009) pointed out to the interactive relationship between the teachers and curriculum materials and added that ''curriculum materials can influence teachers' beliefs, knowledge, and classroom practices. However, teachers change the recommendations of curriculum materials through selective use and interpretations'' (p. 3). In the manner of his thoughts about the curriculum materials, Lloyd (2009) conducted a study with five pre-service mathematics teachers. His aim was to examine the teachers' views of and interactions with the curriculum materials in United States. In the study, the pre-service mathematics teachers' interview

transcripts indicated that teachers use of textbooks influenced their thinking about teaching and learning.

Smith (2000) also conducted a study with a secondary school mathematics teacher in California. He aimed to seek variations in the classroom assessment practices. The participant was using reformed curriculum materials for her pre-algebra students whereas she was continuing to use a traditional textbook in her algebra class. It was emphasized with this study that curriculum, together with teaching, linked teaching goals with learning. Moreover, learning was linked to these goals by assessment process. These four components, on the other hand, constructed the following instructional loop (Smith, 2000):

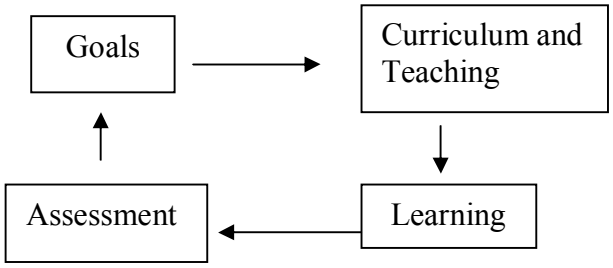


Figure 2.4 Assessment Links Learning with Goals (Smith, 2000, p. 21)

Such a relationship can be observed on different steps of education. For instance Superfine (2008) implied that there was an effect of curriculum materials on teachers' various conceptions. In her study, with three 6th grade teachers, she proposed a model to understand the nature of the teachers' decisions and the conditions under which these decisions changed by time. She revealed that teachers used the curriculum materials as a beginning for their lessons. For instance, in the planning process, knowing the content of the textbook was a need for the teachers in order to teach.

Remillard (1999) also pays attention to the role of textbooks in mathematics assessment. According to him, in order to understand teachers' assessment practices in mathematics classrooms, it was important to investigate the way teachers interact

with textbooks. In his study with two 5th grade mathematics teachers, he examined the teachers' interactions with a new textbook. The study indicated that, textbooks were the exact representations of the curriculum and teachers interacted with them. Moreover, according to his findings, he offered a framework to represent the stages in which the mathematics' teachers engaged with curriculum development. In that manner, the study showed that, the teachers interacted with the textbooks in the selection and designing stages of their mathematical tasks.

There are also studies showing that, teachers did not follow the suggestions of the curriculum materials literally in mathematics classrooms (Freeman & Porter, 1989; Stodolsky, 1989). For instance, teachers were attached to the content topics defined in the textbooks but they were acting free about the related instructional suggestions. Furthermore, some of them made adjustments to the lessons; some supported the lessons with supplemental activities; some of them, on the other hand, preferred to omit the whole lesson (Elsaleh, 2010). Besides making preferences about the implementation of the textbooks, some teachers used the worksheets or other materials that they selected instead of using textbooks (Elsaleh, 2010).

2.4 The Role of Assessment in Teaching

It is advocated by the studies that assessment is done to carry out the improvement of teaching and learning process, accountability of students for learning to finish schools, and accountability of teachers and schools (Heaton, 1975; Torrance & Pryor, 1998; Warren & Nisbet, 1999; Webb, 1992). Therefore researchers take attention to the importance of suitable assessment methods in mathematics lessons (Herman, Aschbacher & Winter, 1992; Pilten, 2001).

Suah and Ong (2012), first of all, conducted a study with 406 in-service teachers in order to investigate the assessment practices of in-service teachers. The study revealed that, teachers spend 10% to 50% of classroom time for the assessment activities in order to grade and group students, to identify student needs, to improve students' learning motivation, and to evaluate the instruction strategies (Suah & Ong, 2012).

Wiliam and Leahy (2007), on the other hand, stated that with the help of formative assessment implementations, students got feedback to improve their learning, the governments learned the needs for improving the quality of learning, and teachers understood the topics on which they needed to make improvements. However, Torrance and Pryor (2001) revealed that the way of using assessment data for planning the needs of all students was not clear to the teachers. They collaborated with a group of teacher-researchers and built a study. The aim was to put the ideas about formative assessment generated by them in the past (Torrance & Pryor, 1998) to the test of practice. It was a project-study conducted to investigate and develop formative classroom assessments in English primary schools. Torrance and Pryor (2001) reported the outcomes of that project-study and at the end they constructed a framework of the formative assessment in practice. In figure 2.5 this framework is represented:

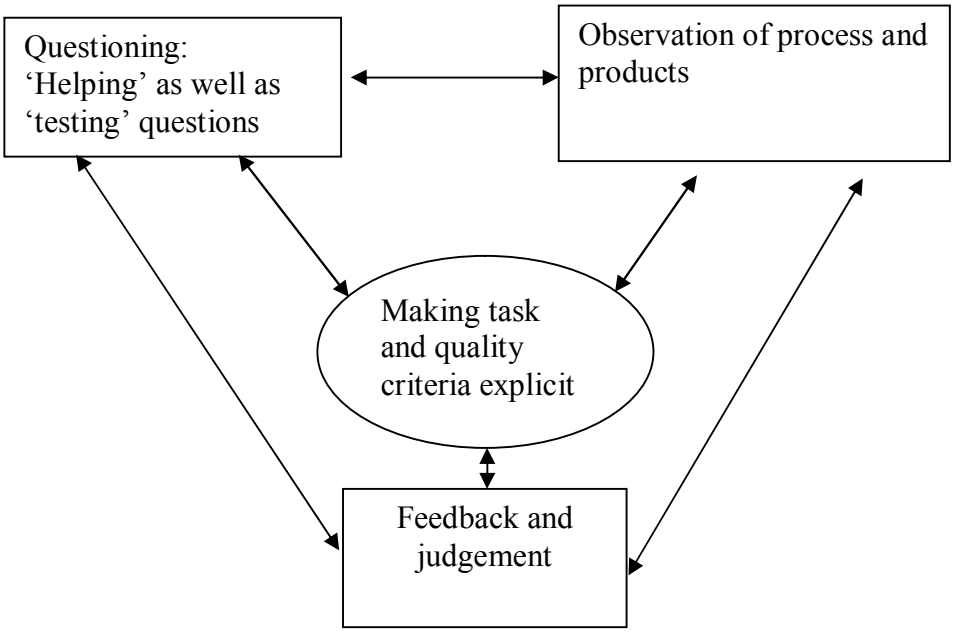


Figure 2.5 Formative assessments in practice (Torrance and Pryor, 2001, p. 623)

It can be seen by Figure 2.5 that, Torrance and Pryor (2001) put clarity of task and quality criteria at the core of formative classroom assessment. The whole model,

on the other hand, is a transmission-oriented one including a dynamic interaction of questioning, observation and feedback.

In order to investigate the effect of assigning homework on the 6th grades' mathematics achievement, Rosário, Núñez, Vallejo, Cunha, Nunes, Mourão, and Pinto (2015) conducted a study with 27 mathematics teachers and 638 students. The results showed that homework positively impacted students' mathematics achievement. However this positive impact was not related to the amount of homework.

2.5 Research on Teachers' Classroom Assessment Practices

In order to determine how assessment takes place in the classrooms, mostly in mathematics classes, in what way the teachers used the assessment results, or the problems that occurred during the assessment processes, a lot of studies have been conducted both in Turkey and in the world:

Türnüklü (2003), for instance, developed a study in Turkey and in England to understand the way mathematics teachers collect, record, and use the assessment results of the students. The participants of the study were 12 mathematics teachers who were teaching to 11-14 years old students. As a summary of her study, she took attention to the importance of communication between student and teacher. She, also, advocated that teachers should create opportunity to the students for performing more activities in mathematics lessons during the assessment process.

Borko et al. (1992) and Raymond (1997) agreed on that, teachers should have the abilities of using the results of the classroom assessment methods. Shulman (1980) also claimed that teachers used assessment results mostly for assigning grades However, Trotman (1997) conducted a study with 20 secondary school mathematics teachers in Caribbean. With her study, she tried to figure out the teachers' classroom assessment practices. According to the results, teachers mostly preferred classroom observations as an informal classroom assessment. The study also showed that, the teachers used the assessment results mostly for understanding what a student knows, monitoring students' progress, motivating students, learning the difficulties that the students encounter, providing feedback to students, obtaining instructional feedback

(such as planning and informing instruction, monitoring or testing effectiveness of teaching), grading, measuring students' attainment, providing opportunities for creative and critical thinking.

Similar with Trotman (1997), Abdul Rahim (2012) conducted a research on the mathematics teachers' classroom assessment. It was a qualitative study with five mathematics teachers. The study indicated that the teachers used the assessment results for evaluating students' understandings, realizing the suitability or efficiency of teaching, encouraging self-study among the students, understanding students' strengths and weaknesses, grading, and monitoring the students' progress in mathematics.

Uçar (2007) also conducted a study with 306 elementary school teachers from 29 public schools in Kırıkkale, Ankara, and Malatya. The purpose of her study was to explore the views of elementary school teachers about their implementation of the assessment methods recommended in the mathematics curriculum. The results of the study showed that teachers used the assessment results mostly for improving their teaching methods, efficiency, etc. They also stated that they wanted to use alternative assessment methods but they could not use them because of the lack of time.

Watson (2000), in her study of *''Mathematics teachers as acting informal assessors: practices, problems and recommendations''*, investigated the assessment practices of mathematics teachers (teaching to primary, middle, or secondary grades). She represented a model to visualize the components of classroom assessment. The main component of the model was observation. According to her findings, teachers observed students' views and knowledge about mathematics by tests, by their oral and written work. They used these observations and interpersonal knowledge of the students to make judgments about students' mathematical work. The actions which reflected the views and knowledge of mathematics, on the other hand, were also affected by students' psychological attributes. Therefore, teachers should also observe students' psychological attributes such as ability, memory, or concept acquisition by their classroom obervations.

Watt (2005) also conducted a study to investigate teachers' attitudes towards alternative assessment methods offered in secondary mathematics curriculum in Sydney. There were 60 mathematics teachers from 11 secondary schools as

participants. Least experienced participants reported positive attitudes towards the alternative assessment methods. However, they mostly preferred to use traditional assessment methods. Some participants, also, told that alternative methods like student journals were not suitable for mathematics classrooms.

In addition to the study of Watt (2005), Greenstein (2004) conducted a study to examine how high school teachers assessed student learning and how they used the information from classroom assessment to inform and guide instruction. For this purpose she carried out interviews with 115 teachers in Connecticut-USA. It was indicated in the study that disconnection existed between instruction and assessment, and teachers had limited assessment literacy. On the other hand, she figured out with her study that, the teachers used their assessment results mostly for assigning grades, for giving formative feedback to students in order to revise their work, for re-teaching a topic, and for identification of the students' strengths and weaknesses.

In order to examine the teachers' purposes for the formative and summative assessments, Segers and Tillema (2011), conducted a study with 351 secondary school teachers. The results indicated that, the teachers did not distinguish between formative and summative purposes of assessment. Besides a teacher chose to use assessment information for a variety of purposes (Segers & Tillema, 2011). Al Duwairi (2013) also conducted a study with 120 secondary school mathematics teachers. In his study, he investigated the secondary school mathematics teachers' conceptions and practices of the assessment models. His study showed that teachers' formative assessments involved both the formal and informal assessments.

There are also studies constructed to examine whether teachers' assessment preferences change in relation with their teaching experiences. However some of these studies indicated that, teachers with experience or teachers who were trained in measurement used performance or observation methods much more efficiently than the inexperienced teachers (Bol et. al., 1998; Zhang & Burry-Stock, 1997). Moreover the experienced teachers had the capacity of making changes in the practices of their assessment methods if they needed to. (Kaynak, 2000).

2.5.1 Teachers' Project and Performance Assessment Practices

In general, performance assessment helps teachers to examine how well students can use knowledge because it gives students the chance of applying and establishing their academic content knowledge on the real world problem solutions (Acar & Anıl 2009; MoNE, 2013c). The mathematics curriculum of Turkey includes content and skill objectives. To assess the skill objectives, teachers need to use performance assessment strategies more often (Acar & Anıl, 2009).

Brualdi-Timmins (1998), on the other hand, advocates that performance assessment cannot be done by short answer questions. He goes on to say that to be successful or unsuccessful have some degrees and if we want to identify these degrees we need to use performance assessment strategies. In order to identify these degrees, on the other hand, performance-tasks are used. According to Hibbard et. al. (1996), performance-tasks can be both short activities and long-term projects. He summarized the importance of performance-tasks as follows:

> Performance-tasks build on earlier content knowledge, process skills, and work habits and are strategically placed in the lesson or unit to enhance learning as the student "pulls it all together." Such performance-tasks are not "add-ons" at the end of instruction. They are both an integral part of the learning and an opportunity to assess the quality of student performance. When the goal of teaching and learning is knowing and using, the performance-based classroom emerges (p. 6).

Mertler (1999) studied with 625 participants in order to investigate the assessment practices of Ohio State teachers. Approximately one-fourth of the participants were teaching to elementary level. The study showed that, elementary school teachers used portfolios, informal questions and observations in order to assess students' mathematics performances.

Stiggins and Bridgeford (1985), on the other hand, conducted a study with teachers who were teaching different courses to different groups in various school districts. They applied questionnaires including items to learn concerns about assessment, use of performance assessment, and patterns of test use. The aim of the

study was to broaden the understanding of classroom assessment by examining the nature and quality of teacher-developed classroom assessments. It was revealed by the study that, about half of the participants felt comfortable with performance-assessment methods and defined performance assessment as a key tool for assessment.

Some studies showed that, teachers apply performance-based assessment methods infrequently since they do not feel confidence about the fairness of these assessment methods (Cooney et. al., 1996; Ohlsen, 2007). Furthermore Parsad, Lewis, and Farris (2001) conducted a study with 5,253 public school teachers teaching in 50 different states and in the district of Columbia in order to examine the quality of the nation's public education system. This was a nationally representative sample. Questionnaires were emailed to the participants. It was indicated by the study that only 37 % of these teachers felt very well prepared to use performance assessment methods.

In Turkey, performance-tasks are the most common performance-based assessment methods (Duban & Küçükyılmaz, 2008). In that manner, Yılmaz and Benli (2011) constructed a study to examine primary school teachers' performance-task practices. They administered questionnaires to 309 primary school teachers from 147 different elementary schools in Hatay. The study showed that, teachers presented choices to the students about the performance-task topics. Students had the chance of selecting a task which seems more related with their interests. The topics were parallel with the curriculum. Suitable resources related with the tasks were also reachable for the students. During the students' performance studies, teachers helped them as a guide. They did not hesitate to explain the misunderstood part of the tasks, they checked the student's studies during the process, and they gave feedback to the students, and helped in their research. At the beginning of the task, on the other hand, a criterion list or a rubric were given to the students. Teachers used these rubrics while they were evaluating students' performance-tasks. They did not only focus on the content of the tasks but also some other factors like using charts or tables, using Turkish grammar efficiently, writing clear and coordinated, using different resources, making the mathematics solutions in the right order, etc.

In lots of the studies in Turkey, it was revealed that performance-tasks encouraged students for making research and improving their content skills (Coşkun et. al., 2009; Güvey, 2009; Selanik-Ay et. al., 2008). However, research studies also confirmed that teachers were worried about the aim, content, or their own ways for the application and evaluation of the performance-tasks (Meydan & Öztürk 2008; Tüfekçioğlu & Turgut, 2008). In that manner, they were mostly worried about assessing students' products or responses fairly. Some problems like inadequate time, inefficient usage of internet, economic burden of the tasks, and redundant help of parents were also examined by the studies (Belet & Girmen, 2007; Coşkun et. al., 2009; Yılmaz & Benli, 2011).

For instance, Acar and Anıl (2009) constructed a study with 252 primary school teachers. They investigated the factors that affected primary school teachers' capability of using performance assessment, portfolio, and rubric in assessment period. During the study, the researchers also investigated the problems that the teachers met during the implementation of performance-tasks. It was indicated by the research that, parents sometimes participated to the data collection and construction process more than expected (Acar & Anıl, 2009).

Baki and Bütüner (2009) also conducted a qualitative study with three teachers in order to examine their project-study practices. One of the teachers was a Turkish teacher, the second one was science and technology teacher and the last one was a primary school teacher. The study showed that, the teachers were not self-satisfied with their supervision of students in project processes. They also had problems in assigning appropriate project-tasks. The students did not seem to use authentic inquiry processes. They usually used printouts taken from the internet, wrote them down on their papers and submitted them to their teachers. The teachers assessed students' projects mostly based on their paper-and-pencil exam scores. In that manner, they awarded the students who had taken high grades from the exams with undeservedly high grades in the projects. For the lower performance students, on the other hand, they assigned grades that were sufficient to pass. The students also thought that, the projects would help them to pass a course in which they were low-achievers.

Arı (2011) investigated the teachers' problems during their performance-task and project practices. In that manner he developed a scale and conducted a study with 242 expert teachers with the help of his scale. According to the statistical analysis of the research, the lesson durations that were defined for the performance tasks were not enough to implement them in classrooms. In order to complete the tasks students needed additional time. Moreover students got their project and performance-tasks done to either their families or someone else. Besides, the students spent their time with playing games on the internet or at internet cafes under the pretext of making research for their projects and performance-tasks. Coming together and studying as pair or in groups also were problems for the students during their group projects.

2.6 Teachers' Views, Thoughts, and Knowledge about Classroom Assessment

Teachers' views, thoughts, knowledge about classroom assessment were also studied by the researchers. For instance, in some of the studies it was showed that, teachers' knowledge of mathematics and assessment of mathematics were generally not comprehensive (Bıçak & Çakan, 2004; Daniel & King, 1998; Güven, 2001; Temel, 1991; Yanpar, 1992). There are also studies indicating that teachers' beliefs and views about teaching, learning, or curriculum strongly affect teachers' teaching and classroom assessment activities, students' learning issues, and students' achievements (Brown, 2004; Calderhead, 1996; Clark & Peterson, 1986; Heaton, 1992; Pajares, 1992; Pepin, 1999; Prawat, 1992; Putnam, 1992; Remillard, 1992; Teo, 1997; Thompson, 1992; Yılmaz, 2006).

Erdal (2007), for instance, investigated the views of the elementary school teachers about assessment methods. He conducted a study with 200 elementary school teachers in Afyonkarahisar in 2006-2007 academic year. It was indicated with the study that, teachers tended to use alternative assessment methods but they could not prevent themselves to use existing assessment methods such as multiple choice tests. They made such choices since they did not feel themselves sufficient to use the alternative assessment methods.

Teachers' views about assessment methods affected them during the implementation of the methods (Bıçak & Çakan, 2004; Doğan, 2005; Duban & Küçükyılmaz, 2008; Gelbal & Kelecioğlu, 2007). For instance, some methods like paper-pencil tests may seem more powerful to the teachers since they had much experience on it (Bıçak & Çakan, 2004; Doğan, 2005) Besides, participant teachers of these studies remarked that, they were not sure whether they were assessing students' performance truly and appropriately.

In some studies, researchers figured out that teachers had missing knowledge about preparing, using, or applying equipments of assessments (Çakan, 2004; Pilten, 2001; Tienken & Wilson, 2001). Besides, some teachers adopted the assessment practices that were applied on them when they were students or that were being used by their departments (Taylor & Nolen, 1996). Moreover, they sometimes felt themselves inadequate during the assessment processes (Çakan, 2004; Pilten, 2001). Although they felt themselves insufficient, they carried on applying assessment methods (Nolen, Haladyna, & Haas, 1992; Stiggins & Conklin, 1992).

Peker and Gülle (2011), also, conducted a study to analyze the knowledge of elementary school teachers and the percentage of their use of assessment tools recommended in the mathematics curriculum. Questionnaires were applied to 131 elementary school mathematics teachers. The results of the study confirmed that, the relationship between teachers' knowledge level about the assessment materials and percentage of using these tools was linearly positive.

Similar with Peker and Gülle (2011), Remillard (1999) conducted a study with a 5^{th} grade mathematics teacher. It was indicated with the study that, teachers' classroom practices were often combined with their own thoughts and plans. Therefore assessment practices might cause inconvenient results if the teachers had missing or insufficient knowledge about these assessment methods (Remillard, 1999). For instance, Wiggins (1991) named many portfolios as unconnected student work collections because of their inadequately developed performance-based assessment involvements.

Lastly, the researchers also took attention to the discrepancy between the teachers' views and their assessment practices. For instance, in their study Mulhall and Taylor (1998) asked teachers to rank their teaching methods. The results showed

that, the teachers tended to rank the methods of teaching according to what they were taught in their teacher training. They did not report their own practices. Susuwele-Banda (2005) also conducted a study with six mathematics teachers for examining the relation between the teachers' perceptions of classroom assessment in mathematics and their classroom assessments practices. The results indicated that, there was a clear discrepancy between what the teachers said they did and what they practiced in the classroom. According to Kersaint and Thompson (2001), the discrepancy between the teachers' thoughts and their practices was because of the lack of collaboration between the schools and the faculties that educated the teachers. In that manner they stated that, during their teaching practice courses, the pre-service teachers practiced their theoretical knowledge in very well-developed schools. However, most of the time, they could not work in such schools during their teaching careers (Kersaint & Thompson, 2011). Therefore, they stated what they wanted to do but they could not activate their thoughts in their instruction practices.

2.7 Summary of the Related Literature

According to the related literature, the classroom assessment procedure can be completed under the headings of purpose, assessment, evaluation, and use (McMillan, 2007a). Although there are different arguments about the ways of classroom assessment, the researchers emphasize on the formative, summative, and diagnostic purposes for assessment (Airasian & Russell, 2008; Black & Wiliam, 1998; Butler & McMunn, 2006; Butler & Winne, 1995; Crisp, 2012; Davidheiser, 2013; Deneen & Deneen, 2008; Earl, 2003; Fisher & Frey, 2007; Hackling, 2004; Harlen, 2007; Hattie, 2003; Keeley & Tobey, 2011; McMillan, 2007a; Popham, 2011; Sach, 2012; Sadler, 1989; Stiggins, 2007).

The assessment and the evaluation stages of the assessment, on the other hand, are discussed under the formal and informal assessment methods with the researchers (Atkin et. al., 2001; Butler & McMunn, 2006; Gallagher, 1998; Marsh, 2009; McMillan, 2007a; Stiggins, 2005; Yorke, 2003).

Ministry of National Education advised that the results of the assessment implications may be used in shaping teaching strategies and in making future plans

for learning (MoNE, 2013c). The related literature, also, took attention to the teachers' diagnostic and instructional decisions, or grading issues (Airasian & Russell, 2008; Butler & McMunn, 2006; McMillan, 2007a; Popham, 2011). In that manner, Ussher and Earl (2010) stated that it was not an obligation that a summatively purposed assessment should be used only for grading. They advocated that, teachers could use their assessment results formatively or summatively.

The researchers discussed the relation between the curriculum materials and classroom assessment, too. The arguments were mostly focused on the textbooks, teachers' use of textbooks, and their interaction with the textbooks (Ball & Cohen, 1996; Battista & Clements, 2000; Clarke, 1997; Davis & Krajcik, 2005; Elsaleh, 2010; Harlen, 2007; Lloyd, 2009; Popham, 2011; Sireci, 2008; Wood et. al., 1990). The studies, also, figured out the effects of the textbooks on the teachers' thoughts (Lloyd, 2009; and Superfine, 2008), the relation between the curriculum, learning, and assessment (Remillard, 1999; Smith, 2000), and the teachers' various methods for using the textbooks (Elsaleh, 2010; Freeman & Porter, 1989; Stodolsky, 1989).

The role of assessment in teaching was also discussed in the literature. Some researchers underlined the role of assessment in the teaching and learning improvement (Heaton, 1975; Herman, Aschbacher & Winter, 1992; Pilten, 2001; Rosario et. al., 2015; Suah & Ong, 2012; Torrance & Pryor, 1998; Torrance & Pryor, 2001; Warren & Nisbet, 1999; Webb, 1992; Wiliam & Leahy, 2007). Torrance and Pryor (2001), also, constructed a formative assessment cycle in which the role of assessment was represented by a dynamic interaction of questioning, observation and feedback.

There are several studies about the teachers' classroom assessment practices. Some of them paid attention to the importance of communication between teachers and students (Türnüklü, 2003), some of them put emphasis on the teachers' adequacies for using the results of assessment practices (Borko et. al., 1992; and Raymond, 1997). Teachers' preferences in practicing assessment methods and using the assessment results, on the other hand, was the most common issue that was investigated by the researchers (Abdul Rahim, 2012; Bol et. al., 1998; Greenstein, 2004; Shulman, 1980; Trotman, 1997; Uçar, 2007; Watson, 2000; Zhang & Burry-Stock). Some of the studies also figured out that, teachers' attitudes towards

alternative assessment methods were positive at most of the time (Watt, 2005). Furthermore, Segers and Tillema (2011) indicated that the teachers did not distinguish the formative and summative purposes of assessment, they used the assessment results for variety of purposes. Al Duwairi (2013) also indicated the teachers' use of formal and informal assessment methods for formative purposes.

In the current study, the participating mathematics teachers' assessment practices were investigated. In that manner, the researcher did not only focus on their informal assessment methods or paper-and-pencil exam practices, she also tried to examine their project and performance-task practices. Project and performance assessment practices covered a large place in the literature arena. Some of the researchers took attention to the importance of performance assessment (Acar & Anıl 2009), and some of them emphasized on the way of performance assessment (Brualdi-Timmins, 1998; Hibbard et. al., 1996). It was indicated that the teachers used portfolios, informal questions, or observations for performance assessment (Mertler, 1999). Teachers' thoughts and feelings when they were using performance assessment methods were also investigated by the researchers (Cooney et. al., 1996; Ohlsen, 2007; Parsad, Lewis & Farris, 2001; Stiggins & Bridgeford, 1985).

The current study was constructed in Turkey and the participants were mostly dealing with the performance-task and project issues. Therefore, the studies that were conducted in Turkey about the performance-tasks and project-studies were also investigated. In that sense, it was observed that the researchers emphasized on the procedures of the teachers (Yılmaz & Benli, 2011), the benefits of the performance-tasks (Coşkun et. al., 2009; Güvey, 2009; Selanik-Ay et. al., 2008), teachers' worries about the performance-tasks (Meydan & Öztürk 2008; Tüfekçioğlu & Turgut, 2008), and the problems that the teachers had during their practices of the performance-tasks or project-studies (Acar & Anıl, 2009; Arı, 2011; Baki & Bütüner, 2009; Belet & Girmen, 2007; Coşkun et. al., 2009; Yılmaz & Benli, 2011).

Last of all, since it was another aim of the current study, the studies about the teachers' views, thoughts, and knowledge about the classroom assessment were explained. In that manner, some studies showed that the teachers' knowledge of mathematics and assessment of mathematics were generally not comprehensive (Bıçak & Çakan, 2004; Daniel & King, 1998; Güven, 2001; Temel, 1991; Yanpar,

1992). Some of the studies, on the other hand, tried to explore the relation between the teachers' views and their assessment practices (Bıçak & Çakan, 2004; Brown, 2004; Calderhead, 1996; Clark & Peterson, 1986; Doğan, 2005; Duban & Küçükyılmaz, 2008; Erdal, 2007; Gelbal & Kelecioğlu, 2007; Heaton 1992; Pajares, 1992; Pepin, 1999; Prawat, 1992; Putnam, 1992; Remillard, 1992; Teo, 1997; Thompson, 1992; Yılmaz, 2006). The relation between the teachers' missing knowledge about the assessment methods and the effects of this missing knowledge on their assessment practices were also studied in the literature (Çakan, 2004; Peker & Gülle, 2011; Pilten, 2001; Remillard, 1999; Tienken & Wilson, 2001). The discrepancy between the teachers' views and their assessment practices was also explained by the related literature (Mulhall & Taylor, 1998; Susuwele-Banda, 2005).

To conclude, the related literature pointed out several factors that were also aimed with the current research. The teachers' assessment practices, their purposes, their use of assessment results, their views about the assessment methods were some of these factors. However it was also observed that, there were limited studies that were indicating the discrepancies between the teachers' views and their perceived assessment practices. Besides, the use of the summatively or formatively purposed assessment results were not always detailed for mathematics courses. Moreover, the studies represented general findings for the performance-tasks or project-studies. For instance, the results of these studies were mostly depended on the questionnaires, not classroom observations. As a result of that, the researcher aimed to make contribution to the mathematics assessment literature by representing both the relations and discrepancies between the teachers' views and their perceived classroom practices. Furthermore, the detailed indications about the participants' use of the assessment results can be a beneficial data for the literature. The study did not only depend on the participant' statements or written documents but also on the classroom observations. Therefore, it was also thought that, the results of the study can represent a wide and reliable information to the readers.

CHAPTER 3

METHODOLOGY

As outlined in chapter one, the purpose of the current study was to investigate mathematics teachers' assessment practices in 5th grades. In order to reach this purpose, the researcher aimed to explore teachers' point of views regarding the assessment methods and their informal and formal assessment activities in the 5th grade classrooms.

In this chapter, the research methodology is described in four main parts. The first part explains the overall research design with a framework. In this part information about the context and the teachers participating in the study will also be explained. The second and third parts, on the other hand, explain data collection instruments by detailing the interview protocols, field-notes, data collection and analysis procedures. Finally, in the fourth part, ethical considerations and limitations of the study are given.

3.1 Research Design

This is a qualitative research study. "A qualitative research is an inquiry process of understanding which is based on distinct methodological traditions of inquiry that explore a social or human problem" (Creswell, 1997, p. 15). During this inquiry process, constructing a complex, holistic picture; understanding the meanings of this picture; reporting detailed views of informants; and conducting the steps of the study in a natural setting are all the interests of the researcher (Cresswell, 1997; Merriam, 2009). The current study is concerned with the teachers' assessment practices in mathematics classrooms. Therefore in the light of the related literature and the research questions, case study design was considered as being appropriate for this research.

Creswell (2007) states that case study research is ‘‘a study of an issue explored through one or more cases within a bounded system, such as a context, a system (i.e. setting, a context)’’ (p. 73). The advantages of a case study research can be the followings: having the chance of in-depth investigation of a phenomenon with the purpose of better understanding the phenomenon of interest (Punch, 2009; Stake, 2005; Yin, 1994); and using more than one data collection method to obtain a rich description for that phenomenon (Punch, 2009).

In the current study, an in-depth understanding of mathematics teachers' classroom assessment implementations in 5th grade classrooms was aimed. In order to have the understanding of this phenomenon of interest five main research questions and related sub-questions were investigated:

1. What assessment procedures do the participating mathematics teachers use in the 5th grade classrooms?

2. In what way are the participating mathematics teachers' formal and informal assessments related with their use of assessment results in 5th grade classrooms?

3. How do the participating mathematics teachers use the results of their assessment practices formatively in 5th grade classrooms?

4. To what extent are the participating mathematics teachers' classroom assessment procedures related to their views about the students' learning of mathematics, about the factors affecting teaching mathematics, and about assessing students' learning of mathematics?

5. What are the discrepancies between the participating mathematics teachers' views about assessing the 5th grades' learning of mathematics and their perceived classroom assessment practices?

The current study was conducted in a single context with three participants. Although all the participants were working in the same school, their instructional decisions were different from each other. During the study, it was examined that the mathematics department of the school took decisions about the implementation dates of the formal assessments. Except the second paper-and-pencil exam, on the other hand, the mathematics teachers did not have any department decision about the common assessment implementations. Therefore, except the second exams, they did

not carry on the assessment procedures in common and they had some different procedures in their assessment activities. As a result of that, each participant was taken as a case during the study. Yin (1994), on the other hand, says that multiple case study design allows the readers and the researchers to comprehend the investigated issue from different individuals' perspectives. He goes on to say that using multiple case study design may present both the researcher and the reader a variety of outlooks on the research since it explores the differences and the similarities between the individuals.Therefore, a multiple case study design was thought to be the most appropriate research design for the study.

Creswell (1997) defines a case as a program, an event, an activity, or individuals. The case in the current dissertation, on the other hand, was the individual teacher. For each participant, the same data collection procedure was followed. In order to develop an in-depth understanding of the mathematics teachers' use of assessment methods in the classrooms, data were collected from multiple sources (Creswell, 1997; Yin, 1994). These sources were interviews (semi-structured interviews; post-activity interviews made after the classroom assessment activities, written exams, project studies and performance-task studies; and the final interviews which was made for the last step of the data collection procedure), classroom observations (recorded by a video camera), document collection (annual and daily plans, mathematics department decisions), and taking field notes.

The case was investigated in three steps. First of all, the interviews were carried out with the participant teachers. Classroom observations were the second step of the study. For the last step, analyzing the interviews, field notes, records, textbooks, and assessment materials that the teachers preferred were helpful for shaping the study.

In the following sections the details of the current case study will be described. Figure 3.1 represents the framework for the data collection and data analysis process, revealing all the phases from the start to the formation of the themes in the study:

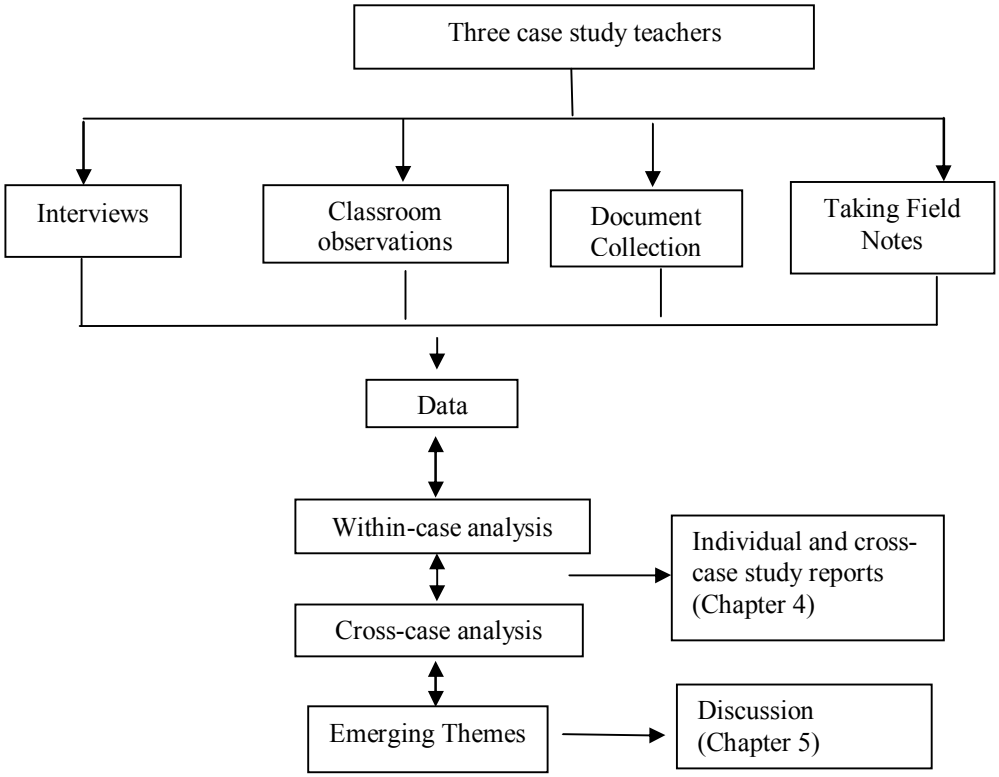


Figure 3.1 Framework for the data collection and data analysis process

3.1.1 The Context

Yin (1994) offers to study the case within its real life context, if the boundaries between the case and the context are not clear. Therefore, in this study, participant teachers' assessment implementations were observed in the classrooms. On the other hand, the study was conducted in a public middle school in Ankara and in relation with the mathematics curriculum, so the context of the study was the current public school and the 5th grades' mathematics curriculum. The curriculum, the school, and the mathematics department issues of the school will be detailed altogether in order to explain the context.

3.1.1.1 The Curriculum Context

The aim of the middle school curriculum was to give students sufficient knowledge, ability, and attitudes of mathematics (MoNE, 2013c). Thence students would become equipped enough for their daily life and educational stages. Ministry of National Education implied that middle school curriculum encouraged students for cognitive learning, for becoming practical in mathematical operations and for being solution oriented in daily life problems (MoNE, 2013c). Developing mathematics sense by concrete experiences was also an aim of the curriculum. With the help of these aims, it was expected that students would see mathematics as ‘‘sensitive, useful, and worth for trying’’ (p. 1).

One of the expectations of the curriculum was a mathematics classroom environment in which students could be the subject of their own learning process (MoNE, 2013c). In other words, students should have the chance of investigation, communication, criticizing, justification, sharing opinions, and presenting different kind of solutions in mathematics classrooms. Therefore it was offered to practice open-ended questions and activities in the classrooms in order to give students the chance of carrying out mathematics (MoNE, 2013c).

It was also offered by the curriculum that the conceptual development of the students should be formed in the learning process, not in a limited time (MoNE, 2013c). It was stated that students should have time to discuss, investigate, and generalize the mathematical concepts and should get the ability of relating mathematics with other majors. In that manner, the curriculum offered teachers to practice various classroom activities with tables, graphs, concrete materials, symbols (MoNE, 2013c).

In the middle school curriculum, Ministry of National Education underlined the importance of assessment in mathematics classrooms, too. According to The Ministry, assessment was done to examine at what rate the students reached to the knowledge, skills, and attitudes expected by the objectives (MoNE, 2013c). In that manner, both the traditional and the performance-based assessment methods were

recommended (MoNE, 2013a). The traditional methods were defined as the activities including open-ended items, fill-in-the-blanks type items, or true-false items. Their items were listed or developed at the end of each unit and they were in multiple-choice or constructed-response types (MoNE, 2013a). For the performance-based assessment methods, on the other hand, self-assessment; group works; problem solving; portfolios; classroom observations; and performance-task were also offered in the curriculum (MoNE, 2013a).

According to the regulations of the Ministry of National Education, teachers should implement at least two paper-and-pencil exams for the mathematics course (MoNE, 2013b). In order to carry on the paper-and-pencil exams, they should determine and announce the dates of their implementations before (MoNE, 2013b). Moreover, they should prepare the answer keys of the exams before their practice. The regulations also explained the common paper-and-pencil exams. In that manner, in a school, if there were more than one teacher for a course, the common paper-and-pencil exams could be implemented (MoNE, 2013b). If the exams were implemented in common, then the teachers should prepare the items and the answer-keys of the exams together, too. Then each teacher should grade the papers of her/his class separately (MoNE, 2013b). Last of all, each teacher should write a report for explaining students' grades, the achievement levels of the students in general, and her recommendations for the further exams. The practice steps could be specified by the school mathematics departments (MoNE, 2013b).

In addition to paper-and-pencil exams, performance tasks and project studies were also the obligations of the Ministry of National Education (MoNE, 2013b) during the data collection process. In that manner, it was stated in the curriculum that, each student was responsible for completing at least one performance-task per semester. However, after the 2013-2014 academic year, the performance-task practices removed from the middle school curriculum (MoNE, 2014). Therefore, it can be said that performance-task obligations removed from the 5^{th} grades' curriculum after the data collection of the study. On the other hand, each student had the duty of preparing a project for at least one course (MoNE, 2013b). It was also offered in the curriculum that, project studies could be related with the real-life situations and could be prepared individually or in groups (MoNE, 2013c). The

rubric for the tasks should also be shared with the students at the beginning of the implementation and the results should be announced in 10 workdays.

3.1.1.2 The School Context

As a part of the context, it is a need to explain the environment, physical conditions and the administrative staff of the school. The school was established in the year 2012 in a sub province of Ankara. Most of the people in that sub province had low-income. There were crowded families and most of the parents were divorced. Moreover, some of the parents were immigrants from the eastern part of the Turkey. Therefore, it can be said that the socio-economic status of the parents were low in general.

During the data collection process, the same building was used for two different school levels with the same administrative staff. In the mornings, it was a middle school including grade levels of 5, 6, 7, and 8. In the afternoon, on the other hand, elementary grades had classes. The school context had approximately 2674 students during the data collection process and 1274 of them were middle grades. In the school building, there were 9 groups for 5^{th} grades, 11 groups for 6^{th} grades, 7 groups for 7^{th} grades, and 6 groups for 8^{th} grades in the school. The average class size of the middle school was approximately 40. It had a conference hall, a library, two computer laboratories, a classroom for mind games course, a classroom for sports, two classrooms for the education of mentally disabled students, an art class, a music class, and a classroom for technology and design course.

3.1.1.3 The Mathematics Department Context

The mathematics department of the school consisted of 7 teachers. It was observed that the mathematics department was responsible for preparing the annual and daily plans according to the curriculum. Moreover, at the beginning of the school year, school administration, together with the mathematics department, decided how to match the classrooms with the teachers. All of the teachers who were teaching

mathematics to 5th grades were using the same textbooks and same plans. Moreover, they decided the week of the mathematics examinations at the beginning of the academic year. Three examinations were carried out in a semester. The second examination of each semester was common paper-and-pencil examination and these examinations were prepared by the whole mathematics department. For the first and the third paper-and-pencil exams, on the other hand, each mathematics teacher prepared and implemented her/his own questions.

According to the decisions of the mathematics department of the current school, each student was responsible for completing one performance-task per semester. These tasks were defined in the first meeting of the mathematics department. A list of performance-tasks was defined in the meeting. During the decision making about the tasks, the mathematics teachers took into consideration of the mathematics curriculum, the physical conditions of the school, and the socio-economic status of the students. All the task lists and the related assessment rubrics were published in each classroom at the beginning of the semester. Each student had the responsibility of reading the lists, choosing one of the tasks, and preparing them in the defined time. The list was only a suggestion. If a teacher wanted to assign different tasks than the ones offered in the list, s/he had the opportunity for that.

Among the examinations and the performance-tasks, each student had the duty of preparing a project at least for one course. In the first meeting of mathematics department, teachers prepared a list about the project issues but this was a suggestion. According to the conditions of their classes, students, individual problems, etc., the teachers had the opportunity for giving different project-studies.

Ministry of Education in Turkey suggested two other evaluation grades for each student's performance in the classrooms (MoNE, 2013b). It was named as the evaluation of the in-class-performance and these evaluations should be graded based on the students' note taking performance, portfolios, self-assessment forms, observation forms, peer-assessment forms, and other relevant activities performed in the classrooms. In the first meeting of the mathematics department, on the other hand, teachers did not decide on a specific criterion to grade this performance. Therefore, during the data collection process, each of the participants used different data for grading the students' in-class performances.

3.1.2 The Participants: The Cases of the Study

The three mathematics teachers of a public middle school in Ankara were the participants of the current study. The participants were teaching mathematics at 5th, 6th, 7th, and 8th grades. ‘‘A convenience sample is a group of individuals who (conveniently) are available for study’’ (Fraenkel & Wallen, 1999, p. 112). Thus, in a study, a certain group of people should be chosen since they are available (Fraenkel & Wallen, 1999). The school administration was also positive about the study. Therefore, the researcher chose the current school conveniently for the study.

Silverman (2010), on the other hand, claims that voluntary participation by the participants of a qualitative study is an ethical issue. Participating mathematics teachers were all open and willing to be a part of the current study. The researcher told the aim, time-schedule, and ethical issues of the study informally to all of the teachers. She gave detailed information about participating in the study. All of them were teaching to 5th grades and showed willingness to participate in the current study. They demonstrated interest in assessment processes and teaching mathematics to 5th grades. They represented different backgrounds. Moreover these three teachers should be included in the study for theoretical and practical purposes. Theoretically, first of all, teachers would have a wider range of perspectives and different experiences. They were all public school teachers who were teaching to 5th grades. The focus of the study was to examine how assessment implementations were carried on 5th grades’ classrooms. Therefore the general flow of a mathematics class can be observed in its natural settings by the help of these volunteers. Such properties would make a more complete picture of the implementation of formal and informal assessment methods within that public school’s mathematics department. Practically, on the other hand, they would not want to withdraw from the study because of their high willingness. As a result of that, the researcher chose them as the cases of the study.

Two of the participants were teaching to grades 5 and 8; one of them to grades 5, 6, and 7. They were all female and were teaching mathematics to the middle grades of that public school. Although the quotes given in the 4th section will

be verbatim, the real names of the teachers and the school are changed to ensure confidentiality. In other words, the information, observation results, and the interviews will be told under pseudonyms names. These names are Ms. Kaya, Ms. Solmaz, and Ms. Yılmaz. The elementary mathematics teachers who were the participants of the study were as follows:

Case 1: Ms. Kaya

Ms. Kaya is a graduate of Elementary Mathematics Education Department and she has a master's degree on Educational Management, Planning, and Inspection. She has 4 years of experience and has taught to 5^{th}, 6^{th}, 7^{th}, and 8^{th} grades. This is her second year in the observed school. During the data collection procedure, she was teaching mathematics to 5^{th}, 6^{th}, and 7^{th} grades in the school. She was teaching to one group of 5^{th} grades and the class size of that group was 40. She taught mathematics to 5^{th} grades in the previous academic year, too.

Case 2: Ms. Solmaz

She is a graduate of Elementary Mathematics Education Department. She has 2 years of experience and has taught to 5^{th}, 6^{th}, 7^{th}, and 8^{th} grades. It was her first year in the observed school and she was teaching mathematics to 5^{th} and 8^{th} grades. Four of these classes were 5^{th} grades and the class size of each classroom was approximately 40. She taught mathematics to 5^{th} grades in the previous academic year, too.

Case 3: Ms. Yılmaz

She is a graduate of Elementary Mathematics Education Department. She has 5 years of experience in mathematics teaching. The first three years were in an after-school support center, and the last two years were in public schools. It was her first year in the observed school and she was teaching mathematics to 5^{th} and 8^{th} grades. Three of these classes were 5^{th} grades and the class size of each classroom

was approximately 40. She taught mathematics to 5th grades in the previous academic year, too. The qualifications and teaching experiences of the participant elementary mathematics teachers of the study are summarized in Table 3.1:

Table 3.1: Qualifications and experiences of the participants

Participant pseudonym	Gender	Qualification	Teaching Experience (years)	Grades Taught
Ms. Kaya	Female	Graduate of Elementary Mathematics Education M.S: Master at thesis stage on Education Management, Planning, and Inspection	4	Grades 5, 6, 7, and 8. In the observed school she is the teacher of grades 5, 6, and 7.
Ms. Solmaz	Female	Graduate of Elementary Mathematics Education	2	Grades 5, 6, 7, and 8. In the observed school she is the teacher of grades 5 and 8.
Ms. Yılmaz	Female	Graduate of Elementary Mathematics Education	5	Grades 5, 6, 7, and 8. In the observed school she is the teacher of 5 and 8.

3.1.2.1 The Researcher's Role

In the current study, the researcher can be accepted as a participant of the study because of being a colleague to the participating teachers. Besides, the participants and the researcher had been in a work environment from time to time. Therefore, the participants and school administration trusted her about being able to conduct the study, the interviews and observations. Such an environment of trust made the study more natural since the researcher and the participants had quick conversations related with the study.

According to Patton (2002) the nature of a participation ''is a continuum that varies from complete immersion in the setting as full participant to complete separation from the setting as spectator, with a great deal of variation along the

continuum between those two points" (Patton, 2002, p. 265). In the current continuum the researcher's role can be defined as being an interviewer and an observer. As an interviewer, the researcher implemented the questions of the interview protocol. During this process she was careful about not to guide the participants and not to make comments on the participants' answers. At the beginning of the observations, on the other hand, she was introduced to the students by the participating mathematics teachers and did not get in touch with the students after that. Field notes were taken after the classroom observations without joining any activities of a lesson. During the data collection process, the researcher was aware of the influence of being a colleague to the participants. Therefore she tried not to forget her place in the study and conducted the interviews and made observations without an official status in the lecture.

3.2 Data Collection Procedure

Data collection was carried out in two stages: first the in-depth interview questions were piloted, and second the main study was finished. Piloting the in-depth interview was completed between February 2014 and March 2014. The main stage of the data collection was carried out from mid-March 2014 to the end of June 2014. All activities were carried out after getting ethical approval for the study from Human Research Ethics Committee at Middle East Technical University. The time schedule for data collection procedure is summarized in Table 3.2:

Table 3.2 Time Schedule for Data Collection Procedure

Action	Time
Preparing the interview protocols	January 2013-January 2014
Piloting the in-depth interview	January 2014-February 2014
Making changes needed for the instruments	February 2014
In-depth interviews with the participants of the main stage	February 2014-March 2014
Classroom Observations and related post-interviews	March 2014-May 2014
Taking field-notes and gathering written documents of the materials	March 2014-May 2014
Final interviews	June 2014

The data collection procedure was completed in three phases. In the first phase the in-depth and detailed interviews were done with each participant. In the second phase the classroom observations were conducted. After each activity, a post-activity interview was made with each participant. Final interviews were also made with the participants at the end of data collection procedure. In the third phase, field notes and extensive document collection were completed. In Table 3.3 the data collected from the three participants is summarized:

Table 3.3 Summary of the Data Collected from Each Participant

Participant pseudonym	Number of interviews	Duration of classroom observations	Duration of video records	Whether the documents and field notes were collected
Ms. Kaya	11	5 lesson hours	139 minutes	+
Ms. Solmaz	11	2 lesson hours	64 minutes	+
Ms. Yılmaz	11	3 lesson hours	94 minutes	+

3.2.1 Interviews

The essential method of the data collection for the current study was making interviews because interviews are ‘‘one of the most important sources of case study information’’ (Yin, 1994, p. 84). In related literature it is stated that, in order to understand a participant’s thoughts or beliefs, interviewing is necessary (Merriam, 2009; Patton, 2002). Patton (2002) underlines that researchers may ‘‘enter into the other person’s perspective’’ by making interviews (p. 341).

In the current study, with the help of the interviews, the researcher aimed to learn teachers' views about assessment issue, the sources and procedures they use for assessing students, the problems they meet during assessment process. Moreover, it was expected to explore teachers' instructional decisions and their knowledge about the way students' learn. The researcher prepared three kinds of interviews for the study. They were in-depth interview, post-activity interview, and the final interview. She prepared the questions of the interviews herself in relation with the aim of the study, related literature, the activities offered to the participants for the study, and the assessment issues of the mathematics curriculum. Then the supervisor of the researcher checked the questions of the interviews. According to her supervisor’s suggestions, the researcher shortened the questions. For the last step, the researcher presented the questions of the in-depth, post-activity, and the final interview protocols to the committee members of the dissertation.

A pilot study may be helpful for refining both the data content and the data collection procedure (Yin, 1994). It is used for ‘‘assisting an investigator to develop relevant lines of questions-possibly even providing some conceptual clarification for the research design as well’’ (Yin, 1994, p. 74). Therefore a pilot study was carried out for the in-depth interviews. The framework of the pilot study questions are represented in Appendix A. By the pilot study, the researcher aimed to clarify the questions of the interview. Moreover, it was aimed to understand whether the questions were sufficient in relation with the research questions of the dissertation. Last of all, the researcher intended to learn the time needed to finish the interview by the pilot study. On the other hand, she did not pilot the post-activity interviews

because they would be carried out at the end of an assessment practice. The same reason was valid for the final interviews, too. As a result of that, only the suggestions and the approvals of the supervisor and the committee members took into consideration for checking the questions of the post-activity interview and the final interview.

The pilot study was completed approximately in two months' time of the 2013-2014 spring semester including January and February. Three interviews were handled for the study. The participants were three teachers who were teaching mathematics to 5th grades in three different public schools. The voluntariness of the teachers was provided for the aim of the pilot study. They were willing to be interviewed. Therefore convenient sampling was the sampling method of the pilot study. Moreover the researcher informed them about the ethical issues of the study. The first pilot study participant met with the researcher in the researcher's house. The second and the third participants, on the other hand, were interviewed in the schools that they were working. The first participant had teaching experience of 32 years, the second one 1 year, and the last one 16 years. All of the interviews were conducted in quite environments and were recorded by a video-recorder. The researcher, on the other hand, did not interfere in the pilot study participants. She was careful about being a listener in most of the interview process. Each of the participants was working in different schools.

After the pilot study, the researcher identified that revision was a need for some questions of the interview protocol that was represented in Appendix A. Some questions were not clear, so the participants gave irrelevant answers to them. For instance, the 18th question was 'If you were the person who is constructing the 5th grade mathematics education programme, what would be your suggestions about the assessment methods and implementations? Why?' This was a broad question. Therefore, too much time was needed to answer it. In order to save time, the question was reworded as: 'What are your opinions about the mathematics programme of 5th grades, which are just added to middle school grades, within the 4+4+4 education system'. Moreover the sub questions were added to this question. With the help of these sub questions, the participant could have summarized her opinions easily. The sub questions were asking the participants' opinions about the

aim, the applicability, the necessity, and the assessment dimension of the curriculum. The vague questions of the interview protocol caused time loss during the interview. In other words too much time was needed for the interview. For instance, it took nearly 120 minutes to make a pilot interview. After completing essential revisions, the researcher tried to prevent the probable time loss of main stage. Last of all, the in-depth interview protocol of the study is conducted.

The in-depth interviews were done before the classroom observations get started. Post-activity interviews, on the other hand, were conducted after a participant implemented an assessment activity. Last of all, a final interview was conducted with each participant. Before each interview, the researcher gave information about the purpose of the study, recording process, the amount of time needed to complete the interview, and for what aims the data would be used. Each participant was informed about the confidentiality of the interviews. One-to-one interviews were conducted. All the interviews were recorded by a tape-recorder. The researcher wrote the responses to the interviewee's comments on the interview protocol sheets. Consent forms were also completed by the participants before the interviews. During the interviews, the researcher was careful to be a good listener rather than a speaker and to sustain the eye contact with the interviewee. The in-depth interviews took about 60 minutes to finish. The time interval of post and final interviews, on the other hand, changed from 10 minutes to 20 minutes. The researcher also offered to give the report of the interviews to the participants. The name of the interviews and the duration of the interviews are listed in Table 3.4:

Table 3.4 Summary of the interviews and their durations

Participant pseudonym / Interview	Ms. Kaya	Ms. Solmaz	Ms. Yılmaz
In-depth interview	61 minutes	80 minutes	62 minutes
Post-activity interview for quiz activity	15 minutes	10 minutes	9 minutes
Post-activity interview for addition of fractions activity	10 minutes	10 minutes	8 minutes
Post-activity interview for problem solving activity	8 minutes	6 minutes	6 minutes
Post-activity interview for constructing a rectangle activity	10 minutes	11 minutes	7 minutes
Post-activity interview for 1st paper-and-pencil exam	10 minutes	10 minutes	6 minutes
Post-activity interview for 2nd paper-and-pencil exam	10 minutes	12 minutes	9 minutes
Post-activity interview for 3rd paper-and-pencil exam	9 minutes	12 minutes	9 minutes
Post-activity interview for performance-task	10 minutes	15 minutes	15 minutes
Post-activity interview for project-study	10 minutes	15 minutes	10 minutes
Final interview	20 minutes	20 minutes	15 minutes

3.2.1.1 In-depth Interview

After constructing a framework for the study, a semi-structured interview protocol was designed. It was prepared by the researcher. After the piloting process, the final design of the protocol was constructed. This interview protocol was a form of three pages in length with 18 open-ended main questions and related sub-questions. There are lots of questions in the study, so the interview questions are represented in Appendix B. It can be seen in the protocol that, the questions of the interview protocol were formed to learn participating mathematics teachers' demographic information (questions 1, 2, 3, and 4), their methods for identifying students' mathematics learning (questions 5, and 7), their views about the way students learn mathematics (question 6), their views about the aims of the assessment methods (questions 8 and 12), the content of the assessment instruments that they used (question 9), the frequency of their classroom assessment implementations (question 10), the sources that they used for preparing the assessment methods (question 11), their views and implementations of performance assessment (questions 13 and 14), their views about rubric (question 15), the questions and problems that they met during the classroom assessments (questions 16 and 17). Last of all, it was expected to learn the teachers' views and comments about the 5th grades' mathematics curriculum (question 18).

3.2.1.2 Post-Activity Interviews

The post-activity interview protocol consisted of 8 main questions. It was carried out after each activity. Nine post-activity interviews were made with each participating mathematics teacher. The post-activity interview protocol is given in Appendix C. It can be seen in the framework that, during these interviews, first of all, the researcher tried to explore the participants' observations about the students' mistakes in the activity and in what way they would use the assessment activity (questions 1, 3, and 6). She also asked whether the activity gave idea about the

teaching effectiveness or students' mathematics achievement level (questions 2, and 4) and would the participants share the results with parents, school administrations or with other teachers (question 5). Last of all, the researcher asked whether the participants' expectations about students' achievement were compatible with the results (questions 7 and 8).

3.2.1.3 Final Interviews

The aim of the final interviews was to clarify the participants' responses about their general assessment procedures. It was about the participants' comments figured out by the obtained data. Final interviews were conducted at the end of the data collection process. Each of the participating teachers had one final interview. The final interview protocol is given in Appendix D. It can be seen in the framework that, there were 5 questions asking teachers' comments about the assessment practices that they carried out during the whole semester. The questions were in follows:

1. During your assessment practices, sometimes students did not show the performance that you expected from them. In your opinion, what was the reason for that?
2. What did you do when you realized the students' mistakes in the assessment processes?
3. Why did (not) you let all students to check their assessment results?
4. In order to determine the reasons of their mistakes and the difficulties that they had for learning mathematics, how did you use the assessment results?
5. In order to monitor the students' progress in mathematics, how did you use the assessment results?

3.2.2 The Activities and Classroom Observations

In the current dissertation non-participant observations were conducted. The researcher preferred to make a non-participant observation since it ''refrains from interventions in the field'' (Flick, 2009, p. 223). With the help of the activities,

the researcher aimed to observe the participants' informal assessment procedures and tried to internalize the teachers' statements in the interviews. In that manner, at the beginning of the 2013-2014 spring semester, the participants and the researcher planned the time schedule for the classroom observations. The researcher, together with her supervisor, prepared four activities in relation with the 5^{th} grades' curriculum: quiz activity, addition of fractions activity, problem solving activity, and constructing a rectangle activity. All the activities are given in Appendix E. The researcher gave the activities to the participants after getting the implementation permission from The Ministry of National Education. The first one was a quiz and the third one was a problem solving activity. They were paper-and-pencil activities and they would not be interactive studies. In other words, the researcher would not have a chance for observing the participants' assessment procedures during the quiz and problem solving activities. Therefore classroom observations were not planned for these activities. Addition of fractions activity and constructing a rectangle activity, on the other hand, were interactive activities. The students would use materials, answer the items, ask questions to the participants and the participants would have verbal communication with the students. Thus they were observed and recorded by a video-camera. Each participant practiced the activities prepared by the researcher. Furthermore one of the participants, called Ms. Kaya, was also observed during a performance-task activity in the classroom. The task was prepared and handled by her. The addition of fractions activity and constructing a rectangle activity were observed in the classrooms. Besides; the researcher, as a complete observer, video-taped the activities in the classrooms. In each observation, The focus of the video-recordings was the participants and their interaction with the students. Therefore, the researcher was careful about video-recording the participants' actions. Name of the activities and their observation durations are summarized in Table 3.5:

Table 3.5: Activities and the observation durations

Participant pseudonym	Activity	Observation	Video-record	Interview after activity
Ms. Kaya	Quiz activity	-	-	+
	Addition of fractions activity	Two lesson hours	45 minutes	+
	Problem solving activity	-	-	+
	Constructing a rectangle activity	One lesson hour	32 minutes	+
	1st paper-and-pencil exam	-	-	+
	2nd paper-and-pencil exam	-	-	+
	3rd paper-and-pencil exam	-	-	+
	Performance-task	Two lesson hours	72 minutes	+
	Project-study	-	-	+
Ms. Solmaz	Quiz activity	-	-	+
	Addition of fractions activity	One lesson hour	30 minutes	+
	Problem solving activity	-	-	+
	Constructing a rectangle activity	One lesson hour	34 minutes	+
	1st paper-and-pencil exam	-	-	+
	2nd paper-and-pencil exam	-	-	+
	3rd paper-and-pencil exam	-	-	+
	Performance-task	-	-	+
	Project-study	-	-	+
Ms. Yılmaz	Quiz activity	-	-	+
	Addition of fractions activity	Two lesson hours	68 minutes	+
	Problem solving activity	-	-	+
	Constructing a rectangle activity	One lesson hour	26 minutes	+
	1st paper-and-pencil exam	-	-	+
	2nd paper-and-pencil exam	-	-	+
	3rd paper-and-pencil exam	-	-	+
	Performance-task	-	-	+
	Project-study	-	-	+

In addition to video-recording, some descriptive notes were taken at the end of the two observed activities. The video records and descriptive notes made contribution to the thick description of the participating teachers' informal classroom assessment implementations. Thereby these classroom observations made contribution to investigate the research questions. The notes included the description of teacher-student interactions that emerged in the classroom, such as comments or

responses made by teachers during the assessment process. Moreover teachers' monitoring method of students' studies was described by these notes.

3.2.3 Field Notes and Documents

Taking field-notes and gathering documents was another part of the data collection procedure. Field notes were taken by the researcher during all the procedure. Informal, haste talkings were made with the participants and these talkings were transformed to a written field note in 5 minutes. The participants were aware that these talkings were made for the study and would be written down. The researcher tried to identify the views of the participants about the assessment implementations that they did not talk about during the interviews. Field notes and written documents of the materials were gathered approximately in three months period. The researcher tried to better understand the participants' comments on their classroom assessment implementations by taking field notes and collecting documents. Furthermore these notes and documents were used to support the data gotten by interviews and classroom observations.

In addition to field notes, written documents were collected. Punch (2005) remarks that documents are valuable source of data in case studies. Some examples of documents collected were the participants' daily and annual plans; project and performance-tasks which were prepared and implemented by the participants; documents of the current school such as the mathematics department's official reports; textbooks or other materials that the participants used during assessment. The field-notes and written documents were used to support and illuminate the data gotten with the interviews and classroom observations.

3.2.4 Trustworthiness of the Study

The term "trustworthiness" is a set of criteria propounded by Lincoln and Guba (1989) with regard to the quality issue of qualitative research. Trustworthiness includes credibility (internal validity), transferability (external validity), dependability (reliability), and confirmability (objectivity).

One of the indicators of the trustworthiness is credibility and it deals with the way research findings match reality (Merriam, 2009). It is the equivalent of internal validity in quantitative research. It is offered that a researcher should avoid from biases during the interpretation of the qualitative data (Merriam, 2009). For supplying qualitative validity, a researcher needs to check for the accuracy of the findings of a study by using certain procedures (Gibbs, 2007). Creswell (2003) offers eight strategies named as triangulation, member checking, rich and thick description to convey the findings, clarifying the researcher bias, presenting negative case analysis, prolonged involvement in the field, peer review, and audit trail in order to deal with the validity threats of qualitative research. In the current dissertation, on the other hand, triangulation of different data sources, member checking, using rich and thick description to convey the findings, and prolonged involvement strategies were used to provide the credibility for the study.

The triangulation strategy was carried out by using several sources in the study. In that manner, the data collection procedure was completed by doing interviews with the participants, making classroom observations, analyzing the materials like annual and daily plans, field notes, records, textbooks, and the official reports of the current school's mathematics department.

The second strategy which was used for the credibility was the member-checking. In order to accomplish member checking, the researcher gave the clarified outcome of the transcripts of the interviews back to the participant teachers in order to determine whether they feel that the polished product was accurate. The participants did not add any changes to the clarified outcome of the transcripts.

Third strategy which was used for the credibility was prolonged involvement of the participants. For the study, the researcher spent nearly four months with the teachers. It is thought that spending prolonged time with the teachers can form a mutual reliance between teachers and the researcher. The researcher was also a close friend and colleague to the school administration and the participants. Therefore, she had much opportunity to get detailed and realistic data about the site, students, administration, parents, and the teachers. Therefore it was thought that spending prolonged time in such a position made the findings much more valid.

The second indicator of trustworthiness is transferability and it is the degree to which the findings are transferable to the similar settings (Merriam, 2009). Transferability property lets the readers ‘‘...to decide on the extent the case study findings are transferable to their own research situations’’ (Abdul Rahim, 2012, p. 66). It is equivalent to external validity in quantitative research. In the current study, as a property of the qualitative study, the researcher did not aim to generalize the findings. On the other hand, she tried to use rich and thick description to convey the findings. Such a description was done in the method and findings parts, in order to move the readers to the settings. In that manner, the researcher gave detailed information about the middle school mathematics curriculum and the demographic information of the participating teachers. Then, each case was described in detail. With the help of the rich and thick descriptions, it was expected that the results would become much more realistic and deeper.

Another indicator of trustworthiness is dependability and it is to provide consistent results with the data collected (Merriam, 2009). It is the equivalence of reliability in quantitative research and it details the information about the data collection process of a study. In that manner, Gibbs (2007) suggests checking the transcripts for mistakes and being sure about not to change the meanings of the codes while coding the transcripts of the recorded data. During the current study, the researcher had a notebook for planning and recording the daily steps. Moreover, she used a tape-recorder during the interviews. Then she transcribed the records word by word by using a word processing program. She checked the transcripts until all the explicit mistakes were cleaned. At that time, since the record was controlled a lot of times, the drifts in the definition of the codes were checked. In order to increase the trustworthiness of the data analysis and interpretation, a fellow doctoral student helped the researcher as a second coder. She recoded all the code data. During this process, she referred to the research questions and conceptual framework of the study. After then, the two sets were compared. More than 80 % consistency between the two sets was observed. However it was revealed that some codes under teachers’ views about the students’ learning of mathematics seemed to be comprehensive. Therefore the irrelevant codes under this theme were transferred to a new constructed theme of ‘‘teachers’ views about assessment’’. Moreover, the codes of ‘‘some factors

affect assessment process'' and ''using assessment for giving formative feedback'' codes were added. It was also realized that some codes had close meanings to each other. Therefore they are combined. For instance ''using assessment to know students better'' and ''using assessment to identify areas of strengths and weaknesses'' codes were combined. During the discussions about the two sets, it was also realized that some dilemmas between the two coders were sourced by the conceptual term discrepancies related with the literature review. Therefore the researcher and the second coder agreed on the change of approximately 10 % in the total coded data of the study.

The last indicator of trustworthiness is conformability and it refers to the "extent to which the data and interpretations of the study are grounded in events rather than the inquirer's personal constructions" (Lincoln & Guba, 1985, p. 324). The definition of the indicator showed that it is the correspondence of the objectivity in quantitative research. In order to provide conformability, the researcher interpreted the meanings of the data with coding. During the coding process, on the other hand, she tried to understand the messages of the participants in their answers. In order to reduce the effects of the researcher bias, the limitation which is caused by the existence of the researcher in the observations is underscored in the limitation section of the current chapter. Moreover, the researcher clearly emphasized her role in all stages of the data collection and data analysis procedures to ensure validity issues.

3.3 Data Analysis Procedure

''Data analysis consists of examining, categorizing, tabulating, or otherwise recombining the evidence to address the initial propositions of the study'' (Yin, 1994, p. 102). In that manner, the following strategies offered by Bogdan and Biklen (1992) were followed by the researcher in order to analyze the case study evidence of the study: Describing the ideas by writing down them in the margins of the field notes; taking notes which also include researcher's comments through the study; making a summary of these notes; getting feedbacks about the subjects before displaying the data; studying on the concepts and alike words; displaying the data by constructing tables and developing categories for codes according to these organized

data; reducing the established information into the categories that they belonged to and relating the categories of the information if needed.

According to the strategies above, the researcher transcribed the interviews, field-notes, observation notes, and other sources collected. Second, the transcribed data were categorized in relation with the research questions and literature review. Marshall and Rossman (2006) claim that the researcher needs to be familiar with all the data collected. Therefore, lastly, the researcher had read and re-read the whole data to get an overall view of the information formed.

3.3.1 Data Analysis Framework

According to Merriam (2009), data analysis has two levels: within-case and cross-case analysis. In the current study, during the first level, the researcher interpreted the teachers' individual assessment procedures, their use of assessment results and their views about the students' learning of mathematics, as well as the factors affecting teaching mathematics and assessment of students' learning of mathematics by performing single-case analyses for each case. In the second level, the cross-case analysis was carried out. In the following paragraphs how the within-case and cross-case analyses were carried out will be explained in detail.

According to Miles and Huberman (1994) the components of data analysis framework are data reduction; data display; and drawing conclusions and verifications from the data. The researcher completed all of the steps in order during the within-case analysis.

During the data reduction stage, for instance, a researcher needs to select, simplify, abstract, and transform data into themes by coding (Creswell, 1997). In the study, during the data reduction stage for the within-case analysis, the researcher did not only adhere to the research questions, but also considered the related literature. At that point the example coding which was summarized in the doctorate thesis of Suzieleez Syrene Abdul Rahim (2012) was the starting point. She conducted a case study on the classroom assessment beliefs of pre-university mathematics teachers. It was observed that some of the themes and codes of that study were so close to the ones in the current study. Therefore, after taking permission from the researcher,

some codes were adapted from that thesis. In that manner the researcher used the following themes of Abdul Rahim (2012) at the beginning of the coding issue of the participants' views about assessment: feedback for instructional decisions (the role of assessment); communication of the students' progress and achievement (the role of assessment); feedback regarding students (the role of assessment); motivating students during their learning (the role of assessment); prepare for external exams (the role of assessment). The coding sheet of Abdul Rahim (2012) is represented in Appendix H.

During the study, the researcher also got data about the participants' classroom assessment implementations and teachers' views about the assessment, learning, and teaching issues. Since it was related with the research questions, she had to code these data. However she realized that, the data needed additional themes other than the ones of Abdul Rahim (2012). The additional themes and the codes of these themes were as follows: the teachers' problems during their assessment implementation (the codes: crowded classrooms, rely on their own feelings/thoughts while choosing activities, variety of assessment methods, students' maturatity levels, positive about the curriculum); teachers' views (the codes: about students' learning and studying, about the aim of the assessment methods, about the assessment content); teachers' implementation of the assessment method (the codes: taking responsibility, inadequateness in the implementation of the assessment method, implementation frequency of the method, using only textbook to compose the content, using sources with/other than textbook to compose the content/criterion, in touch with teachers/parents/administration, material help, need for clarifying the items/task, give objective results, do not give objective results, management problem, storage problem).

All the initial codes re-coded and modified lots of times in order to refine. During the coding process, the researcher did not use any software programme. Instead, she completed all the coding process manually and let her supervisor to check the codes. Then the coded data were combined to more meaningful categories. Some of these codes were the participants' actual words. Creswell (2008) defines this kind of codes as in vivo codes. Some of the in vivo codes of the study were as follows: some assessment methods are not suitable for mathematics (or more suitable

for other branches; or are not suitable for all mathematics topics); primary school teacher or mathematical background affect students' learning; some external factors affect learning and teaching mathematics (e.g: classroom environment, parents, socioeconomic level, time limitation); assessment is important for students to have meaningful learning (e.g. understand the reason for learning a mathematical concept); there is an order of importance between assessment methods. All the themes and codes of the study are represented in Appendix F.

In the display stage, on the other hand, the researcher organized the data by suitable representations. In that manner she preferred to use a table in which the data and the coding part were seperated with two different columns. Such a table was formed for the data gotten from the participants, seperately. The aim of that stage was to make the data representative for the researcher. Therefore, the tables were very useful for researcher to study effectively.

In the study, last of all, conclusion drawing and verification stage took place in order to ''integrate what has been done into a meaningful and coherent picture of the data'' (Punch, 2009, p. 175). In that manner, the researcher combined the data which was coded under the same theme. Then, by using these combinations, she constructed meaningful paragraphs under the findings part.

In order to make the verifications of the data clear, the researcher used the analyses of the video-recordings, the documents, and her field notes. In that manner, she supported the interview data with her observations, documents, or field notes whenever it was needed in the findings part. The classroom observations and the field notes were also transcribed together with the interview data and they were analyzed together with the interview data.

The within-case studies revealed a coding guide for the data gotten from the interviews, field-notes, observation notes, and other sources collected. The themes acquired by the data reduction process of the single-case analysis were the basis for conducting the cross-case analysis. The cross-case analysis results were interpreted by discussing the similarities and the differences of each case under each theme. In order to make a clear representation, the researcher reported the cross-case analysis results in relation with the research questions.

3.4 Ethical Considerations

The proposal and data collection procedure of the study are approved by The Research Ethics Committee of Middle East Technical University. The researcher also got formal permission from Ministry of National Education and from the current elementary school administration. After these formal steps, the researcher talked with the voluntary participants about the aim, method, and time interval of the study. She explained the ethical issues by giving them the consent form. She carefully explained the confidentiality, anonymity, and informed consent issues. She told them this study is depended on their willingness. She told them that they can withdraw at any step in the study. The researcher reiterated this information at the beginning of each interview session. The participants were informed about the other steps including classroom observations, getting video and tape records, collecting documents and post-activity interviews. The researcher told them that the data would be used under pseudonyms in a doctoral thesis. The researcher used caution to not to alter the learning environment in the current school. This would jeopardize the naturalistic character of the study. The researcher told them that the data would be used and kept only by the researcher. She sometimes reminded them that the main issue was constructing the observations in a real environment as much as possible. Last of all, the researcher shared the clarified outcome of the transcripts of the interviews with the participants and asked them whether they feel that the polished product was accurate.

3.5 Limitations of the Study

First of all; the results were limited with the views, feelings, understandings, and the experiences of the three participating mathematics teachers. In the past, none of them had an experience with video-camera and their classroom sessions were not recorded with a video-recorder. They might be nervous or excited during the study. Therefore, they might have behaved differently than they were in their routine classes. Moreover, the researcher was present in the class while the participants were

practicing the activities of “addition of fractions” and “constructing a rectangle”. This might have affected both the participants’ and the students’ behavior in the class. Students could not act as if the researcher was not there and therefore might not have asked questions when they did not understand an issue of the activities. The participants, on the other hand, maybe did not act as if the researcher was not there.

Second; the study was a case study design with three participants. Therefore, the findings of the current study are limited in terms of generalizability. In that sense, the findings were limited with the current study and were evaluated in the contexts of the current school, mathematics department of the school, and the mathematics curriculum.

Last of all; Although she implemented the steps for providing reliability, the researcher’s bias might have limited the current study. She collected the data individually which may also have limited the study. For instance, she had to observe and record the classroom observations at the same time. This might cause focus problem and there might be some data might be overlooked. Moreover, the findings of the study were explained according to the interpretations of the researcher. She was the observer, the interviewer, and analyzer during the study. Besides, she was a collegue to the participants. As a result of that, the study might have affected by the researcher’s views and teaching experiences.

CHAPTER 4

FINDINGS

This chapter explains the findings of the case studies on the views and practices of three participating elementary school mathematics teachers in relation to classroom assessment. In the current study, the overall aim was to figure out the teachers' assessment practices in the 5th grades of a public school in Ankara.

In the following sections, the three cases are described in relation with the research questions and the conceptual framework of this study. Each case is explained under three aspects: teachers' classroom assessment procedures; teachers' use of assessment results; and teachers' views (about students' learning of mathematics, about factors affecting teaching mathematics; and about assessing students' learning of mathematics). All the aspects are derived from the key themes and conceptual framework of the study. Therefore they provide information about the participants' views and practices about assessment. Moreover, they will provide a basis for a systematic discussion of the research questions. The video recordings and the observation notes, on the other hand, are used in explaining the teachers' classroom assessment practices. Therefore they had a supporting role in the discussion of the findings related with the research questions. Documents that were collected during the data collection process, also, are used whenever they seemed to be related with the aspects. The chapter will continue with the cross-case analysis results of the study. The differences or similarities among the three individual cases will be discussed in this part. Moreover, the answers to the research questions will be given.

The researcher did not want to lose any detail. Therefore the transcript reports about the interviews are represented in both English and Turkish versions. In each case, the researcher tried to use fewer amounts of quote and editing in order to aid clarity and reliability due to the inverted Turkish sentences. The Turkish versions

of the quotations are represented in Appendix G with the abbreviations such as q1, q2, q3, etc.

4.1 Case One: Ms. Kaya

In order to observe classroom practices of Ms. Kaya, the researcher offered four informal classroom activities to her. As it was explained in the methodology chapter, she applied all of the current activities. The activities were ‘‘the quiz activity’’, ‘‘addition of fractions activity’’, ‘‘problem solving activity’’ and ‘‘constructing a rectangle activity’’. The video recordings of the ‘‘addition of fractions activity’’, ‘‘constructing a rectangle activity’’, and the performance-task; the interview data; the field-notes and the documents were all used to explain Ms. Kaya’s classroom assessment procedures; to determine in what ways she used the assessment results; and to detail her views about the students’ learning of mathematics, the factors affecting teaching mathematics and assessing students’ learning of mathematics.

4.1.1 Classroom Assessment Procedures of Ms. Kaya

As assumed in this dissertation, like many other teachers, Ms. Kaya had been making use of both formal and informal assessments in her 5th grade classroom. The interviews and the video data indicated that, Ms. Kaya used observations, whole-class worked examples, and the students’ classroom discussion or comments for informal data. Her formal assessments, on the other hand, included paper-and-pencil exams, performance-tasks, and projects. In the following two sections, the informal and formal assessment procedures of Ms. Kaya will be explained respectively. The results will be used to answer the first research question:

“What assessment procedures do the participating mathematics teachers use in the 5th grade classrooms?”

4.1.1.1 Informal Classroom Assessment Procedures of Ms. Kaya

Informal assessments are less structured than formal assessments and put into practice during the lessons (Wragg, 2001). It was revealed by the interview data, the field notes, and the video data that Ms. Kaya's informal assessment data included observations, whole-class worked examples, and student discussions or comments about the topics during the 5th grades' mathematics classes.

To begin with; according to the interview data, Ms. Kaya placed importance mostly on the observational data in the mathematics lessons of 5th grades. She said: ''I can observe a student's problem solving ability, the student's approach to questions, whether s/he understood the topic or not, how s/he writes mathematically. I can observe everything'' (q1).

She advocated her thoughts through three bases: getting observational data is timesaving, easy, and can be done objectively. In detail, she stated in the interviews that she had gotten observational data in even restricted time and it had not been hard for her. She continued by saying that: ''I do not think there is a difficulty during the classroom observations. There is no obstacle between me and the student in the class. I can make a completely objective assessment. Therefore I place most of the emphasis on it'' (q2).

According to the observational data Ms. Kaya used two ways to observe students in mathematics classes: by walking around the classroom and by observing students' works at the board: First; the video recordings of the classroom sessions on the dates 04.04.2014 (addition of fractions activity) and 09.05.2014 (constructing a rectangle activity) showed that she observed the students by walking around the classroom. She stated that by walking around the classroom, she could have been examining the students' classroom activities and identifying the amount of work put by each student. Second; Ms. Kaya observed students' works while they were solving questions at the board. She thought that students' calculation practices at the board gave data both about students' actual mathematics achievement and their mathematical background. Her related words were as follows: a student came to the board. I say s/he is so so. If this is repeated a few times, I start to think that s/he is

good at mathematics, s/he is interested in the lessons, and s/he asks her /his unknowns'' (q3).

Another informal assessment method of Ms. Kaya was whole-class worked examples. According to the field notes she used constructed-response items for this aim. She said that she prepared the items herself or got help from the internet sources. Then she used the items in the sessions. She explained her applications with the following sentences:

> For instance I solve 2 questions. Then I let the students solve the other 2 questions on the board. After finishing the whole topic, on the other hand, we solve mixed questions related with the topic. However I do not wait until we finish the whole unit. For instance today I taught the decimal expansions. I did not wait to teach the whole part of the decimal numbers unit. We solved items about the decimal expansions during the decimal expansion subtopic (q4).

In addition to the observations and whole-class worked examples, it was revealed by the interview data that Ms. Kaya used students' classroom discussions with each other as an informal assessment. Her practices were also observed during the classroom sessions named as the ''constructing a rectangle activity'' on 09.05.2014. The activity is presented in Appendix E. It included four items. Students were asked to construct rectangles with the length of sides given in each item. They used geometry sticks. If they could not construct a rectangle with the given lengths, they would explain the reason for that result. Ms. Kaya said that more than two students could be noisy while they were working. Moreover it would be hard to follow their works. Therefore, she said, the pair groups were enough to follow the discussions about the activity. According to the video recordings, Ms. Kaya let the students to discuss how a rectangle appears within their groups. In some groups it was observed that the students discussed with each other whether a three sided opened shape could be a rectangle, whether a three sided closed shape can be a rectangle, or whether every four sided shape could be a rectangle. For instance in the second item it was asked whether they could construct a rectangle by using 2 units, 2 units, and 3 units lengths. In some groups students did not construct a three sided closed shape. Instead they constructed the following shape represented in Figure 4.1:

Figure 4.1: An example shape constructed by students in ‘‘constructing a rectangle activity’’

Some students said that this was a rectangle. They said there were two opposite sides having the same length. Their group partners, on the other hand, said that there needed to be one more side. This side should be in the opposite side of the 3 units side and should be equal to it. In some groups the student discussions were ended by deciding to correct the shape like it is represented in Figure 4.2:

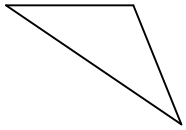


Figure 4.2: Second example shape constructed by students in ‘‘constructing a rectangle activity’’

They wrote on their activity sheets that ‘‘this is not a rectangle because there are three sides in this shape’’. Some groups, on the other hand, wrote that ‘‘this is not a rectangle because this is a triangle’’. Some wrote both.

Another discussion was about the third item. It was asked whether it was possible to construct a rectangle with the lengths of 3 units, 1 unit, 3 units, and 5 units. The students determined the units with the geometry sticks. However after combining the geometry sticks end to end, a discussion got started in some groups. Some students thought that the shape represented in Figure 4.3 was a rectangle whereas some did not:

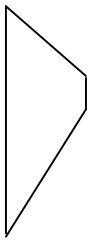


Figure 4.3: Third example shape constructed by students in ‘‘constructing a rectangle activity’’

In most of the groups, the students ended their discussions by writing ‘‘this is not a rectangle because none of the sides are equal. All of them have different lengths’’ It was observed during the works within the groups that, Ms. Kaya did not interfere in the students. However, at the end of their works, it was observed that she became involved in the exercise by giving related examples with the activities, or by directing the students towards the correct answers. For instance during the ‘‘constructing a rectangle activity’’, it was observed by the video data that some groups could not find an answer after their within-group discussions. A few of them, on the other hand, were not sure about their answers. Some also had difficulties in using the geometry sticks. Therefore students asked for help from Ms. Kaya. In 17th minute of the exercise, for instance, a group asked for help about using the geometry sticks. Ms. Kaya made an example geometric shape with the material and asked the students to continue in the same way. Moreover when a group asked whether their answer was correct, she replied to them by saying yes or no.

The classroom session above was an example for students’ classroom discussions with each other in Ms. Kaya’s mathematics lessons. According to the interview data, Ms. Kaya named such kind of group disccussions as an assessment method. It can also be seen with the session above that, Ms Kaya gave feedback to the students by replying their questions about the solutions.

After the analysis of interview data and video data, it was shown that Ms. Kaya preferred to solve the items which were not correctly solved during the classroom assessment activities. After collecting the activity sheets of ‘‘constructing a rectangle activity’’, for example, Ms. Kaya preferred to explain the third item of the activity. The item is represented in Appendix E. It asked the students ‘‘whether

they can construct a rectangle with the line segments of 2 units, 1 unit, 3 units, and 5 units''. The item was the one which the students found most difficult to solve. Ms. Kaya came to the board and the following conversation took place between her and the class:

> *Ms. Kaya: You answered the first, second, and fourth items but you had difficulty in answering the third item. Therefore we will solve this together. The length of the line segments are 2 units, 1 unit, 3 units, and 5 units. (She wrote the dimensions of the lengths on the board). Some of you counted the holes. We are counting the segments between the holes, not the holes themselves. (She constructed the geometric shape represented in Figure 4.3 by combining the geometry sticks). Now tell me what is this shape?*
> *Student A: A triangle*
> *A few students: It is a shape like triangle or trapezoid*
> *Ms. Kaya: How many sides does a triangle have?*
> *Whole class: Three*
> *Ms. Kaya: How many sides does this shape have?*
> *Whole class: Four*
> *Ms. Kaya: Can it be a triangle?*
> *Class: No*
> *Ms. Kaya: Then, what does it look like?*
> *A few students: Trapezoid*
> *Ms. Kaya: Yes, it looks more like a trapezoid or a tetragon than a rectangle. Then this is…*
> *Class and Ms. Kaya (at the same time): Not a rectangle (Loudly).*

It was understood in the conversation that, Ms. Kaya tried to clarify the misunderstandings about using geometry sticks, the properties of a triangle, the difference between a triangle and a tetragon by discussing the current item with the students. However it was also understood in the current conversation that during the ''constructing a rectangle activity'' Ms. Kaya did not wait for the students to solve the item individually on the board. Instead, she gave the answer of the item.

Like she did at the end of the ''constructing a rectangle activity'', Ms. Kaya gave the answers of the items after the ''addition of fractions'' activity on 04.04.2014, too. As it can be seen in Appendix E, the first item of the ''addition of fractions activity'' was:

> *''Construct two fractions with the same denominators and two other fractions with the same numerators by using the fraction bars''*

In the 24th minute of the activity, in order to discuss the results with the students, Ms. Kaya read the item and gave a student opportunity to respond. The student said that she took $\frac{2}{8}$ and $\frac{3}{8}$ as the fractions with the same denominators. Then the following conversation took place between the students and Ms. Kaya:

> *Student A:* $\frac{2}{8}$ *and* $\frac{3}{8}$ *(After that, Ms. Kaya constructed the current fractions by using fraction bars)*
> *Ms. Kaya: Look at the denominators, class. They are the same, aren't they?*
> *Class: Yes.*
> *(Then she read the second part of the item which was asking to determine two fractions with the same numerators. She let student B to respond. Student B responded by saying two fractions with the same numerators)*
> *Student B:* $\frac{1}{3}$ *and* $\frac{1}{2}$ *(After this reply, Ms. Kaya constructed the given fractions with the fraction bars)*
> *Ms. Kaya: Are the numerators same? Look they are same, aren't they?*

It can be seen in the conversation above that, for the solution of the item of the ''addition of fractions activity'', Ms. Kaya answered her own question. She did not wait for the students to make comments or to give any answers.

At the end of the ''addition of fractions'' activity on 04.04.2014, it was again observed that Ms. Kaya interfered in the students' solution. For instance in the 30th minute of the activity, a student was on the board to solve the second item of the activity. The item was

> *''Try to add the fractions* $\frac{1}{3}$ *and* $\frac{2}{3}$ *with the help of fraction bars. Then show the operations through models''.*

When a student was showing $\frac{2}{3}$ through model, she did not divide the area into three parts and she painted the whole area by board marker. She was continuing with the solution, but Ms. Kaya did not wait for the student to finish and check her work. She said *''let's divide this area into three, too''.* The student divided the current area into three equal parts and continued with her solution.

According to the video and interview data, while she was doing a session on the activities, Ms. Kaya sometimes asked students to volunteer to solve the items at the board. She explained the reason of her behavior with the following words:

‘‘coming to the board to solve a question is a kind of examination’’. After the analysis of the field notes, it was understood that, according to Ms. Kaya ‘‘a kind of examination’’ had the meaning of ‘‘assigning a score for students’ informal assessment works’’. Her related words were as follows: ‘‘if you ask me about a student, whoever it is, I definitely have an idea about her/him. My memory about my students is strong. When a student comes to the board for a question, I give a score in my mind’’ (q5). In other words she did not keep a written record for students’ informal works.

Ms. Kaya claimed that some students hesitated to be active in classroom activities since they were afraid of making mistakes. In order to encourage such children she took decisions of their parents. Her related words are in the following:

> I am glad to incorporate parents during assessment implementations at that point. They tell me that their kids are studying too hard at home but they are shy. They say that their children are afraid of making mistakes. They ask me to call the students to the board. Then I pay attention to this request during the lectures. (q6).

According to the interview data Ms. Kaya did not keep the activity sheets of the informal assessments. Moreover she did not keep a written record for them. She said she recorded the common mistakes in her mind so she would follow students’ progresses.

To sum up; Ms. Kaya made observations, applied whole-class worked examples, and let the students to discuss within the groups in order to make informal assessments. Although she placed most of the emphasis on the observational data, Ms. Kaya did not keep a written record for the classroom observations. Moreover she did not use a checklist or a scale for recording students’ whole-class worked studies and classroom discussions. In other words it was revealed by the interviews, document analysis, field notes, and video data that Ms. Kaya did not keep written records for students’ informal class works. On the other hand, she said that, she had scored these observational data in her mind.

4.1.1.2 Formal Classroom Assessment Procedures of Ms. Kaya

Formal assessments can be carried out by the standardized tests, examinations, etc. on a fixed amount of time (Wragg, 2001). For formal assessments, Ms. Kaya obeyed the regulations of The Ministry of National Education during the data collection process. According to the Assessment Regulations of Ministry of National Education, a mathematics teacher in a public school had to assess students with at least three paper-and-pencil exams and one performance-task per semester (MoNE, 2013b). Moreover each student had to conduct a project-study for one of the courses s/he chose in an education year (MoNE, 2013b). Therefore, as it was the obligation of Ministry of National Education, Ms. Kaya used paper-and-pencil exams, project-study, and performance-tasks for formal assessment.

To begin with; it was revealed with the document analysis that, Ms. Kaya implemented three paper-and-pencil exams during the data collection process. According to the interview data she announced the date of the exams one week before. She stated that, except common paper-and-pencil exams, she prepared the items herself and then photocopied the exams. Common paper-and-pencil exams, on the other hand, were the 2nd exams in the current school and were prepared by all mathematics teachers. In common paper-and-pencil exams, 5th grades had the same exams on the same lesson hour. The aim of that implementation was to compare a student's achievement among the other 5th grade students.

Ms. Kaya also stated that she got help from some sources in order to prepare the items of the paper-and-pencil exams. In that manner, she made use of internet and 5th grades' course textbook. She said that she determined some items during the whole-class worked examples, too. ''Sometimes'' she added ''items come into my head during the lessons and I take notes. Then I ask them in the exams'' (q7).

It was observed in the documents that Ms. Kaya did not write the time interval of the exams on the exam papers. However in the interview data she said that she informed students about the duration of the exam orally before the exam started.

According to the field notes, before she distributed the exam papers to students, she told students that they had one-lesson-hour to finish the exam.

The document data of the three paper-and-pencil exams indicated that Ms. Kaya prepared three types of items in paper-and-pencil exams of 5th grades: multiple-choice items, fill-in-the-blank-type items, and constructed-response items. In order to represent an example exam, which was prepared and implemented by her during the data collection procedure, the third paper-and-pencil exam of her 5th grade class is shown in figure 4.4:

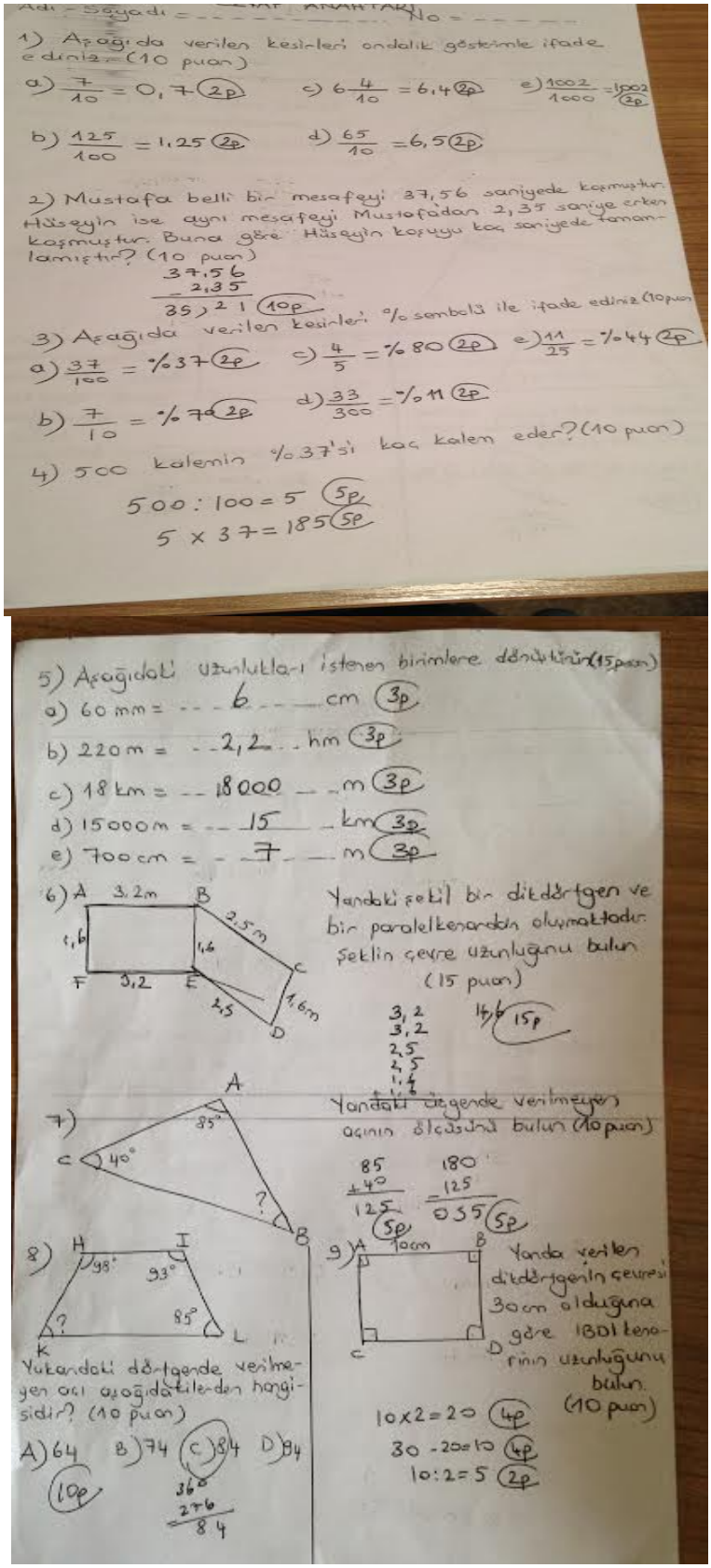


Figure 4.4 An example paper-and-pencil exam implemented by Ms. Kaya

It can be seen in Figure 4.4 that, the paper-and-pencil exam was composed of multiple-choice items (9^{th} and 10^{th}), fill-in-the-blank-type items (5^{th}), and constructed-response (1^{st}, 2^{nd}, 3^{rd}, 6^{th}, and 7^{th}) items.

Figure 4.4 is also an example for the answer key of the current exam. According to the interview data, Ms. Kaya prepared the answer keys of the paper-and-pencil exams before the implementation. Moreover she stated with the interview data that, when preparing answer keys, she took the objectives of the course into consideration. She clarified her words with the 9^{th} item shown in Figure 4.4. She said that in the 9^{th} item, the students were asked to find the unknown side length of the rectangle. According to the interview data, Ms. Kaya thought that in order to find the answer, a student needed to know two main properties of a rectangle: the opposite sides of a rectangle had the same length and the perimeter of a rectangle was calculated by adding all side lengths to each other. She continued with the following sentences:

> If a student understood these properties, s/he had to do the first two operations of the solution correctly. I mean the aim of this question is to observe whether student had learned the properties of a rectangle. Then it is not very important whether s/he did the last step wrong or not at al. This can be originated from lack of attention; because of this reason, I assigned most of the points to the first two operations and the least to the last operation of the solution. (q8).

Like it was explained with the 9^{th} item of the third paper-and-pencil exam, Ms. Kaya stated that she always prepared the answer keys by deciding such scoring-objective relationship. For instance it was observed in the first paper-and-pencil exam documents that Ms. Kaya asked items about putting fractions in order by using ‘‘smaller than’’, and ‘‘bigger than’’ signs. The item was as follows:

> *Rewrite the given fractions in decreasing order by using the suitable sign between them*
>
> *a)* $\frac{5}{9}, \frac{2}{9}, \frac{1}{9}, \frac{11}{9}$ *b)* $\frac{3}{3}, \frac{3}{5}, \frac{3}{15}, \frac{3}{8}$
>
> *Rewrite the given fractions in increasing order by using the suitable sign between them*
>
> *a)* $\frac{7}{2}, \frac{7}{4}, \frac{7}{8}, \frac{7}{3}$ *b)* $\frac{1}{5}, \frac{1}{4}, \frac{1}{3}, \frac{1}{6}$

According to the document analysis it was observed that, Ms. Kaya gave full points to completely correct rankings and ‘‘0’’ to the other answers. During the interviews she explained her scoring preference with the following words:

> …the aim was to assess whether the students could rank the fractions. If s/he used the wrong symbol, this was a big mistake. I mean s/he had not put a comma between them. Instead she put the wrong symbols between the fractions. That meant s/he had known wrong (q9).

Ms. Kaya stated that she gave the answer keys to the students after she announced them the results of the paper-and-pencil exams. She stated the followings: “I give their exam papers to them. I put the answer key on my desk or I give it to them. I let them to check how the items were scored and to see their mistakes. I do this because I do not want them to make the same mistake again’’. (q10).

In addition to the paper-and-pencil exams, by the requirements of Ministry of National Education, students were assigned performance-tasks in each semester. As a result of this, Ms. Kaya implemented performance-tasks as a formal assessment, too. It was understood with the document analysis that, in the current school, department of mathematics took common decision about the number of performance-tasks. According to their decision one performance-task would be implemented per semester. Therefore Ms. Kaya implemented one performance-task during the data collection process. Then she scored the tasks by using a scoring-guide which she adapted from internet sources. Last of all, she gave performance-task grades according to these scores.

To begin with; Ms. Kaya stated during the interviews that, she wanted to monitor students’ progress with the performance-tasks. She added that, for that reason she preferred to implement all steps of the performance-tasks in the classrooms. She claimed that she could observe each step of the task by such an application. Therefore she had listed the equipment needed for the task before implementation. Then, on the implementation day, the students brought their equipment to the classroom. The equipment was pencil, construction paper, scissors, and a carton paper.

Second, it was also revealed by the interview data that Ms. Kaya decided on the topic and the instructions of the performance-task herself before the

implementation. She determined the topic according to the annual plan. She stated that she had done all the lessons about the addition and subtraction operations with fractions. She added that, for that reason she decided on a task about addition and subtraction operations with fractions. The name of the task was ‘‘doing and modeling the addition and subtraction operations with fractions’’.

Third of all, it was revealed by interview data that Ms. Kaya decided on the group members before the implementation day. It was observed in the video recordings on 11.04.2014 that the students were divided into groups. In each group there were four students. Ms. Kaya claimed during the interviews that she tried to form heterogeneous groups. Her words were as follows:

> I tried to form a balance. I did not form a group with only easily-taught students. I did not form a group with only hardly-taught students, either. For instance there was one easily-taught student, one hardly-taught student. The other two students were neither easily-taught nor hardly-taught ones. (q11).

Another issue of the performance-tasks was the scoring-guide which was used to score students’ tasks. According to Ms. Kaya a teacher might follow students’ works during the performance-tasks, if the scoring-guide could have been ready before the implementations. The field notes, also, revealed that Ms. Kaya prepared the scoring-guide and shared it with the students. For that aim she explained the criteria of the scale to students and hanged it on the classroom billboard one week before the task was implemented. She stated during the interviews that she used the scale for two aims: to score the performance-tasks and to let the students check their assessment results. In figure 4.5 the scale that Ms. Kaya used for scoring the students’ performance-tasks and the project studies is shown as an example:

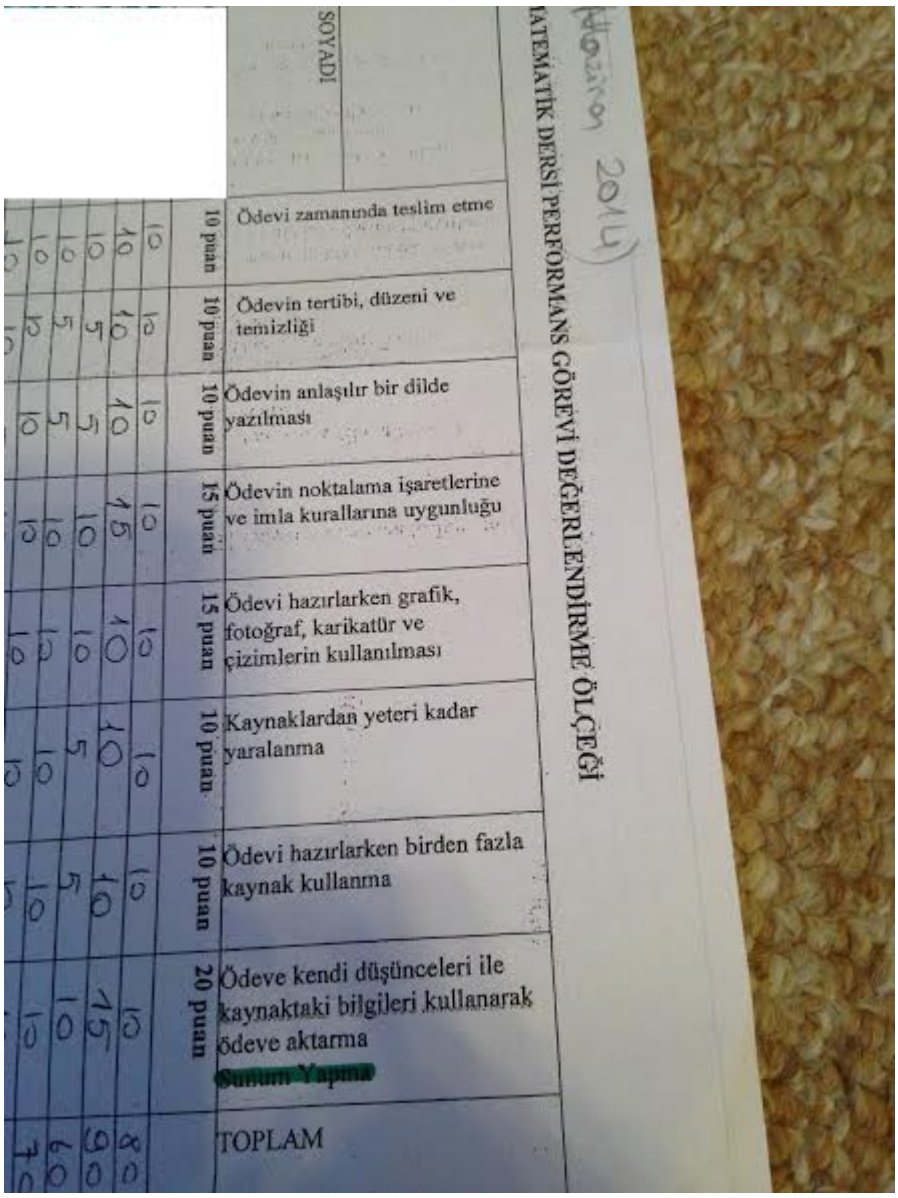


Figure 4.5: The scoring-guide of performance-tasks used by Ms. Kaya in 5th grades.

It can be seen by Figure 4.5 that the criteria for scoring the performance-task were as follows: submitting the task on time; using an order in giving the information; using Turkish language understandably; using punctuation marks and spelling correctly; using pictures, photographs or drawings if needed; making use of references sufficiently; using more than one reference; connecting her/his own thoughts with the information given by the references. Moreover it was shown in figure 4.5 that the scoring was determined only for the completed works. Scoring for

the incomplete or completely wrong works was not determined in written form on the scoring-guide.

It can, also, be seen in Figure 4.5 that Ms. Kaya did not construct any criteria for scoring mathematics issues. She explained this situation during the post-activity interviews. She asserted that since the 5th grades of the current school had problems on writing and understanding Turkish and doing efficient research, they could not have been preparing the tasks adequately. ‘‘Therefore’’ she added ‘‘I preferred these criteria in scoring their work. I think using these criteria will make contributions to their prospective mathematics performances, too’’.

The interview data and the document analysis showed that, Ms Kaya made use of mathematics department decisions and internet in order to prepare her own scoring-guide for performance assessment. According to the document analysis, for instance, mathematics department of the current school suggested an example rubric framework at the beginning of the school year. There were five main criteria in the mathematics department example rubric: making use of sufficient references, pictures, photographs or drawings if needed; using Turkish language and the punctuation marks correctly and giving the information in order; using more than one reference; submitting the task on time; and cooperation between the group members. The document analysis showed that Ms Kaya used four of them in her own scoring-guide. They were: making use of sufficient references, pictures, photographs or drawings if needed; using Turkish language and the punctuation marks correctly and giving the information in order; using more than one reference; and submitting the task on time. She added that she also got help from scoring-guide examples on internet in order to construct her own guide. On the other hand she did not use the measurement scale which was suggested by the mathematics department. The scale of the school mathematics department rubric was rated from 1 to 4 for each criterion whereas Ms Kaya’s scoring-guide did not represent such a scale. According to her scoring-guide she gave full points to completely correct answer. She did not define any points for completely wrong or partially right answers.

Fourth of all, Ms. Kaya implemented performance assessment tasks on 11.04.2014. According to the video recordings, she wrote the instructions for the task on the board before the exercise started. Then students wrote them on their papers. In

other words, she did not give the guidelines in written form. The instructions were as follows: please take two fractions with different denominators, do an addition operation with them, and show the operation through the model; please take an improper fraction and a proper fraction, do a subtraction operation with them, and show the operation through the model; please take an integer and an improper fraction, do an addition operation with them and show the operation through the model; At the end of the exercise, only the cartons will be collected as performance-tasks. Therefore please show all your work on the carton papers.

Like she did during the paper-and-pencil exams, Ms. Kaya did not write time interval of the performance-task activity in written form. She did not state the time at the beginning of the exercise, either. On the other hand, on the 46th minute of the exercise, she warned the students about remaining time. She told how much time was left and then, on the 72nd minute, she collected the cartons.

During the performance-task session, Ms. Kaya interfered in the students' works. For instance; according to the video records, like she did during the informal assessment activities, Ms. Kaya gave the answers of her own questions during the performance-task implementations. For instance on the 12th minute of the video record, there was a conversation between her and a student about the current performance task:

> *Student C: Here it says ''find the difference of a proper fraction and an improper fraction''.*
> *Ms. Kaya: Yes*
> *Student C: How will we find the difference?*
> *Ms. Kaya: (Loudly to the classroom) what does it mean ''to take a difference''*
> *Class: Making a subtraction operation*
> *Ms. Kaya: (providing eye contact with the student) you will find the difference. This means doing a subtraction operation. You need to remember the previous lessons. We have solved similar questions.*

It is shown in the conversation that Ms. Kaya asked the students what taking a difference meant. After getting the correct answer from the class, she gave the answer of her own question by saying *''you will find the difference''* to Student C.

Similar with the previous conversation, Ms. Kaya interfered in the students' handworks, too. Sometimes she provided them with practical information about how to fit the study on the carton papers. Moreover if she observed that they were losing concentration or not following the guidelines, she did not hesitate to warn them. For instance on the 16th minute, a group passed the instruction of ''please determine two fractions with different denominators''. They passed this instruction and started to do the operations. Ms. Kaya warned the group by saying:

> *''First you need to choose the numbers and write them on the paper. Then you will make the operation and modeling with these chosen fractions''.*

During the study, on the other hand, it was observed that some students' behaviors were not compatible with their group work. For instance they were playing with each other or talking with their friends. Ms. Kaya, however, showed more attention to these students. She spent much time near them and showed interest in their studies by asking questions like ''what will you do next? Is this your answer? Did you model the operation''. In other words it can be said that, during her classroom observations Ms. Kaya did not hesitate to get involved in students' works.

During the interviews Ms. Kaya stated that she would score students' performance-tasks by observing their works in the classrooms. Therefore she observed students by walking around the classroom during the performance-task activity. At the same time, different from the informal assessment activities, she kept written documents such as ''Ali cut the construction paper for modeling the fractions in his group work'', or ''in group A, Zeynep drew the models of the operations on the cartons''. However, it was indicated with the interview data that Ms. Kaya did not use observation notes for scoring students' performance-tasks. The document analysis also showed that, in the scoring-guide, there were no criteria related with her observation notes or students' group work.

Another major assessment procedure that Ms. Kaya used in her 5th grade class was the project-study. In each year, by the requirements of The Ministry of National Education, students are assigned a project-study from a course that they select. Moreover according to the field notes the assignment deadlines and the topics of the projects were determined by the mathematics department of the school in the beginning of the academic year. According to the decisions of the department, the

projects were assigned in December 2013 by the mathematics teachers. The deadline, on the other hand, was determined by the department as the last week of April. Last of all, the department offered six project topics for the 5th grades. They were constructing a Gregorian calendar, constructing a kite, planning a trip, suggesting solutions to prevent water-waste, get to know the polygons, and representing the parents' jobs with a table.

According to the document analysis, similar with the performance-task procedure, Ms. Kaya gave project topics along with the mathematics department suggestions. Ms. Kaya chose the topic of ''get to know the polygons''. There were 7 students who wanted to prepare a project from mathematics in Ms. Kaya's 5th grade classroom. She gave the same project to each student. The project was about the triangles, rectangles, squares, pentagons, and hexagons. Ms. Kaya said that the properties of the polygons and drawing them was a topic of 5th grades' curriculum. Moreover she thought that since the topic included abstract items, the students would have difficulties in understanding the geometry concepts of that topic. She added that, as a result of this she asked the students to prepare projects about the polygons topic. During the post-activity interview of the project-study Ms. Kaya explained how she determined the projects with the following words:

> I am aware of students' achievement levels. Furthermore I observed their handcraft during the performance-tasks in last semester. I decided that researching properties of the types of polygons, explaining their differences, and drawing their shapes would be sufficient for them. I thought that students who prepare projects in accordance with their achievement levels would finish their works willingly. Therefore they would not become alienated from mathematics. Moreover I wanted the unsuccessful students get higher points, too. (q12).

According to the interview data Ms. Kaya determined the instructions of the projects herself. The related instructions were as follows: research the properties of triangles, rectangles, squares, pentagons, and hexagons; explain their differences; draw their shapes; and show your all work on your projects. She added that she gave guidelines in written form and explained the instructions of the projects orally.

According to the document analysis, however, the properties of the pentagons and hexagons were not included in the 5th grades' curriculum. However the students were asked to draw, to explain, and to compare pentagons and hexagons

too. Moreover it can be understood by the guidelines of the project-studies that there were no instructions about drawing the intended geometric shapes or about using a ruler or a miter. A part of a project-study completed by a 5th grade is shown in figure 4.6:

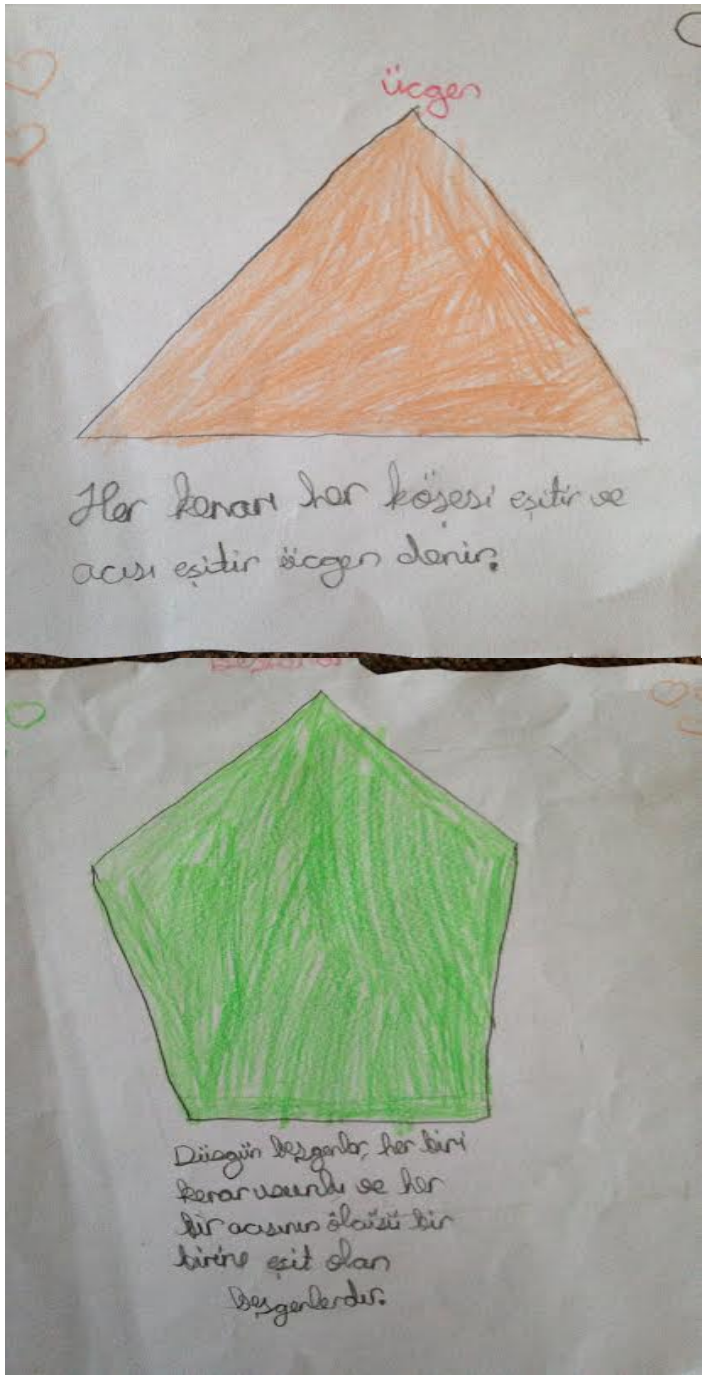


Figure 4.6: A part of a project-study completed by a 5th grade in Ms. Kaya's class

In Figure 4.6 a student's drawings about an equilateral triangle and a regular pentagon are given. Two evaluations can be done by the figure. First, the project included pentagons although it was not included in the 5th grades' curriculum. Second, it can be seen by the figure that the student had not used a ruler or a miter in drawing the geometric shapes. Therefore the student could not have drawn a regular pentagon although she thought she did it. Moreover the edges of the equilateral triangle were not equal. If the student could have used a ruler, maybe she would have drawn the shapes correctly. However, according to the interview data, using equipment such as a ruler or a miter had not been determined through the guidelines of the project-study. Therefore it can be said that Ms. Kaya preferred to give project studies that included external topics. On the other hand she did not prefer to determine instructions for encouraging supportive equipment such as ruler or miter.

According to the interview data, Ms. Kaya graded students' projects with the same criteria that she used for performance-tasks. The criteria were as follows: submitting the task on time; using an order in giving the information; using Turkish language understandably; using punctuation marks and spelling correctly; using pictures, photographs or drawings if needed; make use of references sufficiently; using more than one reference; connecting her/his own thoughts with the information given by the references.

The project which was partly shown in figure 4.6, on the other hand, got a score of 70 for that project. According to the document analysis, the student lost points from the criteria of using Turkish language understandably; using punctuation marks and spelling correctly; using pictures, photographs or drawings if needed and connecting her/his own thoughts with the information given by the references. She got the least points from the criteria of using pictures, photographs or drawings if needed (5 points over 15) and connecting her/his own thoughts with the information given by the references (10 points over 20). Ms. Kaya explained this result during the interviews: ''the owner of the project which was shown in figure 4.6 wrote incompatible explanations with her drawings. Her wrong or incomplete answers also indicated that she did not use reliable resources''.

Last step of the formal assessments was announcing the results to the students and the school administration. Announcing formal assessment results

included some procedures. To begin with, according to the rules of The Ministry of National Education, all the formal assessment results should be announced to the students in 10 workdays (MoNE, 2013b). Moreover the common-paper-and-pencil exam results should be reported to the school administrations at the end of each semester. It was revealed by the field notes that, for announcing formal assessment results to the students, Ms. Kaya obeyed the obligations of The Ministry of National Education. She announced each formal assessment in 10 workdays. Moreover she gave a written report to the mathematics department about the results of the common-paper-and-pencil exams at the end of the semester. These reports included the number of the students that got grades over 44 and under 44. The school administration, on the other hand, used these reports for calculating the overall annual mathematics achievement of the current school.

In summary; the document analysis revealed that Ms. Kaya implemented three paper-and-pencil exams and one performance-task to each 5^{th} grade student whereas she gave project studies to only the willing ones. The procedures of the formal assessments were determined by the Ministry of National Education (MoNE, 2013b). Therefore, it was observed that Ms. Kaya tried to obey the obligations of the Ministry. According to the field notes and interview data, she announced the time of the implementations one week before the study; she prepared answer keys or announced the scoring-guides before the implementations. Moreover she announced the results within 10 days and gave answer keys or scoring-guides to students for checking. She also gave common-paper-and-pencil-exam report to mathematics department. However, it was also indicated by the documents that there were no criterion available for assessing students' mathematical skills in performance-tasks and project studies directly.

4.1.2 Ms. Kaya's Use of Assessment Results

The interview data, the observational data, the document analysis, and the field notes indicated that, for summative purpose, Ms. Kaya practiced formal assessment such as paper-and-pencil exams, performance-tasks, and project-studies. For formative purpose, on the other hand, Ms. Kaya practiced both the formal and

the informal assessments. The informal assessments included observations, whole-class worked examples, and student discussion or comments about the classroom activities.

According to the classroom assessment framework of McMillan (2007a), Ms. Kaya's use of informal and formal assessment results was the last step for her assessment processes. Therefore it is required to explain Ms. Kaya's use of assessment results.

In the following sections Ms. Kaya's use of classroom assessment results will be detailed. With the help of the related data, the answers to the following research questions are investigated:

1. In what way are the participating mathematics teachers' formal and informal assessments related with their use of assessment results in 5th grade classrooms?"
2. How do the participating mathematics teachers use the results of their assessment practices formatively in 5th grade classrooms?

As a result of the related literature and the data collected, in order to answer the current research questions, Ms. Kaya's ways for using assessment results will be explained in the following subsections.

4.1.2.1 Ms. Kaya's Use of Assessment Results for Making Decisions on Her Instructional Practices

In some of her instructional decisions, Ms. Kaya demonstrated that she made use of assessment results for making decisions on her instructional practices In that sense, according to the interview data, Ms. Kaya used assessment results in order to make decisions about repeating a topic or about the effectiveness of her teaching.

To begin with; during the interviews Ms. Kaya stated that if she realized that students had doubts, could not answer correctly, or could not find the solution by themselves, she summarized the misunderstandings in a limited time and explained why they gave wrong answer to the questions. She gave an example from the ‘‘quiz activity’’ which was represented in Appendix E. In the activity the first item was the following:

Decide whether the fractions $\frac{2}{3}$ *and* $\frac{4}{5}$ *are equivalent or not? Explain your answer. You can show your operations through model too.*

Ms. Kaya said at the end of the activity that some students drew the fractions with different amount of models. Therefore they could not have compared the fractions truly. An example answer is represented in Figure 4.7:

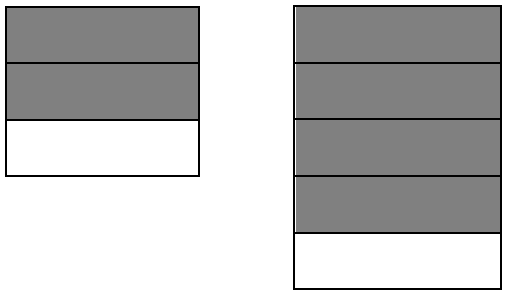


Figure 4.7: An example answer in Ms. Kaya's class for comparing fractions

According to the document analysis, the owner of the answer represented in figure 4.7 wrote that, the two fractions were equal because they had the same distance to be a whole. In Ms. Kaya's opinion, this mistake occurred because of wrong modeling. Therefore, she told that, she gave a break in her plan and reviewed the topic in the classroom in 15 minutes, emphasizing on the comparisons of fractions. Her related words were as follows: ''I told them that comparisons with a model could be done if all the fractions were represented on the same amount of a whole''.

It was revealed in the documents that Ms. Kaya's 5th grade class made mistakes about length measurement, too. For instance after the 3rd paper-and-pencil exam, the common mistake among students was about the following sub-item:

220 m = ...hm

Ms. Kaya stated that students had difficulties about transferring a length measure to a higher length unit. According to the document analysis, on the other hand, some students did not do the operation whereas some wrote ''22'' in the empty space. It was stated in the final interview data that, after she scored students' papers, Ms. Kaya preferred to repeat the subtopic about making transfers from a length

measure to its higher units. She stated that she repeated the topic by solving examples related with it.

After the 1st paper-and-pencil exam, also, she stated that she repeated the meanings of ‘‘smaller than’’ and ‘‘bigger than’’ signs. According to the document analysis students made mistakes mostly on putting the direction of the signs. The related items were in follows:

I_1: Rewrite the given fractions in decreasing order by using the correct sign between them

a) $\frac{5}{9}, \frac{2}{9}, \frac{1}{9}, \frac{11}{9}$

b) $\frac{3}{3}, \frac{3}{5}, \frac{3}{15}, \frac{3}{8}$

I_2: Rewrite the given fractions in increasing order by using the correct sign between them

i) $\frac{7}{2}, \frac{7}{4}, \frac{7}{8}, \frac{7}{3}$

ii) $\frac{1}{5}, \frac{1}{4}, \frac{1}{3}, \frac{1}{6}$

According to the document analysis, some students rewrote the fraction groups of both items in decreasing order or rewrote all of the groups in increasing order. Some of them, on the other hand, did not use the correct sign. According to the document analysis, Ms. Kaya shared these results with the students and repeated the ‘‘comparison of fractions’’ topic.

On the other hand it was also indicated with the interviews that in some situations Ms. Kaya decided not to repeat a topic. For instance she claimed that if a student did a logical error in her/his solution, it did not give negative feedback about her teaching effectiveness. She said that ‘‘in such a situation I do not use assessment results for repeating the topic’’. In that manner she mentioned about students’ common mistakes in the ‘‘problem solving activity’’ which was represented in Appendix E. In the problem there were two price lists for the equipment of two different puppet trademarks. The lists of the two trademarks are listed in Table 4.1:

Table 4.1: The lists of the two trademarks listed in the ‘‘problem solving activity’’ (In Ms. Kaya’s Class)

Product	**Price of Trademark A (Turkish Liras)**	**Price of Trademark B (Turkish Liras)**
The puppet	20	26
Linden made puppet stem	7, 75	11,25
The dress kit for the puppet	4	9, 5
The dye kit for the puppet	3, 5	6
Equipment for pulling the wires of the puppet	3	5, 5

By using the Table 4.1, students were asked to answer the following item:

Find the minimum cost of the equipment for constructing the puppet.

After the activity, the document analysis indicated that some students decided wrongly on the trademark although they did the addition operation correctly. Ms. Kaya stated that:

> Lots of the mistakes were not related with addition-subtraction operations of decimal numbers, but related with the logic students used. Students who made mistakes seemed to have learned the addition operation with decimal numbers but they could not decide on which trademark was cheaper. This is related with their logic. This is not about the objective. This is a challenge related with the problem solving ability. If they could not have done the addition operation with decimal numbers, on the other hand, I would repeat the topic again. (q13).

Second of all, Ms. Kaya remarked that she understood her teaching effectiveness with the assessment results. For instance after the ‘‘addition of fractions activity’’, it was understood with the documents that, although they had difficulty about showing the operations through models, most of the students could have done the addition operation with fractions. The questions were:

> *Do the following operations by using fraction bars and show the operations through models:*
>
> $\frac{1}{3}+\frac{2}{3}$ $\frac{2}{4}+\frac{1}{8}$

The documents of students' activity papers showed that, students could do the operations. For instance they did the following operations:

$$\frac{1}{3}+\frac{2}{3}=\frac{3}{3}$$

$$\frac{2}{4}+\frac{1}{8}=\frac{4}{8}+\frac{1}{8}=\frac{5}{8}$$

It was observed in the documents that, for adding $\frac{1}{3}+\frac{2}{3}$, they added the numerators and wrote the result with the common denominator. Moreover they equalized the denominators of $\frac{2}{4}$ and $\frac{1}{8}$ by enlarging $\frac{2}{4}$ by 2. Then they found the common denominator as 8. Lastly, they added the numerators and wrote the result with the common denominator. Ms. Kaya stated that only two students had difficulty in solving the operations. As a result of this, she thought that her teaching was efficient enough to make students learn the topic. She claimed the followings:

> They only had problems about modeling the operations by using materials. They mostly asked questions about using fraction bars. This showed me that I could have taught the addition operation and solved enough questions about the topic. On the other hand, I think that the difficulty about using materials was originated from their lack of experience about using fraction bars. (q14).

In summary; it was shown in the interview data, classroom observations, and field notes that Ms. Kaya used assessment results for deciding on repeating a topic and for understanding her teaching effectiveness. However it was also indicated that Ms. Kaya repeated a topic if most of the students made mistakes about it. In order to understand the effectiveness of her teaching, on the other hand, she checked the number of students who made mistakes about a topic. If most of the students answered the items correctly, then she thought that her teaching was efficient enough. Moreover the field notes indicated that she wanted to adhere to the schedule of the annual plan. Therefore she did not spend more than 15 minutes in repeating a topic.

4.1.2.2 Ms. Kaya's Use of Assessment Results for Making Decisions on Her Assessment Practices

The overall data indicated that Ms. Kaya used assessment results to decide on the adjustments for further assessment practices. Moreover she decided on the suitability of the assessment methods by using the results of 5th grades' assessment practices.

First of all; she gave a student's paper-and-pencil exam as an example. Student Selin got 49 from the 1st paper-and-pencil exam. She had been a successful student until then. According to the document analysis Selin made mistakes on arranging the fractions in correct order. She used the ''bigger than'' and ''smaller than'' signs in the wrong way. Moreover she did not answer the following problems:

I: Uncle Ali broke $\frac{3}{5}$ *of 84 eggs. How many eggs are left?*
I: A greengrocer sorted out 8 kg rotten tomatoes from the total tomatoes he had. The rotten tomatoes were $\frac{2}{5}$ *of the total. Find the amount of the total tomatoes.*
I: We have 200 balloons. $\frac{6}{10}$ *of them exploded. How many balloons are left?*

It was understood with the document analysis of Selin's exam paper that she could not answer the problems related with the fractions. According to the post-activity interview data, on the other hand, Ms. Kaya observed Selin carefully during the following classroom practices. She stated that she let Selin to answer whole-class worked examples more often and tried to find the reason that prevented Selin from getting a higher grade. Then she figured out that Selin had understood the topic but she had not solved different kind of problems on fraction operations individually. Therefore Ms. Kaya gave her achievement tests about fraction problems. She stated that she also discussed the results of the achievement tests with Selin during the break.

In addition to paper-and-pencil exam results, Ms. Kaya used performance-task results for making adjustments for further assessment practices, too. According to the interview data, for example, Ms. Kaya used performance-task results for making adjustments on project studies. She explained her decisions as follows:

> Among my 5th grades, there were 7 students who had project-study assignment in mathematics. I observed their levels and handcraft during performance-task practices in the first semester. I decided that researching properties of the polygons, explaining their differences, and drawing their shapes would be appropriate for them. (q15).

According to the interview data, sometimes Ms. Kaya used assessment results for making intentions her further practices, too. An example for that situation took place after her performance-task implementation on 11.04.2014. The task was about doing and modeling addition and subtraction operations with fractions. In the current performance-task the following items existed:

> *Please take two fractions with different denominators, do a subtraction operation with them, and show the operation through a model; please take a mixed fraction and a proper fraction, do a subtraction operation with them, and show the operation through a model; please take a whole number and a mixed fraction, do an addition operation with them and show the operation through a model.*

Ms. Kaya stated that dealing with the operations related with such amount of items were hard for her 5th grade class. For the subsequent performance task, on the other hand, she made intention to prepare tasks with fewer items. She said that ‘‘I will offer fewer items. For instance I will ask for doing only an addition operation with the fractions. I think it would be more efficient for them. Moreover it would be less time consuming’’. She also made a decision on the way of implementing further tasks. She said that: ‘‘I will explain the instructions before the implementation, not on the implementation day of the activity. In order to clarify each item, I will explain the purposes and my expectations in detail’’.

Ms. Kaya stated that, she used performance-task evaluations for making decisions on the improvement of further group works, too. The interview data and video recordings showed that, during the performance-task exercise students could not work efficiently in group works. For instance, a group member was only cutting a paper whereas another one was doing the mathematical operations alone. Moreover screaming quarrels took place between some group members. The video recordings revealed that a group member wanted to write $\frac{1}{2}$ and $\frac{1}{5}$ for the two fractions with different denominators, and do a subtraction operation with them. Another group member, on the other hand, wanted to write $\frac{2}{3}$ and $\frac{1}{6}$. They could not stop this

discussion and made complaints to their teachers. At the same time, some group members interfered in different groups' studies. Ms. Kaya claimed that all these led to loss of time and lack of organization in group works. According to her, students were not aware of work sharing. She also asserted that they were not aware of exchanging considerations about making addition and subtraction operations with fractions or modeling the operations. As a result of these evaluations, Ms. Kaya made decisions on the implementation of the group works. She acknowledged that in the further performance-tasks she would prefer one of the following adjustments: supporting more group works, or implementing individual tasks through fewer items. She advocated that encouraging such practices would prepare students for listening and making efficient discussions in a group work. Implementing individual performance-tasks, on the other hand, would be more productive in the crowded classrooms. However during the data collection process, the researcher did not observe or realize any other group work in Ms. Kaya's 5th grade mathematics class.

The document analysis and interview data indicated that, like she did after the formal assessment results, Ms. Kaya also used informal assessment results to decide on adjustments for further formal assessment practices. According to the interview data, for instance, whole-class worked examples and her classroom observations affected her decisions about the type of the items she used in paper-and-pencil exams. For instance she observed that 5th grades did not have enough capability to express their thoughts through words. Therefore she did not prefer to ask open-ended-questions in paper-and-pencil exams. She gave an example from a classroom session:

> During a whole-class worked example, I drew a triangle and asked students whether the current geometric shape was a rectangle or not. I also asked them to explain their answers. All of the students confirmed that it was not a rectangle. However lots of them could not explain the reason of their answer by words. Some of them drew the shape of a rectangle and said that 'because a rectangle looks like that shape', some of them, on the other hand, said that 'this is not a rectangle because it is a triangle'. I understood that they knew the answer but have not been ready for discussing an open-ended item. Moreover I could not decide how to score such kind of items. Maybe a student knew the properties of a rectangle, drew its shape correctly but used wrong words because of her/his weak Turkish background. How could I know that? Therefore I did not ask any open-ended item in my 5th grade paper-and-pencil exams (q16).

The interview data also indicated that Ms. Kaya used the assessment results for deciding on the suitability of the assessment method, too. For instance she used 1st paper-and-pencil exam results in order to decide the suitability of the exam. A part of the exam is visualized in Figure 4.8:

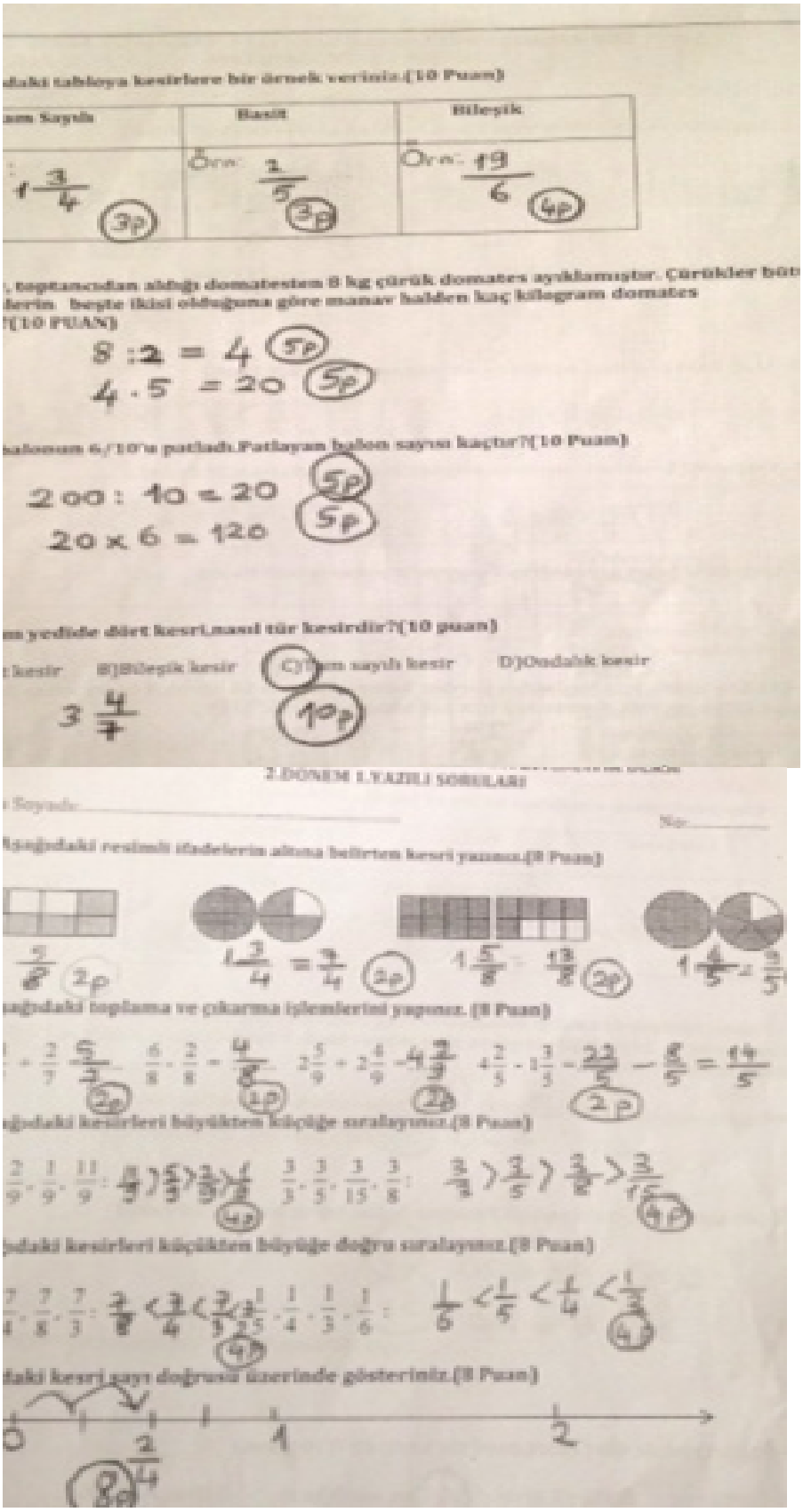


Figure 4.8: A part of the 1st paper-and-pencil exam that Ms. Kaya implemented

It can be seen in figure 4.8 that Ms. Kaya asked items related with rewriting fractions in decreasing or increasing order; doing addition and subtraction operations with fractions; modeling the fractions; placing the fractions on number line; illustrating and defining the mixed fractions, proper fractions, and improper fractions. According to the interview data, on the other hand, she was positive about the suitability of the exam. Her explanation was as follows:

> All of the questions are similar to the ones I solved during the lessons; I did not ask different thematic items. The class achievement is quite high. I also think that the items are in relation with the objectives. Therefore I think that the exam is sufficient in assessing students' successes (q17).

The document analysis of the annual plan and curriculum also indicated that, like she stated during the interviews, the 1st paper-and-pencil exam items were compatible with the related objectives. Moreover it was also made clear with the field notes that Ms. Kaya asked similar items during her previous whole-class worked activities in the 5th grade mathematics class.

To sum up; the overall data of the study showed that Ms. Kaya decided on the adjustments for further assessment practices or the suitability of the assessment methods by using the results of the 5th grades' assessment practices.

4.1.2.3 Ms. Kaya's Use of Assessment Results for Improving Students' Learning of Mathematics

Ms. Kaya used assessment results in order to improve students' learning of mathematics. In that manner she used the results for monitoring the students' progress; assigning their overall grades for the whole year; giving formative feedback to both students and their parents; preventing students from feeling anxious; encouraging them to study; and identifying areas of strengths and weaknesses (diagnostic decisions).

To begin with; the interview data indicated that in order to monitor students' progress, Ms. Kaya followed the students' classroom activities, paper-and-pencil exams, and performance-tasks. Her related words were as follows:

> The increase in their success can be observed by their participations to lessons. Moreover they work regularly. They question things that they did not understand. Although they get low grades from the paper-and-pencil

> exams, they prepare efficient performance-tasks. They try in some way. (q18).

The classroom observations and field notes showed that Ms. Kaya did not keep written records for monitoring students' progress, but she trusted her memory. She explained her method with the following sentences:

> I observe their mistakes and record them on my memory. I monitor students' progress through the further assessments. I try to indicate whether these mistakes have been removed or not. Since I observe and write it on my mind, I can monitor whether it is removed or repeated (q19).

It can be understood by the quotation that Ms. Kaya used both the formal and informal assessment results for monitoring students' progress in mathematics. However it was revealed by the interview data that in order to monitor students' progress in mathematics, she mostly relied on the paper-and-pencil exam results. During the post-activity interviews of the paper-and-pencil exam, for instance, she stated that the exam results gave her idea about students' progress. After the first paper-and-pencil exam she told the following words: ''the results of the exam gave idea about students' progress. I realized that students who were the high-achievers in the first semester were successful in this exam, too''. (q20). After the third paper-and-pencil exam, also, she added the followings:

> I was expecting that students, who participated in lessons and showed success, would also be successful in the exam. It occurred as I expected. Only a few students got grades different from my expectations. I was expecting them to get 85 and over 85 however they got 82 or 83 points. These scores were not exactly 5 but they were close to 5. Therefore students, mostly, got grades close to my expectations. (q21).

Second, Ms. Kaya claimed that she used both summatively purposed and formatively purposed assessment results during the overall grading process. According to the interview data, the grading process started with getting the observational data of students' progresses. She stated that she learned each student's mathematical progress by observing them in class. She added that none of the results had a pre-determined proportion on the overall grades for the whole year. According to the document analysis, at the same time, she kept records of all the formal assessment results. She said that she used the observational data for the overall grade at the end of the semester. She explained her system with the assessment results of

Student Demir. According to the document analysis, Demir had an overall grade of 80 from the formal assessment results but he got 90 for mathematics in his school report. Ms. Kaya explained this example with the following words:

> I checked the overall grade gotten through the paper-and-pencil exams, performance-tasks and project studies. Demir's overall grade was 80 but I observed that he raised his finger for solving the exercises, was active during the lessons, and interested in the lessons. Therefore, through my classroom observations, I had already a grade on my mind for him. I think his mathematical performance was 90. It did not matter if he got an overall grade of 80, I compensated the deficiency somehow and I gave him 90. (q22).

Third of all, Ms. Kaya used the assessment results for giving formative feedbacks to both students and their parents. According to the document analysis and interview data, she gave formative feedbacks to students orally or by writing notes on their tasks or projects. For instance she wrote feedbacks on a student's project-study, a piece of which is shown in figure 4.9:

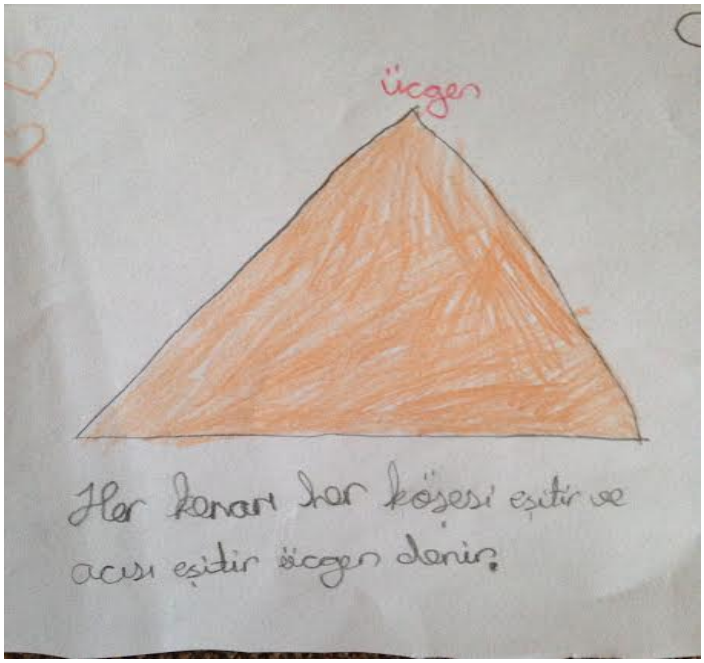


Figure 4.9: The part of a project-study on which Ms. Kaya wrote feedbacks

Ms. Kaya wrote the following feedbacks for the part of the project which is represented in figure 4.9:

> The information about the current triangle cannot be understood. You need to be clearer on summarizing a topic. Furthermore you need to fix the drawing of the triangle. If you do not want to make these mistakes again, you need to do the researches more carefully (q23).

Ms. Kaya gave formative feedback about the students' assessment results to their parents, too. It was observed on the documents that after the informal assessment activities, for instance, Ms. Kaya reported students' weaknesses to their parents. She informed the individual student's weaknesses to his/her parents by writing a note on the activity papers. For instance after the ''quiz activity'' she realized that a few students made mistakes in enlarging the fractions which were stated in the following item:

> *Decide whether the fractions* $\frac{2}{3}$ *and* $\frac{4}{5}$ *are equivalent or not? Explain your answer. You can show your operations through model, too.*

The document analysis revealed that a few students made the following operations in order to enlarge the fractions:

$$\frac{2}{3} = \frac{2}{15}$$
(5)

$$\frac{4}{5} = \frac{4}{15}$$
(3)

It can be seen with the operations that, in order to enlarge the fractions, students multiplied only the denominators by the required numbers. However it was observed in a student's paper that, Ms. Kaya wrote the following note to his parents: ''He does not study enough. He needs to review previous topics. I am sending a test about the topic. Please support him to finish it.'' (q24).

After the practice of ''addition of fractions'' activity, also, Ms. Kaya wrote on another student's activity paper the following feedbacks: ''she has some difficulty on addition operation of fractions with different denominators. Her practice about equating denominators is weak''. She explained the reason of writing such feedbacks as follows:

> I inform the parents. Therefore they can monitor their children's mathematical progress. Moreover they can support students about reviewing the issues. It is good that parents also learn the weaknesses of their children. Cooperating with them affects students' progress positively. (q25).

Ms. Kaya thought that there was not enough time to give formative feedback to each student. She continued: ''however I solved the unanswered items.

Moreover I explained the common mistakes and gave the correct answer. I warned them to be careful about the current mistakes. I preferred to give feedbacks during the activity because it was more effective''. (q26).

Like she stated in the quotation above, Ms. Kaya gave formative feedbacks about the students' common mistakes during the classroom observations, too. She gave the correct answer to the students or explained what they did wrong. For instance it was revealed with the observational data that, at the end of the ''constructing a rectangle activity'' Ms. Kaya preferred to explain the correct usage of the geometry sticks. In the activity the students were asked to determine whether rectangular shapes could be constructed with the given measures. In order to construct the shapes, on the other hand, students would use the geometry sticks. However, it was observed on the video recordings that students were confused about the usage of the geometry sticks. Some of them counted the holes whereas others counted the segments between the holes. However they had difficulty in answering the third item. The item asked the students ''whether they can construct a rectangle with the line segments of 2 units, 1 unit, 3 units, and 5 units''. According to the interview data, Ms. Kaya realized that some students could not answer the item because of the wrong usage of the material. Therefore she gave the following formative feedback orally at the end of the activity:

> *.....The length of the line segments are 2 units, 1 unit, 3 units, and 5 units. (She wrote the dimensions of the lengths on the board). Some of you counted the holes. We are counting the segments between the holes, not the holes themselves. (Then she constructed the geometric shape by combining the geometry sticks).*

It can be observed in the conversation that, Ms. Kaya gave formative feedbacks about the wrong usage of geometry sticks. Her relevant words were: ''students could not get the correct answer because they counted the holes instead of segments between the holes. Therefore I preferred to give feedback about the usage of the geometry sticks''.

Fourth of all, Ms. Kaya used informal assessment results to prevent students from feeling anxious. Her words for a 5^{th} grade student Kaan were as follows:

> He does not want to volunteer for solving problem on the board. He does not attempt to answer even an easy question. [I think if a student does not

> ask to attend for any activity, it means s/he does not understand the issue]. Sometimes I want to call Kaan to the board however if he cannot answer the question, he would feel unsuccessful. I do not want to hurt his feelings. It is obvious that he could not have answered the questions. When I force him, on the other hand, it would be like emphasizing his situation. Therefore I prefer not to force him (q27).

Fifth; Ms. Kaya stated in the interviews that she used the results of the classroom observations and whole-class worked examples to encourage students to study. She continued with saying: ‘‘sometimes the students who were unsuccessful or unwilling for studying mathematics, wanted to answer an item. I gave them permission to answer the item. In other words, I gave them a chance. I wanted to make them feel comfortable in the mathematics lessons’’ (q28).

Sixth of all, the interview data and classroom observations pointed out that Ms. Kaya used assessment results to detect on which fields of mathematics were the 5^{th} grades weak or good. In other words she used the assessment results for making diagnostic decisions. For instance after the performance-task implementation on 11.04.2014, by which students had to show the addition and subtraction operations of fractions through model, she identified that some students were good at doing operations with fractions but not good at handcrafts (drawing, constructing shapes, making arrangements, etc.). Her related words were as follows:

> Some students drew the model on the carton. Then they cut the same shape from the construction paper. However they could not match the model and the construction paper part since they did not have handcraft. Although they knew what they would do, they did not have the ability of visualizing their work. (q29).

In addition to detecting students’ weakness about handcraft, Ms. Kaya acknowledged that some students were weak on showing mathematical operations through models, too. She gave Student Mehmet’s performance-task study as an example for such situation. In an item, according to the guidelines, students were asked to determine an integer and an improper fraction. Then they were asked to add these numbers and show the operation through a model. According to the observation data, Mehmet’s group chose an integer and $\frac{15}{4}$ for the addition operation. Moreover they were asked to show the operation through a model. In that manner it was observed that Mehmet asked questions to Ms. Kaya. Ms. Kaya summarized their conversation as follows:

> Mehmet is a high-achiever. However he could not show 15/4 through a model. I observed that he wrote the fraction. I think he could not remember to model a fraction. He had divided a whole area into 15 pieces and thought to paint four pieces of that whole area. Then he said himself that such an operation could not have been correct. He realized that he was wrong in showing the fraction through a model. However he could not realize to transform the fraction into mixed fraction and to continue with drawing a whole area for the integer part of the fraction. (q30).

The interview data and document analysis also revealed that Ms. Kaya determined students' weakness on problem solving ability. She stated that students gave correct answers to the mathematical operations. However she added that when a problem was asked, they could not do the operations related with that problem. For instance in the ''problem solving activity'', the cost of each equipment for constructing a puppet was given. Moreover the cost of the puppet for each trademark was also given. They were asked to find the minimum cost of the equipment for constructing the puppet. Ms. Kaya claimed that students were able to make the addition and subtraction operations with decimal numbers but they had difficulties in solving the current problem. She said that some students added the cost of a puppet to the total cost of equipment. This was wrong. Some of them, also, calculated the prizes for the two trademarks but they could not answer the problem. She clarified her observations with the following sentences:

> I was expecting more number of correct answers. However some students surprised me. I think this was the result of their lack of problem solving ability. It was not because of lack of knowledge of addition-subtraction operations with decimal numbers. Maybe if we had not asked the operations in a problem form, they would have given the correct answer. On the other hand, if we asked the cost of each equipment for constructing a puppet, or how much a puppet will cost, I think they would solve such problems. (q31).

According to the interview data, by using the assessment results, Ms. Kaya identified the 5^{th} grade students who had strengths about drawing geometric expressions whereas they had difficulties in writing the definitions of these expressions. She mentioned a classroom dialogue as an example: ''I asked a student the definition of the rectangle. He could not define it in written form, and wanted to define it by drawing. Then he drew the shape correctly. He had learnt the rectangle and properties of a rectangle but I realized that he was more comfortable on defining it by drawing.'' (q32).

During the interviews Ms. Kaya stated that she used assessment results for determining the students who showed weak performances in the lessons but got high marks in the paper-and-pencil exams:

> My students Mustafa and Ali do not seem to be interested in mathematics. They are not active in the mathematics lessons. Moreover they misbehave during the lessons. I need to warn them too much about their misbehaving. However they got over 95 from the 1st paper-and-pencil exam. That means they understand the lessons somehow or they learn by studying alone at home. In other words they have a potential about mathematics. They misbehave but they are high-achievers at the same time. (q33).

Ms. Kaya determined that students were weak on transferring a length measure to the higher length units, too. She came to this conclusion with the results of the 3rd paper-and-pencil exam. It was seen in the students' exam papers that, some of them passed the sub-item asking *''220 m = ...hm''* whereas some of them gave an incorrect answer to it. For instance they wrote ''22'' in the empty space. According to the interviews, by using the results of project-study and performance-tasks, Ms. Kaya determined that students' were weak on doing research, summarizing the results of their research, and studying in group. Moreover, she admitted, since they were not familiar with group works, 5th grade students had difficulties in being organized during group works of the performance-tasks.

To sum up; Ms. Kaya used assessment results in order to improve students' learning of mathematics by monitoring the their progress; assigning their overall grades for the whole year; giving formative feedback to them and their parents; preventing them from feeling anxious; encouraging them to study; and diagnosing the areas of strengths and weaknesses.

4.1.3 Ms. Kaya's Views

In this section Ms. Kaya's views about their views about the students' learning of mathematics, about the factors affecting teaching mathematics, and about assessing students' learning of mathematics will be described. The results will be used to answer the following research questions:

1. To what extent are the participating mathematics teachers' classroom assessment procedures related to their views about the students' learning of mathematics, about the factors affecting teaching mathematics, and about assessing students' learning of mathematics?

2. What are the discrepancies between the participating mathematics teachers' views about assessing the 5th grades' learning of mathematics and their perceived classroom assessment practices?

4.1.3.1 Ms. Kaya's Views about Students' Learning of Mathematics

Ms. Kaya claimed that 5th grade students learned mathematics mostly by questioning. She stated that:

> Since they are very young, their skills to work by themselves have not developed completely. They ask everything. They even ask which pencil to use or how to arrange their notebook. In other words, working by questioning method is more effective on their learning. Leaving them alone or waiting them to study are not as effective methods as questioning (q35).

In that manner Ms. Kaya thought that students put teachers in the place of counselors during the assessment process. She added that they consulted her during the processes of performance-tasks, project-studies, or their homework. She explained her thoughts as follows:

> Their thoughts have not been developed yet. Therefore they cannot clearly see what is missing in their studies and they ask questions. For instance, a student may say that s/he has finished half of her/his task and asks whether s/he has done correctly; or another says s/he does not understand her/his task and s/he does not know what s/he would research. They are consulting and I am giving answers to their questions. In other words there is a consultation process. (q36).

Ms. Kaya argued on the factors that affected the 5th grades' learning of mathematics, too. She stated that students' natural ability about mathematics was important in learning mathematics. She gave examples from her students and said that ''some students do not have the ability. Even though s/he works ten times harder, s/he cannot comprehend the topic.'' (q37). After the activity of "addition of fractions", in which students are expected to model addition of fractions, she said

that some students could express and did the addition operation correctly but they could not model them. According to her, the students could do the operations in their mind, but writing in mathematical form or modeling needed different abilities. Therefore she thought that natural ability of mathematics varied based on the types of mathematical tasks. She claimed, for instance that a student who was successful in doing mathematical operations did not always have the ability for other types of mathematics tasks such as modeling or working for a project.

In addition to natural ability, Ms. Kaya thought that background knowledge was needed for achieving mathematics. During the interviews she also emphasized the importance of basic mathematics knowledge for becoming good at mathematics. Her words were as follows:

> For instance there are 5th grade students who do not know multiplication and division operations. Even there are such students in 7th grades. In other words they do not have a background in mathematical knowledge. They have not learned multiplication and division in primary school. How can I teach him/her a harder topic? (q38).

In that manner she placed more importance on the primary school teacher's role in a student's learning of mathematics. However she did not think similarly about the importance of the mathematics teacher. She thought that if a student had a proper mathematical background and had enthusiasm for studying mathematics, s/he could learn mathematics herself/himself. Moreover she thought that the students liked to study the courses at which they were successful. In that manner she sampled such students saying that they wished to have three lessons on the days they have two mathematics lessons or two lessons instead of one in one day.

According to Ms. Kaya's views, in learning mathematics, primary school teacher and students' enthusiasm were as important as natural ability and background knowledge. She stressed that students spent all the classroom hours with their primary school teachers in the primary school. Therefore primary school teachers' concerns affected students' mathematics learning. Her thoughts about the importance of a student's mathematical background, enthusiasm towards mathematics, primary school teacher, and elementary school mathematics teacher were as follows:

> Primary school teacher's contribution to mathematics is very important. I do not think that a student is able to do middle school mathematics if s/he does not know the addition-subtraction operation, or if s/he does not have

> a problem solving ability. So I think...if I want to express the factors with percent, the big percent is for primary school teachers. Then the student's mathematics ability comes. I think that the middle school mathematics teacher has very little role in that. For instance a student could not come to school and listen to the topic from her/his teacher. If that student has a background, ability and enthusiasm, s/he can achieve by studying at home...I think it is not only related with the mathematics teacher. (q39).

Ms. Kaya also emphasized the importance of regular practice in mathematics learning. She asserted that some students could not achieve in mathematics because they did not make regular repetition. Even if they could understand mathematics and had a mathematical background; they did not practice constantly. Thus, they were not successful in mathematics. She, also, said that the mistakes of the students were not related with her teaching. She explained her thoughts during the post-activity interview of the 3rd paper-and-pencil exam. A part of the transcript of her thoughts was as follows: ''the reason for the student's mistakes in the exam is not my teaching. Actually I solve similar problems in class. It happened because he/she did not repeat'' (q40).

Ms. Kaya, also, pointed out the classroom environment as an important factor in learning mathematics. For instance she told that if the students in a classroom were mostly high-achievers, the low-achievers in that classroom tried harder to study mathematics. She said that ''school administration changed some students' classrooms during the academic year. These students were the low-achievers or misbehaving ones. The reason for the practice was to provide hard-working role models to low-achievers''. (q41).

Last of all; Ms. Kaya acknowledged the importance of parents' socioeconomic level and education on the students' mathematics learning. She supported her thoughts within the context of the current school. She said that, in the current school, family problems existed. For instance divorced parents, uneducated, illiterate families, economic problems and unconcerned mothers-fathers were among some of these problems. She thought that such family characteristics affected students' learning habits negatively. At the same time, she added that students who had parental support at home learned easier than the ones who did not. Thus, she claimed that parents' concerns were very important for students' learning, too. In

order to explain the positive effect of a family, on the other hand, she gave one of her students as an example:

> He is not only interested in learning mathematics; he is also trying to learn to play a musical instrument, and he made researches about the natural environment. He even wrote a little book about ants. He had made a cover with an awesome picture of an ant on it. He wrote a detailed preface about ants in it. He investigated test items from internet, made research about mathematics. I knew his family. They were very attentive to him. They were literate people and he was their only child. They have been involved with him from his childhood. Since they were very attentive to him, he had improved himself (q42).

In summary; According to Ms. Kaya, although the 5th grades learned by questioning, their natural ability about mathematics, background knowledge, primary school teacher, their enthusiasm and regular practice in mathematics affected their learning of mathematics. On the other hand, achievement level of a classroom, parental support, socioeconomic and educational levels of their parents were distinctive factors on the 5th grades' learning of mathematics, too.

4.1.3.2 Ms. Kaya's Views about the Factors Affecting Teaching Mathematics

Ms. Kaya said that she could not use some teaching methods because of time limitation. Her thoughts were as follows: ''managing everything is very hard: using teaching methods, giving lectures, disciplining the students. Therefore, in any case, you neglect one of them.'' (q43). She described her thoughts with time limitation and workload of the curriculum. According to her, 5 hours a week was limited to teach mathematics efficiently. For instance she claimed that she could not use teaching materials or assessment methods such as portfolio or constructed-grid because of restricted time. She added that if she was the person who prepared the 5th grades' mathematics curriculum, she would transfer some 5th grade topics to 6th grade, so that time limitation would not be a problem for mathematics teaching. In other words, according to her, some changes could be done to make mathematics teaching more efficient in 5th grades' classrooms. She explained her opinions as follows:

> For instance it can be like this. We teach addition-subtraction operations in fractions. Problem solving by using fractions is also in the curriculum. This is an evolving curriculum. Therefore the fraction problems can be transferred to 6th grades' curriculum. By this way, teacher can solve more examples about the addition-subtraction topic. However, I look at the existing curriculum, there are lots of topics and textbook is thick. Well...if I do a lot of addition-subtraction operations, there will be less time left for problem solving. Therefore I accelerated teaching the ''fraction'' topic. Some topics also can be transferred to the 8th grade curriculum-of course the 8th grades' topics are harder-but they have a few topics. The 6th grades, on the other hand, have a loaded curriculum, too. In my first year at teaching, for example, I had difficulties in teaching all topics of the 6th grades' curriculum. Now, it is the same for 5th grades'. I think time is not enough (q44).

According to the overall interview data, Ms. Kaya had clear thoughts about mathematics teachers' effective teaching. She thought that having elementary mathematics knowledge and teaching it were different. She added that there were hard topics to be taught and primary school teachers were not always good enough at teaching all these topics. Middle school mathematics teachers, on the other hand, were more professional on these topics. Therefore she claimed that mathematics teachers taught mathematics more efficiently than primary school teachers. In that manner, she stated that adding a 5th grade to middle school was a good choice.

Although she came up with positive ideas about mathematics teachers' teachings to 5th grades, Ms. Kaya had concerns about the process of 4+4+4 education system. She reminded that the 5th grades became middle school students unpreparedly. She claimed that students were expecting to continue with their primary school, but they had to start with the middle school, suddenly. As a result of this, she said, both the teachers and the students could not become familiar with the new system. She continued with the following sentences:

> Students faltered because of this unexpected change. Maybe because of their ages or the way of their thinking, they ask primary school students' questions. For instance they ask whether they could use colored pencils, whether they would use subtitles. (q45).

To sum up; Ms. Kaya claimed that time limitation and workload of the 5th grades' mathematics curriculum had negative effects on mathematics teachers' teachings. Moreover 5th grade students were too young to adapt to the middle school

environment. On the other hand learning mathematics from mathematics teachers would have a positive impact on students' mathematical development.

4.1.3.3 Ms. Kaya's Views about Assessing Students' Learning of Mathematics

First of all; it can be said that Ms. Kaya is a teacher who mostly relies on classroom observations and paper-and-pencil exam results in assessing students' learning of mathematics. According to her, there is an order of importance between assessment methods. She thought that, in order to assess students' learning of mathematics; paper-and-pencil exams, participating in classroom exercises and their behavior during lessons are more important than performance-tasks and project studies. She put much emphasis on a student's participation in the classroom exercises, raising her/his hand to volunteer for responding to the questions, and her/his exam marks.

Second of all; she told her views about the assessment methods that she used. According to her, paper-and-pencil exam results and classroom observations were important in getting valid data about students' learning of mathematics. She claimed that together with observational data, paper-and-pencil exams helped for getting valid results about students' achievement. At that point she stated the followings:

> Getting much more valid results depends on lots of criteria. Which is much effective, implementing one paper-and-pencil exam or 3? Of course 3 paper-and-pencil exams are more effective than implementing one. Some students cannot show their potential in all the paper-and-pencil exams. However they can be active in classroom activities. Thus it is important to assess a student as much as possible'' (q46).

However her thoughts about the performance-tasks and project studies were not as positive as her thoughts about the classroom observations and paper-and-pencil exams. Although she agreed that both the performance-tasks and project studies initiated self-study among students, she admitted that she had to implement performance-tasks and projects since it was an obligation. However she did not think that the tasks and projects completely reached their aims. She explained the reason of her thoughts as follows:

> Students want to increase their paper-and-pencil exam grades by project-studies and performance-tasks. For instance, students who have low paper-and-pencil exam grades from mathematics mostly want to make a project-study from mathematics. The reason for such a choice is to make the overall grade higher. They want to upgrade their grades from 2 to 3; or from 1 to 2, etc. (q47).

Like she interpreted the aims of performance-tasks and project studies, she also represented her views about the contexts of them. According to her, the aims of performance-tasks were to make students review a topic or consolidate a topic whereas project-studies aimed to evaluate higher order skills. She explained her expression of ''higher order skill'' as thinking three dimensional, having the ability of connecting information, making more research. She claimed that ''Researching Famous Turkish Mathematicians'' could be a performance-task but ''3D scale models of prisms, pyramids, and their expansions'' could be a project study. She continued to advocate her thoughts by the following words:

> We give project-study once in a year because it evaluates higher order skills. For instance I think that learning fractions is not enough for developing mathematical sense. I think a student needs different information about mathematical world, too. S/he needs to learn cutting-sticking, preparing a poster, making researches for further studies. It means s/he needs to gain different abilities. For instance in my time-I cannot remember whether in primary school or in middle school-my teacher asked us to learn meanings of the words from the dictionary. What did we learn by this exercise? We learned how to use a dictionary. There are even adults who cannot use the dictionary efficiently. Another example can be the golden ratio. This is a topic related with real life. Students can learn the reflections of golden ratio in real life by studying it as a project. On the other hand the way of making research through internet can be gained by project-study, too. In this sense I think, if a project-study was implemented conveniently, it would be efficient. However I do not think that project-studies are being implemented in parallel with their aims. (q48).

According to Ms. Kaya assessing a student's performance referred to implementing performance-tasks. She explained her thoughts about performance assessment with the following quotation:

> Performance assessment is a method that helps education from using only paper-and-pencil exams, or from 10 or 25 standardized patterns of items. It is expected that students get the opportunity of showing their different

> abilities through this method. However it is a must to observe students' performances during the task. (q49).

Although she did not practice all of them, Ms. Kaya made comments on the assessment methods that were offered in the mathematics curriculum. For instance, according to her, student portfolios were useful resources for students. In their advanced mathematics education, students could check what they have done about a topic by using their portfolios. Moreover, she said that concept-maps gave students the opportunity to summarize their learning. She explained her comments by saying that, students could group the concepts and distinguished them clearly by using concept-maps. For constructed-grid, on the other hand, Ms. Kaya thought that it helped students to draw 3D shapes. She said that, in symmetry topic for instance, using constructed-grid could be a good choice. She underlined the supportive roles of writing journals, constructing posters, and presentations on mathematics learning, too. In that manner she thought that teachers could check students' learning by journals day by day whereas they could prevent cheating by following students' presentations and posters. Last of all, she thought that drama study was suitable mostly for language courses.

Third of all; Ms. Kaya affirmed comments about the contribution of assessment results to students' learning of mathematics. For instance, she argued that paper-and-pencil exams gave feedback to both mathematics teachers and 5^{th} grade students. She claimed that teachers could understand their teaching effectiveness and the students realized their weaknesses and strengths about mathematics. Moreover teachers could make adjustments for their further assessment practices whereas students could study regularly to make up for their lack of knowledge in mathematics.

Fourth of all; Ms. Kaya discussed the factors that affected the assessment of students' learning of mathematics. She mostly complained about time-limitation and curriculum disparity. She thought that, for an assessment process, time limitation and the workload of 5^{th} grades' curriculum were effective. For instance she stated that, because of time-limitation she could not implement assessment methods such as drama study, presentation, writing-journal, and constructed-grid. Her words were as follows:

> There are lots of assessment methods. In order to implement them effectively, you need to have fewer groups and fewer students. In other way, I need to spend all my afternoons for preparing them and dealing with them. Therefore I cannot do everything. If I try, I need to take too much work to home. Therefore I have not been implementing all of them. I, mostly, try to implement the compulsory and the important ones. (q50).

She continued with saying that, there should be a formal time to evaluate students' works. Thus teachers would spend efficient time to evaluate students' works.

She also claimed that classroom environment affected the students' performances in the assessments. For instance she analyzed that some students got high marks in the paper-and-pencil exams but preferred to be inactive during the lessons. According to her views, hard-working students did not feel themselves comfortable if their classmates were low-achievers or misbehavers. She added that in such classrooms hard-working students preferred to isolate themselves and did not pay attention to whole-class worked examples.

In addition to time-limitation and classroom environment, Ms. Kaya also mentioned the effects of students' personal problems on their assessment results. In that manner she talked about the students who were active during the classroom activities but low-achievers in paper-and-pencil exams. According to her the reason for such differences took place because of the paper-and-pencil exam anxiety, family problems, or being physically sick during the exams. In order to make a clear evaluation on a student's mathematics performance, on the other hand, she pointed out the classroom observation data and continued with the following sentences: ''you look at student's performance in class and observe her/him directly. I mean there is nothing else; there is not another criterion. The whole reality about student emerges directly, so it is not like performance-task or project-study.'' (q51).

In order to clarify her thoughts, she gave an example from her first semester experience. She implied that although 5th grade students were high-achievers during the lessons, some of them could not get high marks in the first paper-and-pencil exam of the first semester. ''I think they were mixed up to have a new teacher, new curriculum, etc. Most of the items were traditional type, however there were a few multiple choice items in the exam. They could not get over it'' she admitted. Then

she explained how she used the observational data results for calculating the overall grades of the students at the end of the first semester: ‘‘Therefore I did not focus on the paper-and-pencil exam results. In order to compensate the grades, I tried to be flexible in grading their class-within performances’’. (q52).

The interview data showed that Ms. Kaya’s views about the suitability of an assessment method affected her assessment practices, too. She thought that some methodss were not suitable for mathematics or more suitable for other fields. For instance she put concept-maps in this category and continued with the following words:

> I think that concept-maps can be used for a few topics. For instance, since they involved definitions, they can be used in assessing students’ concept knowledge about triangle types. However I think that concept-maps would be more suitable for science courses than they would be in mathematics course. Therefore I do not use this method effectively (q53).

Another argument put forward by Ms. Kaya was about the incompatible results of the assessment practices. For instance she acknowledged that sometimes students got low marks in the paper-and-pencil exams, but they got higher marks in their performance-tasks. She explained this situation by parental help. According to her, parents cannot intervene in the paper-and-pencil exams but they can direct their children at home during the preparations of the performance-tasks. She added that students wanted to see a high overall mark in their semester report, so they let their parents to be a part of the tasks. In other words she claimed that parents helped performance-tasks and projects physically, so performance-tasks and project studies were risky. She continued with saying that she preferred to implement all steps of the performance-tasks in the classrooms. She advocated her related thoughts as follows:

> When s/he did her/his performance-tasks and project studies at home, I cannot be sure whether s/he did the studies herself/himself. Maybe s/he got help from other people, maybe s/he wrote a prepared one from internet. For instance I give a task-I guess the golden ratio. I observe that s/he searches from internet, write it down and take it to school. I do not think that is a big assessment. In my opinion participating in classes, raising hand to volunteer the exercises, and exam grades are ahead of the others. I put much emphasis on them. Of course I do not mean that performance-tasks and projects are insignificant but...I think they do not provide certain results. (q54).

It can be said by the quotation above that, according to Ms. Kaya, providing honesty was also a problem for her assessment practices. For instance, she stated that she did not prefer to assign a task on researching a topic at home because of the honesty problem. She thought that, if she did not actually observe students as working, she could not be sure whether all the steps of the study were completed by the students. Therefore, she advocated, not assigning a task about researching a topic was a kind of solution for preventing students from cheating.

At the same time Ms. Kaya asserted that 5th grades' maturity level was an obstacle on assessing students' learning of mathematics. She claimed that students were not interested in drama study because of their lack of maturity and added the followings: ''they are too young. Therefore I do not use drama study. I know that they are not interested in such methods. They even do not make their project studies by themselves; their parents do them'' (q55).

Ms. Kaya went on to say that students were too young to get some responsibilities and could not concentrate on a topic for a long time. She gave the group work study of performance-tasks as an example. She thought that group work had a negative effect on performance-tasks. According to her, 5th grades were unpracticed to be organized in a group work. After she implemented the performance-task in the classroom, she stated that:

> I designed it for a group work but it was not as I expected. Although it was 72 minutes, they wasted time and could not use it efficiently. They were solving such questions easily in the classroom. There were only 3 basic questions; however they could not make decisions, could not share the duties, and could not decide whose words would be written on the study. Even easily taught ones faltered. I think they need to learn group work (q56).

In addition to the previous statement of Ms. Kaya, it was observed that some students did not get the equipment of the performance-task to the classroom. Some of them, also, seemed to be practicing irrelevant activities with the performance-task. ''Therefore'', she added, ''such behaviors haltered assessment process''. She also claimed that: ''If they were in 7th or 8th grades, they would have taken the requirements to the classroom on the implementation day and would finish their works much more consciously''.

As a result of her thoughts about maturity effect, Ms. Kaya stated a suggestion. She said that if she would have the chance of making changes in 5th grades' assessment procedures, she would make changes about project-studies and performance-tasks. Her suggestion was as follows:

> I think a 5th grade's inability of constructing a poster is acceptable because in order to gain higher order skills, the intelligence and thoughts should be developed. Therefore the project-study should be removed from 5th grade curriculum, even performance-tasks; therefore I would like to make a change about this issue. (q57).

During the data collection process, as a suggestion of the mathematics department, 5th grades' second paper-and-pencil exams were implemented in common. However in Ms. Kaya's opinion, common-paper-and-pencil exams caused problems. For instance she stated that although she had taught all the topics related with the common-exams, her 5th grades' mathematics achievement average was low in that exam. However the field notes also indicated that, 5th grades' grade average in the common paper-and-pencil exam were lower than it was in the 1st and 2nd paper-and-pencil exams. Ms. Kaya claimed that since some of the items were prepared by other mathematics teachers, students were mixed up and got low marks. She gave a student's paper-and-pencil exam grades to support her argument: ''she took 95 from the first exam and 65 from the common-exam. I guess she will take a higher grade in the third one because this exam included other teachers' items, too; not only mine''.

Ms. Kaya pointed out the impact of reading comprehension on students' mathematics assessment results. She thought that students could not understand what the question asked because of their incapacity in reading and understanding. She claimed that sometimes students gave wrong answers to the items only because of reading comprehension problem. Moreover, she observed that weaknesses on reading comprehension made negative effect on 5th grade students' researching and inferring activities. She thought that gaining reading habit would solve reading comprehension problem. Then she advocated her thoughts with the following quotation:

> Some students can think mathematically and can do operations correctly in the assessment activities, however they cannot respond to open-ended items. If they read regularly, they would not have problems on explaining mathematical operations by sentences (q58).

In conclusion; Ms. Kaya's views showed that, in order to assess students' learning of mathematics, she placed the much emphasis on the results of paper-and-pencil exams and classroom observations. She also taught that performance assessment was an alternative to paper-and-pencil exams and could be done by performance-tasks. Although she had positive ideas about writing journals, constructing posters, presentations, constructed-grid, concept-map, drama study and student portfolios, she did not prefer to use them. She explained her reasons by the limitation of time and the workload of the curriculum. Moreover, as they were affecting the assessment process, she disputed the negative contributions of parent help, time and curriculum disparity, classroom environment, personal or family problems of the students, the maturity level of them, and the suitability of the assessment methods, difficulties to provide honesty, capability in reading, and the common paper-and-pencil exam obligations.

4.1.4 Summary of Ms. Kaya's Views and Assessment Implementations

Ms. Kaya implemented both formal and informal assessments in her classes. For informal assessment she used observational data, whole-class worked examples and let students to discuss the topics during the activities. For formal assessments, on the other hand, she used paper-and-pencil exams, project-studies, and performance-tasks.

Moreover, in the scoring part of the assessment procedure, Ms. Kaya prepared answer keys and used scoring-guides and she was in communication with other people (parents, colleagues, etc.). She was in touch with the parents during the assessment stages.

She used assessment results for several purposes: to make decisions on repeating a topic, to understand her teaching effectiveness, to make or to intent adjustments for further assessments, to decide the suitability of an assessment method, to diagnose the areas of strengths and weaknesses, to monitor students' progress, to prevent students from feeling anxious, to assign students' overall grades at the end of the year, to give formative feedback to students and their parents, and to encourage students to study.

Ms. Kaya stated her views about the 5th grades' learning of mathematics. According to her observations, 5th grades learned by questioning. She also stated that, although mastery of mathematics developed by regular studying, 5th grades could not study by themselves. Instead, they preferred to ask questions about each issue in a lesson. In that manner she claimed that, students thought the teachers as a kind of counselor and asked all their questions to them during the lectures.

She also made comments on the factors which were effective on learning of mathematics. According to her, students' primary school teachers and mathematical background were the most effective factors on their mathematical learning. Besides students' natural ability and enthusiasm about mathematics; regular practice; their parents' education and socioeconomic status; and classroom environments were also effective on mathematics learning.

Ms. Kaya did not place much emphasis on performance-tasks and project-studies because of the possibility of cheating. According to her, in order to assess students' learning of mathematics, paper-and-pencil exams, participating in the class and students' behaviors were more important than the results of the performance-tasks and project studies. Besides she claimed that common paper-and-pencil exams had negative effect on students' grades.

Last of all; Ms. Kaya stated her views about the effects of the 4+4+4 curriculum. Although she agreed that activities such as performance-tasks and projects encouraged self-study among students, her complaints were mostly about these two assessment methods, too. It was understood that she implemented them because of the legal obligation. She thought that she could not implement these methods effectively because of students' ages, their incapacity in reading and understanding Turkish, difficulty in preventing cheating, and time limitation. On the other hand, she thought that transferring 5th grades from primary school to middle school had the following positive effect on learning: students had the opportunity for learning middle school mathematics from the teachers who were educated to teach only middle school mathematics.

4.2 Case Two: Ms. Solmaz

First of all; different from Ms. Kaya, Ms. Solmaz had been teaching mathematics to four 5th grade classes during the data collection procedure. She stated during the interviews that her 5th grades had similar levels in mathematics achievement and had similar background about mathematics.

Like Ms. Kaya did, Ms. Solmaz also practiced the formative classroom assessment activities which were prepared by the researcher. The activities were ‘‘the quiz activity’’, ‘‘addition of fractions activity’’, ‘‘problem solving activity’’ and ‘‘constructing a rectangle activity’’. The video records of the ‘‘addition of fractions activity’’ and the ‘‘constructing a rectangle activity’’; interview data; field notes and documents were contributed to explain Ms. Solmaz’s classroom assessment procedures; to determine in what ways she used the assessment results; and to explain her views about students’ learning of mathematics, factors affecting teaching mathematics and assessing students’ learning of mathematics.

4.2.1 Classroom Assessment Procedures of Ms. Solmaz

Ms. Solmaz had been making use of both formal and informal assessments in her 5th grade classrooms. Interview and video data indicated that, Ms. Solmaz used observations, whole-class worked examples, journals and homework for informal assessment data. Her formal assessments, on the other hand, included paper-and-pencil exams, performance-tasks, and project-studies. In the following two sections, the informal and formal assessment procedures of Ms. Solmaz will be explained respectively. The results will be used to answer the following research question:

“What assessment procedures do the participating mathematics teachers use in the 5th grade classrooms?”

4.2.1.1 Informal Classroom Assessment Procedures of Ms. Solmaz

According to the overall data Ms. Solmaz's informal assessment data included observations, whole-class worked examples, journals, and homework.

First of all; according to the interview data, Ms. Solmaz placed importance mostly on observational data in assessing 5th grades' mathematics achievement. She explained her thoughts with the following words:

> I think I mostly care my individual observations because I can directly observe a student in the classroom. Of course we implement paper-and-pencil exams however, according to my classroom observations, I have already had an idea about students' achievement levels. Of course there are exceptions. There will be exceptions in the further exams, too. For instance some students are not active in classroom activities but getting high grades from paper-and-pencil exams. Anyway, I think my classroom observations give more realistic data (q59).

She claimed that observational data was very important because she could analyze students' behaviors and achievement levels directly by observing them. She added that she could understand how much a student learned a topic by looking at her/his eyes:

> I can understand whether a student understood the topic from her/his eyes. S/he involves in classroom activities, too. S/he holds her/his finger insistently to volunteer for solving the problems. Whether you do not give her/him permission to talk, s/he insists. The student who does not understand, on the other hand, hides herself/himself. S/he does not look you in the eye. Although you do not observe her/his practice in an activity, you can realize that s/he does not learn the topic. (q60).

The video records of the classroom sessions on the dates 04.04.2014 (addition of fractions activity) and 09.05.2014 (constructing a rectangle activity) revealed that Ms. Solmaz observed students by walking around the classroom. It was observed that Ms. Solmaz tried to understand whether the items of the activities were responded or not. As soon as all the groups responded to an item, she gave them permission about responding the subsequent item. She did not keep a written record for examining students' classroom activities or for identifying the amount of work put by each student.

It was revealed with the video records that while she was observing students, Ms. Solmaz also involved in students' activities. For instance during the ''constructing a rectangle activity'', she realized that a group had difficulty on using the geometry sticks. At that point she wanted to help students for using the sticks and for the aim of helping, she solved one of the items. The situation took place in the 14th minute of the ''constructing a rectangle activity'':

> *Student A: We could not decide on how to use the material (The item was the first one and the materials were the geometry sticks. It was asked students to figure out whether the lengths of 2 units, 4 units, 2 units, and 4 units construct a rectangle)*
> *Ms. Solmaz: Now show the 2 units with the geometry stick (student did it). Now fix a screw in the hole.*
> *Student B: Ok. We did it like that (They showed the 2 units length with the material and put a screw in the hole)*
> *Ms. Solmaz: Ok. Now here it says 4 units. Show it and, by using the previous screw, combine the two sticks on the same hole. (At that point students get confused and could not combine the two sticks. Then Ms. Kaya combined them. Moreover she showed another 2 units with a different stick, and 4 units with the last stick. Last of all, she used screws and constructed the rectangle herself).*

It can be seen in the conversation that Ms. Solmaz tried to clarify the misunderstandings about using geometry sticks by answering the item directly. In other words, Ms. Solmaz interfered in the activity by giving answer to one of the items.

A similar situation took place in the ''addition of fractions activity'' session on 04.04.2014, too. According to the classroom observation of the activity, Ms. Solmaz chose a spokesman in each group. When a group solved an item, the spokesman went to Ms. Solmaz and asked whether the answer was correct. For instance in the second item of the ''addition of fractions activity'', it was asked students to do the following operations by using fraction bars and show the operations through models:

$\frac{1}{3} + \frac{2}{3} =$

$\frac{2}{4} + \frac{1}{8} =$

Ms. Solmaz did not wait for students to discuss the item. Instead, she read it to class, wrote the operation on the board and asked them to solve it. In the 5th

minute of the activity, the spokesman of a group said that they found the result as 3/5. Ms. Solmaz said that ‘‘Ok. Now show it through model on your papers’’. The activity continued like that: Ms. Solmaz wrote items on the board and gave time. Then the spokesmen gave the answers. The whole activity finished in 17 minutes. According to Ms. Solmaz, doing such an organization provided classroom management and efficient.

According to the interview data, Ms. Solmaz also practiced whole-class worked examples and she named them as ‘‘brain storming’’. In that manner she stated that she practiced whole-class worked examples for two aims: in order to remind students their mathematical background or in order to complete the teaching of a new topic. She explained her practice:

> Before starting to teach a topic, on which they had a pre-knowledge, I check what they remember about that topic by question-answer method. For instance before we solved problems about exponent numbers, I provided them brain-storming and asked to respond quickly to the questions such as 5^2 or 2^3. Students who have pre-knowledge about the topic could answer the questions. Sometimes they gave wrong answer. However if they remembered anything, they corrected their mistakes. After then I continued the lesson. On the other hand, there are topics which are not familiar to the students. In such situations, I teach the topic with a few sentences and then I ask questions in order to clarify the topic. I try to teach the topic by problem solving. Some students are enthusiastic to respond or state their ideas. Then, in the light of their comments, I continue to teach the topic. (q61).

It was indicated by the interviews that Ms. Solmaz used constructed-response items in classroom exercises. According to her words, she did not have any intention about what to ask in the lessons, the classroom environment oriented her. ‘‘in some classrooms’’, she stated, ‘‘students seem more ambitious towards mathematics. In such situations I ask higher order questions’’. Her related words about actualizing the exercises were as follows:

> I do not intent or make a pre study about the examples. I do not prepare a written document about the questions. The classroom environment affects me. For instance, in some classrooms, students are willing to study and wait for encouragement. In such classrooms I push myself to make alternative studies. In some classrooms, on the other hand, you do not feel excited because students’ weak mathematics potential prevents you to ask higher order questions. (q62).

She added that sometimes she used students' own questions in the sessions, too. She continued by saying: ''during the teaching period for instance, students bring questions related with the topic. Sometimes these questions can either be the ones which are not easy, only high-achievers can answer them. Nevertheless, I ask the question to whole class''. (q63).

The interview data and the field notes showed that Ms. Solmaz's 5th grades kept journals other than their classroom notebooks. Ms. Solmaz called these journal as ''home-notebooks''. Students rewrote their daily studies on these notebooks. ''I wanted to provide them making daily repeats about what I told in mathematics classes'' said Ms. Solmaz and continued: ''with this method I thought that, what I taught would not go in vain and they would learn to take responsibility. Lastly I wanted to encourage self-study among students''. (q64). She also explained how students kept these journals:

> Suppose I taught the lesson today. Students will summarize the topic and repeat the questions which we solved during the lesson at home tonight. They will not look at the answers but will solve them again on these notebooks. They will try to solve by themselves. I have been practicing this method since the first semester (q65).

Ms. Solmaz added that she was in cooperation with parents about keeping the home-notebooks. She stated that most of them got surprised about that practice. On the other hand, they were glad about the practice and supported Ms. Solmaz by checking students' journals at home.

According to the documents and interviews, Ms. Solmaz kept written records for the journals. She recorded whether students kept journals regularly or not. On the other hand, she stated that she did not have a time schedule for checking and continued with the followings:

> Last semester I checked the journals twice: in the middle and in the end of the semester. They were effective on the overall grades of the semester. Therefore I asked students to bring the journals to the classroom at the end of the semester. I used the journals for contributing to the overall grades of the semester. However I decide the time for checking during the semester. Sometimes, for instance, I realize that they are not studying. I mean I understand that they are not keeping the journals. Then I want them to bring the journals to the classroom on that week. They get panic and tell the truth. They cannot lie, they are 5th grades and so young. Therefore they admit that they are not keeping journals on those days. Then they try to complete the lack of their journals. (q66).

It can be seen in the quotation above that, Ms. Solmaz did not use a scoring-guide or criteria for the journals. According to the documents, also, she even did not assign a grade to the journals. Although she notified students about the time of the checking, it was understood by the quotation that she did not define deadlines in the beginning of a semester. On the other hand, she said that when she realized that students lost their concentration on mathematics, she identified and announced a checking time for the journals.

Last of all; According to the interview data and field notes, Ms. Solmaz gave homework to students during the data collection process. One of them was giving exercises from their mathematics textbook. She gave this homework at the end of each topic or subtopics. The other one, on the other hand, was solving 50 or 100 multiple-choice items in the weekends. In that manner, she determined the topics and asked students to find and solve 50 or 100 questions about the related topics during the current weekend.

According to the interviews and documents, Ms. Solmaz kept a written record for students' homework and noted whether the students did their homework or not. She acknowledged that she identified the students who did homework regularly with these records. She kept a written record for students' homework and noted whether the students did their homework or not. However it was observed that she did not check the homework herself, instead she charged 3 students for this aim. She claimed that since too much time was lost for homework checking, she preferred such a method. She explained her preference in the following:

> I have checking lists for the students' homework. In the first weeks of the year I checked the homework myself. Then I realized that I loose too much time because classrooms are crowded. Therefore I divided each class in three groups and charged one student for each group. These three students are checking homework and recording the results. I am glad from that practice because students who are in charge with checking are doing their jobs responsibly. I am keeping the records till the end of the education year. (q67).

To sum up; Ms. Solmaz made observations, applied whole-class worked examples, kept records for homework, and asked students to keep journals in order to make informal assessments. Although she put the most emphasis on observational data, she did not keep a written record for the classroom observations. She did not

use a checklist for recording students' classroom studies, either. However she kept written records for homework and journal checking. She checked journals herself but in order to check the homework, she imposed duty to three students in each classroom. They checked and noted whether the students did homework or not. However it was understood with the document analysis that, the accuracy of the homework could not be checked.

According to her, classroom management could be kept by having the control of students' studies, so she had to have the control of all steps during the classroom activities. In that manner she interfered in the steps of the activities. In other words it was indicated by the interviews, document analysis, field notes, and video data that Ms. Solmaz did not hesitate to interfere in the students' informal practices during her observations.

It can also be said that; although she emphasized on the classroom observations, whole-class worked examples, homework and journals, she preferred to keep written records only for the homework and journals. On the other hand, in the grading process, she did not determine a definite contribution of these informal assessments on the students' overall semester grades.

4.2.1.2 Formal Classroom Assessment Procedures of Ms. Solmaz

It was observed during the data collection process that, in the manner of formal assessment, Ms. Solmaz obeyed the regulations of Ministry of National Education. According to the Assessment Regulations of Ministry of National Education, a mathematics teacher had to assess students with at least three paper-and-pencil exams and one performance-task per semester (MoNE, 2013b). Moreover each student had to conduct a project-study for one of the courses s/he chose in an academic year (MoNE, 2013b). Therefore, as it was the obligation of Ministry of National Education, Ms. Solmaz practiced paper-and-pencil exams, project-studies, and performance-tasks for formal assessment.

To begin with; in each semester, Ms. Solmaz photocopied and implemented three paper-and-pencil exams herself. The field notes and the interview data disclosed that she prepared the items of the first and third paper-pencil exams

individually and announced the date of the exams one week before the implementations. The second exam was common in 5th grades, so the items of the common paper-and-pencil exam were prepared according to the common decisions of the mathematics department.

Second, Ms. Solmaz stated that, in order to prepare the items of the paper-and-pencil exams, she got help from the 5th grade mathematics textbook and other source books in which multiple-choice items exist. She went on to say that: ‘‘I have a few source books from different publishers and I utilized from them. I prepare the multiple-choice items by myself or by the help of these source books. Obviously, I do not make use of internet very often’’. (q68).

Third of all, according to the overall data, Ms. Solmaz gave one-lesson-hour to students for finishing their exams but the duration of the exams was not determined on the exam papers. Moreover she stated that she had informed students about the duration of the exam orally before the exam started.

Fourth, the document analysis of the 5th grades’ paper-and-pencil exams showed that Ms. Solmaz prepared three types of items: multiple-choice items, fill-in-the-blank-type items, and constructed-response items. An example exam paper, which was prepared and implemented by her during the data collection process, is shown in Figure 4.10:

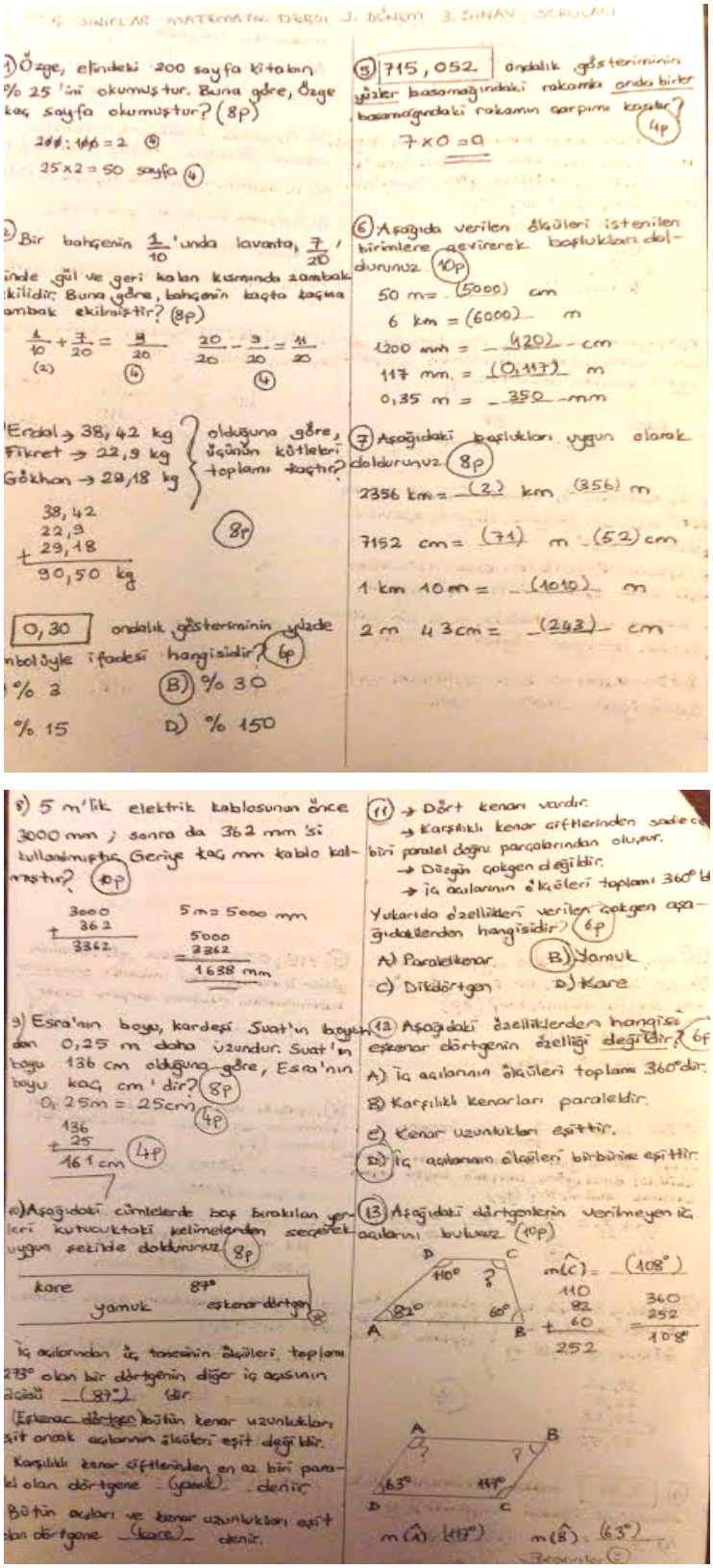


Figure 4.10 An example paper-and-pencil exam constructed by Ms. Solmaz

The Figure 4.10 is the third paper-and-pencil exam that was implemented by Ms. Solmaz during the data collection process. It can be seen by Figure 4.1 that, the exam was composed of multiple-choice items (4th, 11th and 12th), fill-in-the-blank-type items (6th, 7th, and 10th), and constructed-response items (1st, 2nd, 3th, 5th, 8th, 9th and 13th).

Figure 4.1 was also the answer key of the current exam. The interview data indicated that, Ms. Solmaz prepared the answer keys of the paper-and-pencil exams before the implementation. It was seen in the answer key that, in some of the items she wrote the score for the completely correct answers of the constructed-response items (3rd, 5th, and 8th). She did not assign a score to the partially correct answers of these items. However after she graded the students' papers, it was seen that she gave points to the correct solution methods with wrong results. Such a situation was observed in the 3rd item of the paper-and-pencil exam in Figure 4.1. The item was as follows:

Erdal= 38,42 kg
Fikret= 22,9 kg
Gökhan= 28,18 kg
Please calculate the total amount of weight of these three friends (8points).

According to the document analysis, some students could not find the correct answer because they did not put the comma symbol in its place. For instance the answer of Student Zehra was as follows:

38,42+22,9+28,18=8950

It was seen with the document analysis that Ms. Solmaz gave 4 points to Student Zehra. She explained her statement with the following sentences:

> She had not rewritten the numbers one under the other while she was doing the addition operation. Therefore she had missed the place of the comma sign. However she had made addition operation correctly. Therefore she got half of the points for her answer. (q69).

A similar result was also observed in the 1st paper-and-pencil exam, too. The scoring of the 6th item in the answer key of the exam was as follows:

> *There was a jug of water. Alper drank* $\frac{1}{4}$ *of the water; Ahmet drank* $\frac{1}{12}$ *of it,* $\frac{1}{8}$ *of the water was drunk by Cenk and* $\frac{1}{48}$ *of it was drunk by Nail. Who drank most of the water? (7 points)*

$\frac{1}{4} > \frac{1}{8} > \frac{1}{12} > \frac{1}{48}$ *(5 points)*
Therefore Alper drank most of the water (2 points)

It can be seen with the related data that, Ms. Solmaz gave the most points to ranking the fractions correctly. During the interviews she explained this preference with the following words: ‘‘in the solution, the most important part was ranking the fractions correctly. If they cannot rank correctly, then they can not reach the answer. Therefore I think that ranking the fractions should have most of the points”. (q70).

Fifth of all; according to the interview data that, Ms. Solmaz did not give their papers to the students after she announced them the results of the paper-and-pencil exams. She stated that instead of giving their papers, she preferred to solve the items of the exams. On the other hand, she stated that she gave the papers to their parents in parents’ meetings. She explained the reason of her preference with limited time and continued with the followings:

> In parents’ meeting, I gave the exam papers of the students to their parents and let them check their children’s mistakes. On the other hand, it takes too much time to show the papers to individual students. For instance although a student got 98 from the exam, she asked why she lost 2 points. Therefore I explain their mistakes but I do not give them their papers. (q71).

In addition to the paper-and-pencil exams, performance-tasks were also the requirements of Ministry of Education, so Ms. Solmaz wanted students to prepare performance-tasks, too. In that manner, according to the common decisions of the department of mathematics, students prepared one performance-task per semester. Then Ms. Solmaz scored the tasks by using a scoring-guide which was gotten from internet resources. Last of all, she graded performance-tasks according to these scores.

First of all; Ms. Solmaz expected students to finish their tasks at their homes on their own in order to save time. She stated that too much time was needed to control students’ studies during the lesson, so she determined and wrote the instructions of the tasks to students and then students completed the task at home. In that manner she gave students 3 weeks for completing their tasks and did not interfere in or involve in their studies. In other words during their task studies, students completed all the steps of their works at their homes without Ms. Solmaz’s intervention.

Secondly; it was seen in students' tasks that Ms. Solmaz did not insist on studying individually. According to the interview data all students had two choices: They would rather make the tasks individually or in groups. She said that shy students did not want to study in groups, so she did not force them to study in groups. In order to form groups, at the same time, she did not interfere in students, and let them free about forming the groups.

Third of all, the interview data revealed that Ms. Solmaz decided the topic and the time interval of the tasks herself. According to the document analysis, the school mathematics department offered three performance-tasks: drawing the plan of a house, giving examples to indicate the facilitating role of graphics and determining the geometric shapes of the doors, windows, carpets, etc. Ms. Solmaz did not prefer to give the current topics as performance-tasks. According to her words students had difficulties mostly on fractions, showing fractions through models, changing a fraction to its decimal form and percentage form, so she gave ''modeling fractions and representing them in their decimal and percentage forms '' as performance-tasks. She added that for the aim of providing enthusiasm, she asked students to prepare cards for presenting their studies. She named these cards as ''fraction cards''.

Fourth of all; the field notes showed that Ms. Solmaz did not give a written guideline to students, instead she wrote the instructions on the board and her students wrote them on their papers. She also explained them her expectations from the task. In the interviews her words about the performance-task was as follows:

> The task was about preparing cards for 10 different fractions. They would cut 10 small, square shapes from cartons. They would determine 10 fractions. For each fraction they would prepare one piece of carton. On the front face of each carton piece, they would write the fraction and show it through model. On the reverse side, on the other hand, the decimal and percentage representations of the fraction would be written but they did not have to show the decimal and percentage forms of the fractions through model. Such a task was a kind of play, so it would be helpful for them in learning the topic. I did not give the instructions in written form but I explained them. I think they had understood the instructions. (q72).

An example task that was completed by a 5^{th} grade was represented in Figure 4.11:

Figure 4.11: Performance-task of Student Murat in Ms. Solmaz's class

It can be seen in Figure 4.11 that the performance-task of Student Murat was in congruent with Ms. Solmaz's expectations. There were 10 cards in the task.

On the front face of each card, a fraction and its model were denoted. Moreover, on the reverse sides, the decimal and percentage representations of the current fractions took place.

In Figure 4.12 an example task that was completed by a group (Group A) was represented:

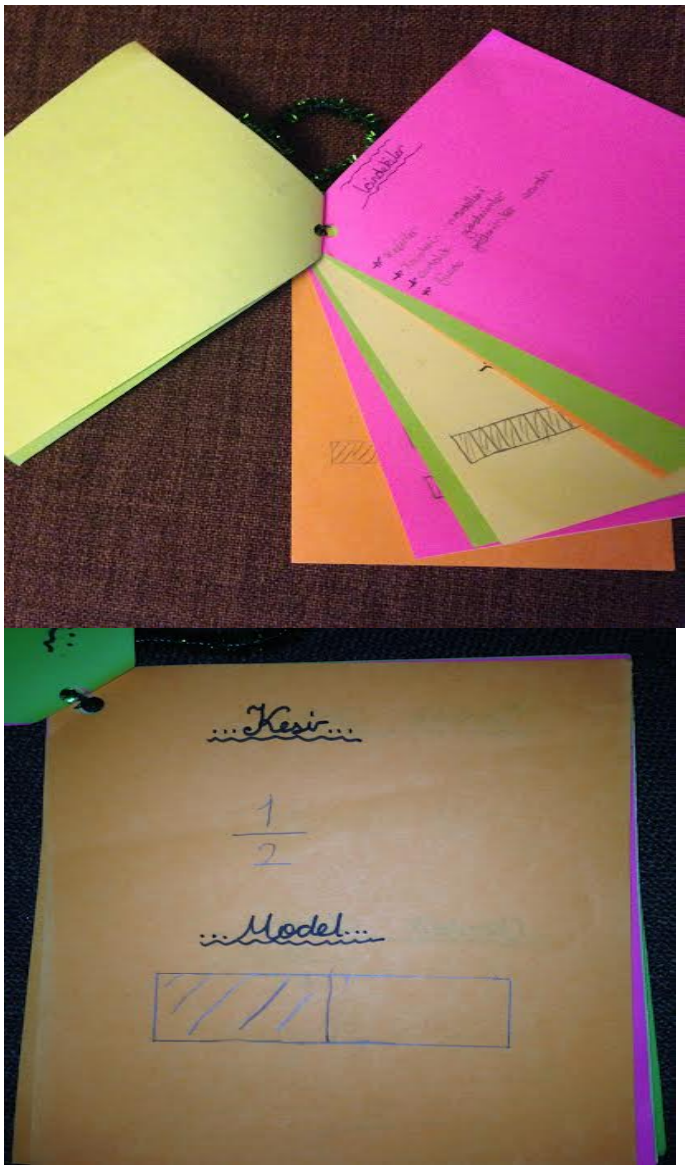


Figure 4.12: Performance task of Group A in Ms. Solmaz's class

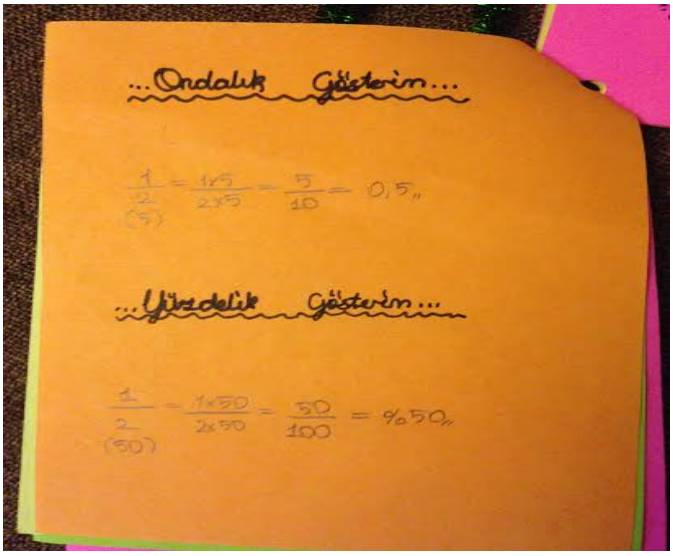


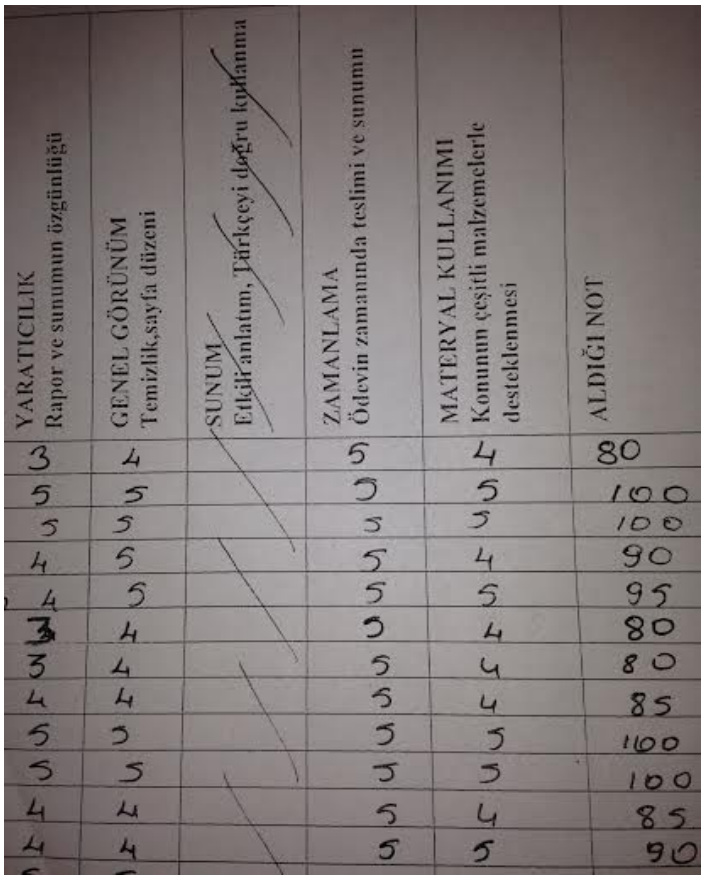
Figure 4.12 (cont'd): Performance task of Group A in Ms. Solmaz's class

It can be seen in Figure 4.12 that the group study was also in congruent with Ms. Solmaz's expectations. There were 10 cards in the task. On the front face of each card, a fraction and its model were denoted. Moreover, on the reverse sides, the decimal and percentage representations of the current fractions took place.

Another issue of the tasks was the scoring-guide which was used to score students' tasks. She implied that she used a scoring-guide since it was an obligation. According to her, the aim of a rubric or a scoring-guide was providing objective assessment but she could not use them in convenient with their purpose. She explained her words:

> I know scoring-guides are formed to make objective assessment. However I do not think that they are valid or reliable. For instance a student is active in the lessons. I decide on a grade for her/him according to his class performance. Then when I am scoring her/his task, I think about that grade and try to reach the grade on my mind. Therefore sometimes I use the criteria of the scoring-scale as a formality. (q73).

She added that she did not prepare the criteria of the scoring-guide herself. She used a prepared guide from internet with the criteria in it, then she explained the criteria of the guide to students and hanged it on the classroom billboard as soon as she assigned the tasks. In Figure 4.13 a piece of the scoring-guide that Ms. Solmaz used for scoring students' tasks is represented as an example:



YARATICILIK Rapor ve sunumun özgünlüğü	GENEL GÖRÜNÜM Temizlik,sayfa düzeni	SUNUM Etkili anlatım, Türkçeyi doğru kullanma	ZAMANLAMA Ödevin zamanında teslimi ve sunumu	MATERYAL KULLANIMI Konunun çeşitli malzemelerle desteklenmesi	ALDIĞI NOT
3	4		5	4	80
5	5		5	5	100
5	5		5	5	100
4	5		5	4	90
4	5		5	5	95
3	4		5	4	80
3	4		5	4	80
4	4		5	4	85
5	5		5	5	100
5	5		5	5	100
4	4		5	4	85
4	4		5	5	90

Figure 4.13: The scoring-guide used by Ms. Solmaz for grading performance-tasks.

It can be seen in Figure 4.13 that there were four criteria in the scoring-guide: creativity, overall appearance, submitting until deadline, and using materials (supporting the issue with various materails). However she did not construct any criteria for scoring mathematical issues. She explained her preference with the following words: ‘‘since I used the scale for an obligation, I did not need to add a new criterion to the prepared one’’.

For each criterion she scored students’ tasks over 5 points. In order to calculate the final grade, on the other hand, she multiplied the total scores by 5. As a result of that, at the end of the scoring, she calculated each student’s grade over 100.

Figure 4.13 also showed that there was a criterion about making presentations but Ms. Solmaz cancelled this criterion. She said that with this modification she wanted to prevent students from feeling anxious because she had

observed that some of the students had shy character and got sad when their class-mates joked with their mistakes. Therefore she did not want to force the 5th grades for presenting their tasks.

Fifth of all; the interview data and document analysis revealed that, while she was modifying the criteria of the guide, Ms. Solmaz did not take the decisions of students or school administration but she was depended on the decisions of mathematics department. For instance, in the first meeting of the mathematics department, which took place at the beginning of the academic year, an example rubric framework was prepared. It was observed in that rubric there were five main criteria: making use of sufficient references, pictures, photographs or drawings if needed; using Turkish language and the punctuation marks correctly and giving the information in order; using more than one reference; submitting the task on time; and cooperation between the group members. However, Ms. Solmaz used three of them in her own scoring-guide. Those three criteria were: making use of sufficient references, pictures, photographs or drawings if needed (using materials); using Turkish language and punctuation marks correctly and giving the information in order (the overall appearance); and submitting the task on time. Therefore it can be said that, Ms. Solmaz was depended on mathematics department's criteria decisions and used three of them in her own scoring-guide.

Lastly; like she did about the criteria, Ms. Solmaz also did not use a similar scoring interval with the mathematics department's rubric. The scale of the school mathematics department rubric was rated from 1 to 4 for each criterion whereas Ms. Solmaz's scale was 1 to 5. According to the document analysis, in order to determine how she would score the tasks, she wrote the meaning of each point at the bottom of the scoring-scale and gave them to students. It was written that 5 points meant ''very well'', 4 points meant ''good'', 3 points meant ''tolerable'', 2 points meant ''acceptable'', and 1 point meant ''needs improvement''. Therefore it can be said that, in order to grade 5th grades' performance-tasks, Ms. Solmaz did not only score the completed works, she also scored partially complete, incomplete or completely wrong works, too. It means she did not only score totally correct tasks. She also scored the partially correct, tolerable, acceptable, and inadequate tasks.

Another major assessment procedure that Ms. Solmaz practiced in her 5th grade classes was the project-study. According to the requirements of Ministry of Education, in each academic year, students were assigned a project from a course that they selected. According to the decisions of the mathematics department of the current school, on the other hand, the projects were assigned in December 2013 by Ms. Solmaz and the deadline was determined as the last week of April.

Firstly; it was revealed with the interview data and document analysis that, like she did during the performance-tasks, Ms. Solmaz did not choose the project topics along with the mathematics department suggestions. She stated that the topics were only the suggestion and added that ‘‘however I think the prism topic is more appropriate than the department’s suggestions’’. Therefore she preferred to offer project about the ‘‘prisms’’ topic and asked students to construct mathematics materials for the prism topic. In that manner students were responsible to model, construct and explain the prisms (rectangular prism, square prism, and cube).

Second; according to the field notes there were 40 students who wanted to prepare a project from mathematics course in Ms. Solmaz’s 5th grade classrooms and she gave the same project to each student or group. Moreover the students were free to make their projects individually or in groups, and it was indicated with the field notes that, if they wanted they would prepare posters for representing their works.

During the interviews it was also revealed that Ms. Solmaz did not teach prism topic before giving projects about it. In other words students had not learned prism unit before they made their projects. Ms. Solmaz explained how she decided on the project topic with two reasons in the interview data:

> I gave a topic about which I had not taught anything yet, so I thought I would teach the prism topic easily in the future. For instance I would be aware of the probable misconceptions and misunderstandings about that topic and such awareness would make my further teaching more efficient. They also showed the prisms through models. I think such a practice would also make their learning permanent. Actually project-studies were mostly requested by the low-achievers, so I wanted them to work by themselves and to show their labour through their projects. (q74).

However during the final interview Ms. Solmaz stated that she was glad to give projects before teaching the related topic because the learning environment during her teaching was developed as she expected. Students remembered the issues

about the prism topic and they volunteered to talk about the properties of the prisms.

Moreover she implied that she took into consideration of the students' socioeconomic levels before assigning their projects. In that manner she did not ask students to use expensive equipment for constructing prism models. According to the field notes, also, students in the current context had opportunity to reach internet resources, so Ms. Solmaz encouraged students for internet search, too.

Third of all; the interview data showed that Ms. Solmaz determined the guidelines of the projects herself. Then she photocopied and delivered them to students. During that practice she explained the instructions of the projects orally, too. The related instructions were as follows: research the properties of rectangular prism, square prism, and cube; explain their properties; and show the closed and opened appearances of each through models; show your all work on your projects. Last of all, it was understood by the guidelines of the project studies that there were no instructions about using a ruler or a miter.

An example of the project from Ms. Solmaz's 5^{th} grade classes is shown in Figure 4.14:

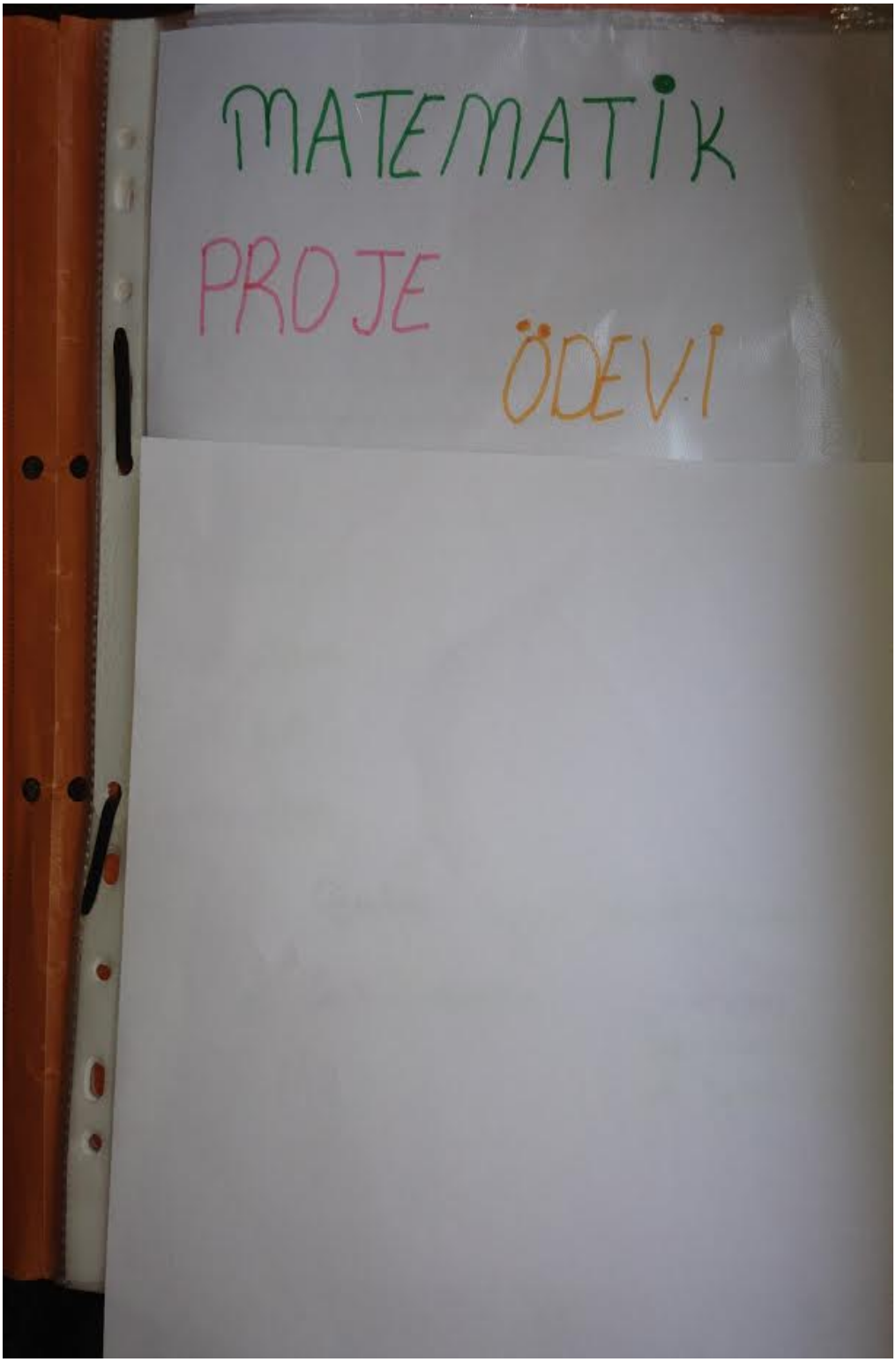


Figure 4.14: The project submitted by Student Elif in Ms. Solmaz's class

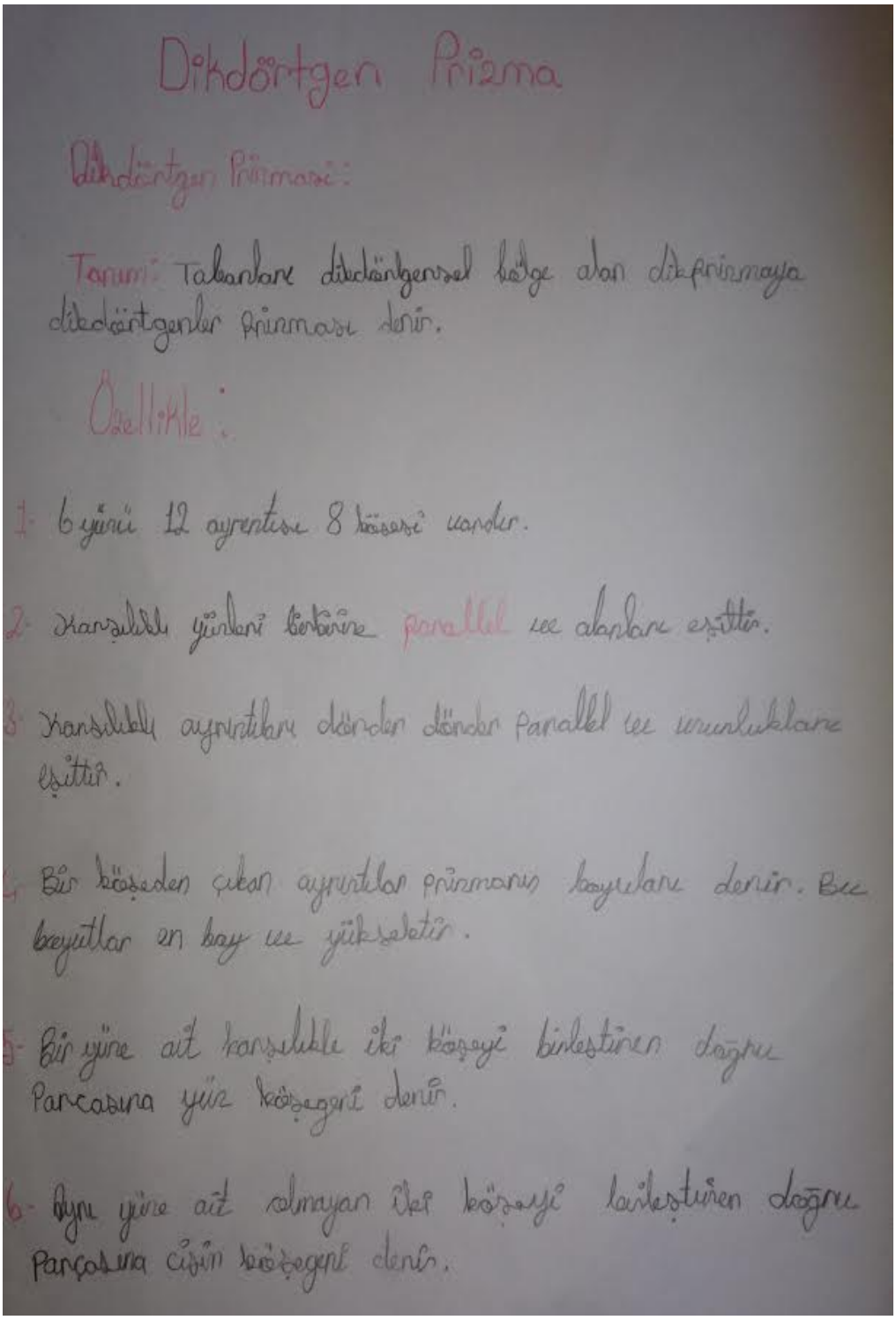


Figure 4.14 (cont'd): The project submitted by Student Elif in Ms. Solmaz's class

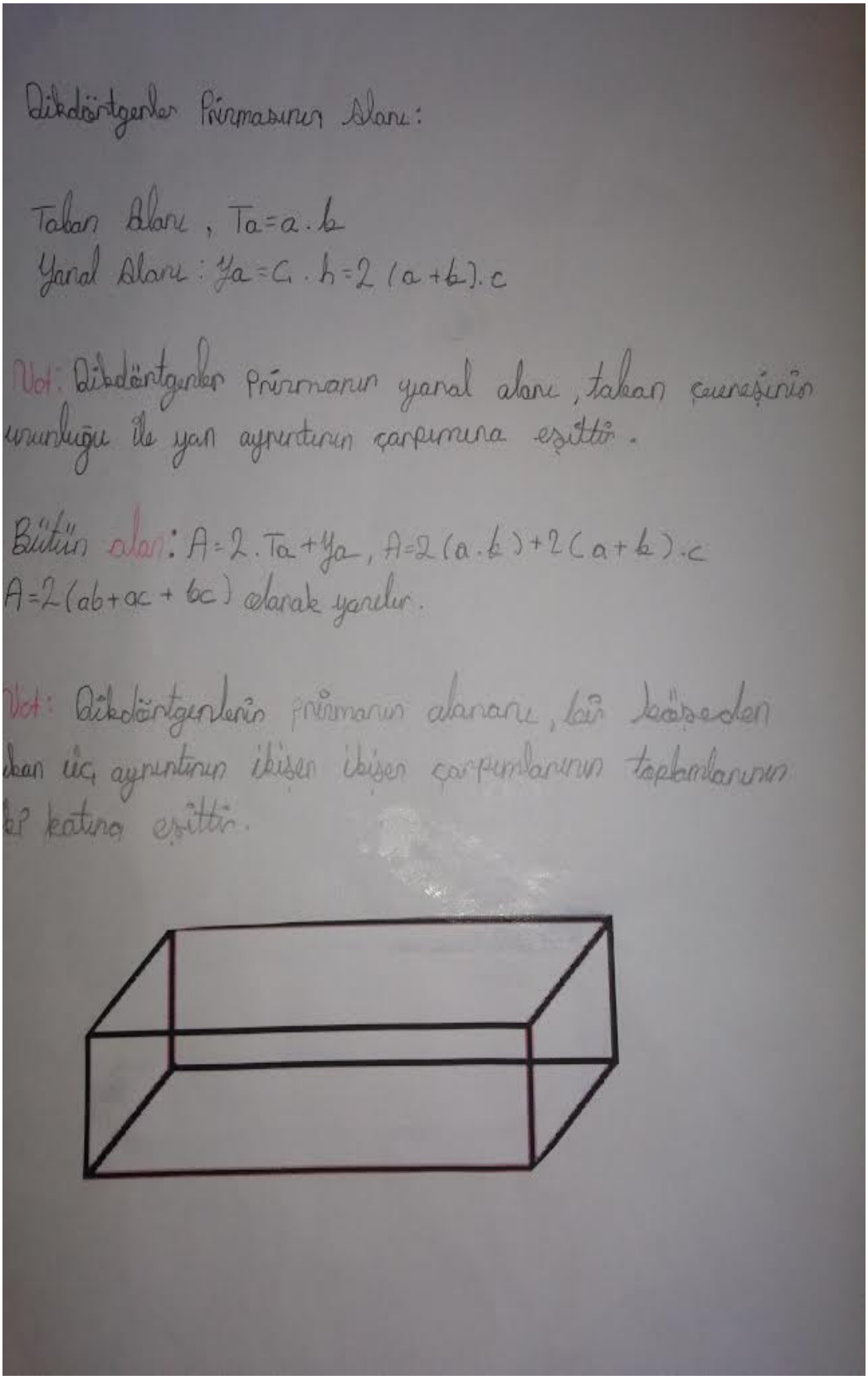


Figure 4.14 (cont'd): The project submitted by Student Elif in Ms. Solmaz's class

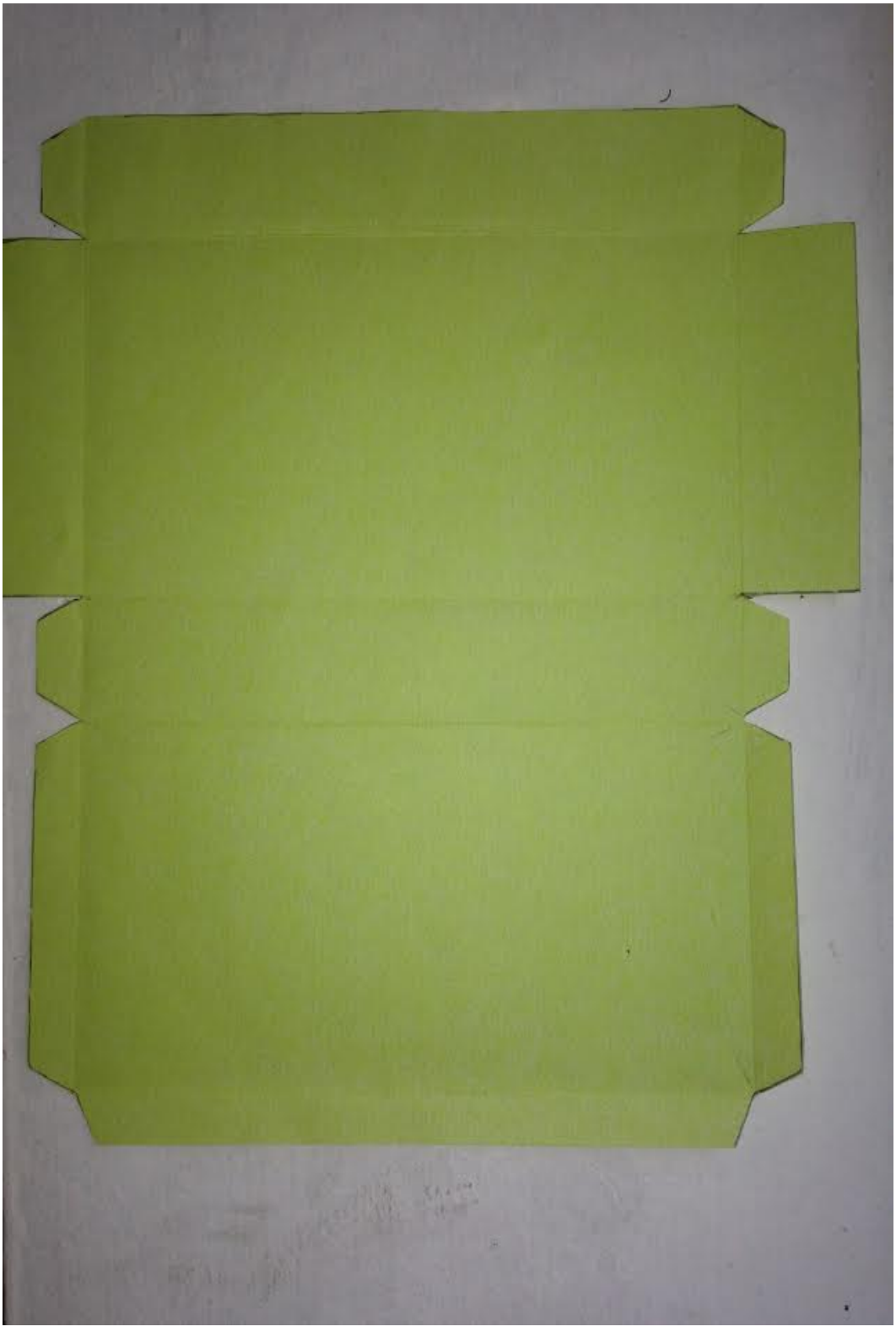


Figure 4.14 (cont'd): The project submitted by Student Elif in Ms. Solmaz's class

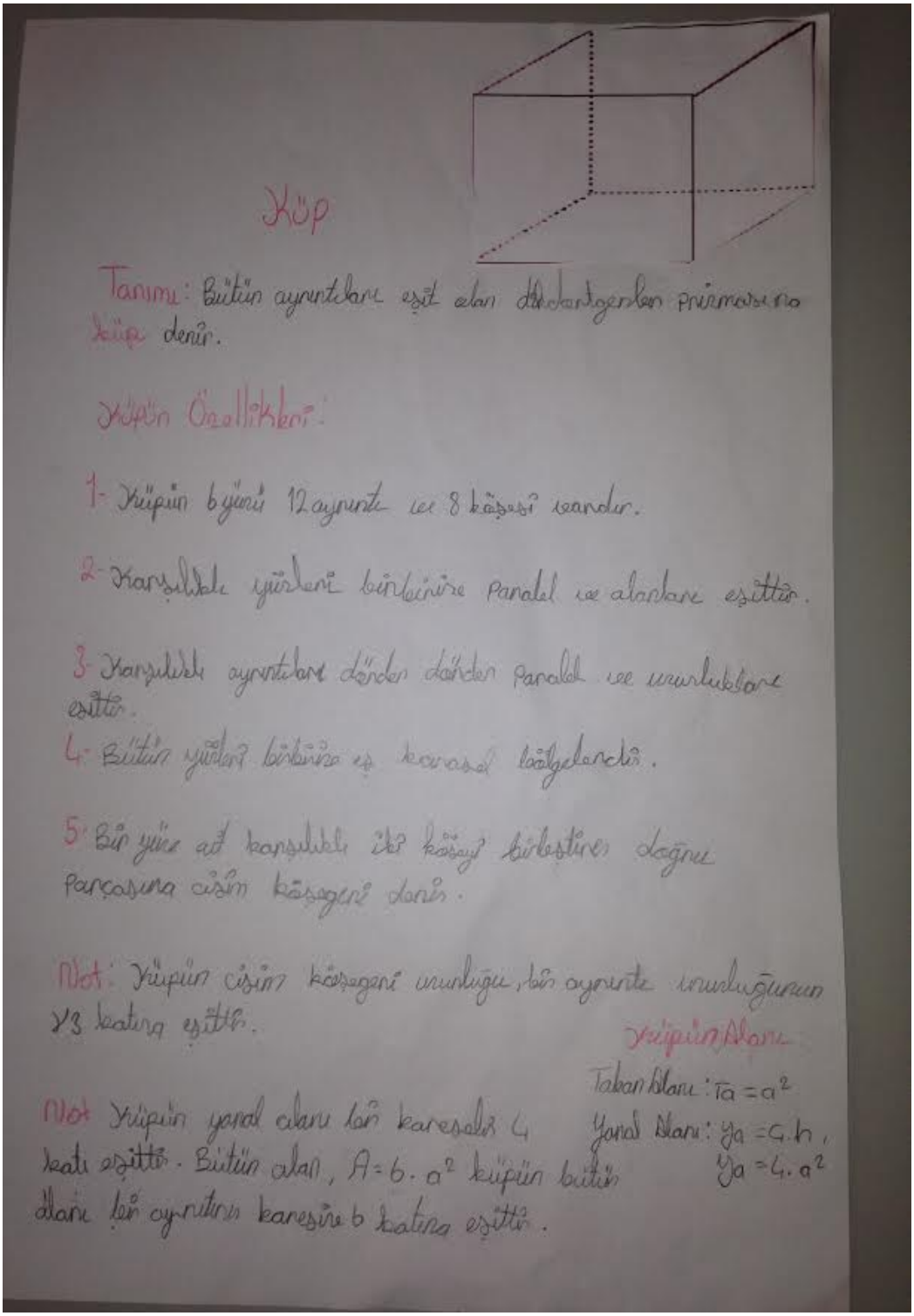


Figure 4.14 (cont'd): The project submitted by Student Elif in Ms. Solmaz's class

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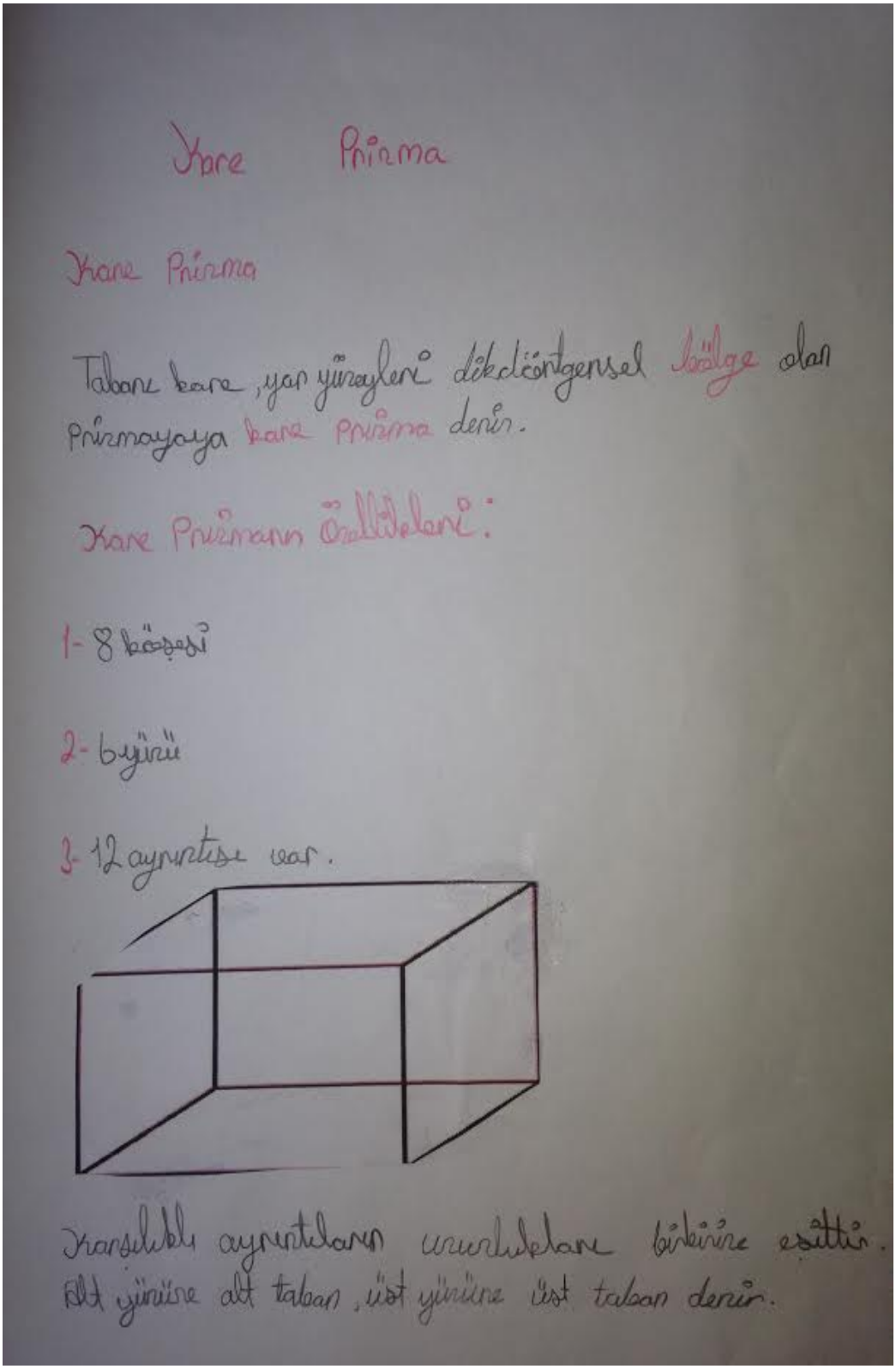


Figure 4.14 (cont'd): The project submitted by Student Elif in Ms. Solmaz's class

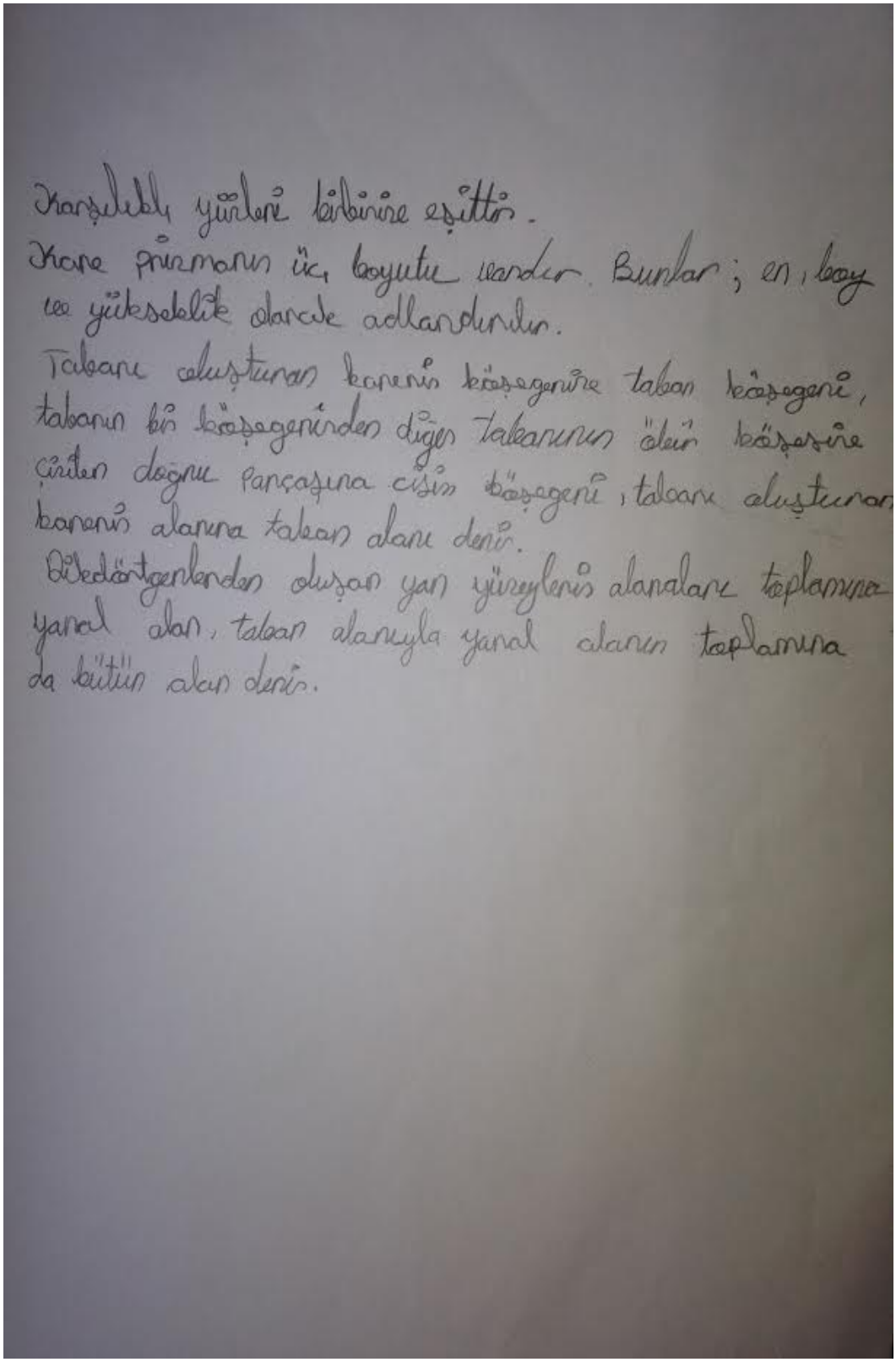


Figure 4.14 (cont'd): The project submitted by Student Elif in Ms. Solmaz's class

Figure 4.14 (cont'd): The project submitted by Student Elif in Ms. Solmaz's class

In Figure 4.14 the project of Student Elif about rectangular prism, square prism, and cube is shown. It is seen in the figure that the student drew and modelled the prisms. However some of the students explained the properties which were not in the 5th grade curriculum whereas some of them stated information irrelevant with the prisms. For instance, in Figure 4.14, Student Elif explained the space diagonal concept, floor area, lateral area, the total area although the area calculations and diagonal concept did not exist in the curriculum. In the curriculum, on the other hand, the following properties of the prisms were told: a prism has 8 vertices, 12 edges, and 6 faces; the opposite faces of a prism are parallel; the opposite edges of a prism are parallel and their lengths are equal; the floor edges of a square prism are equal to each other; the lateral face of a square prism are equal to each other; all the edges of a cube are equal to each other; and all the faces of a cube are identical squares.

An example of the project submitted by a group from Ms. Solmaz's 5th grade classes is shown in Figure 4.15:

Figure 4.15: A 5th grade group project submitted to Ms. Solmaz

In Figure 4.15 a group project about rectangular prism, square prism, and cube is shown. It is seen in the figure that student drew and modelled the prisms. However, like some other students did, some students explained the properties which were not in the 5th grade curriculum whereas some of them stated information irrelevant with the prisms. For instance, in figure 4.15, the group members explained the symmetry axis concept although it did not exist in the curriculum. They also explained the properties of a rectangle although they drew a rectangular prism shape.

As a result of the analysis of the studies shown in the Figures 4.14 and 4. 15, it can be said that, the students were not exactly sure about the context of their projects. Maybe if Ms. Solmaz had told the topic before the projects or would give a guideline to the students, they would not state any irrelevant or wrong information in their projects.

Fourth; Ms. Solmaz graded students' projects by using the criteria which were offered by the mathematics department. There were two main criteria in the scoring scale of the mathematics department: the preparation process of the project and the content of the project. The preparation process included the criteria of: identifying the purpose of the project, planning the project, determining the needs of the project, using different references, and carrying out the project according to its plan. The criteria about the content of the project were as follows: using Turkish language rules correctly, the accuracy of the information, organizing the information, and using creativity.

It was revealed by the document analysis that both of the projects showed in the figures 4.14 and 4.15 got the scores of 90. The students lost points from the criteria of the accuracy of the information (5 points over 10) and organizing the information (5 points over 10). Ms. Solmaz explained the reasons of these scores in the interviews:

> In group project students gave information about a rectangle instead of rectangular prism. Moreover in both of the projects there was information related with the higher grades' mathematics curriculum. They gave information about the area calculations, the symmetry axis, and the space diagonal. They should have organized the information and omitted the unnecessary parts (q75).

Fifth of all; it was understood with the field notes that Ms. Solmaz obeyed the rules of The Ministry of National Education and announced the grades to students in 10 workdays. Moreover she gave the written report about the results of the common paper-and-pencil exams to the mathematics department at the end of the semester. In that manner she wrote the number of the students that got grades over 44 and under 44 in her report. The mathematics department, on the other hand, gave these reports to school administration.

Last of all; it was figured out that Ms. Solmaz did not let students check their performance-tasks and projects with the scoring-guides and she did not discuss the results with them. She said that this was because of the students' unwillingness in checking the performance-task results. Instead, it was indicated with the interviews that she preferred to inform the students about the common mistakes done in the assessment activities and she explained the correct solutions of the items at the end of the activities. She did not prefer to give feedback to individual students.

To sum up; it can be understood with the data that Ms. Solmaz tried to obey the obligations of the Ministry of National Education. She implemented three paper-and-pencil exams, and one performance-task to each 5^{th} grade student whereas she gave project to the willing ones. According to the field notes and interview data, she announced the time of the paper-and-pencil exams one week before the implementations and prepared the answer keys before exams. On the other hand, she did not prepare a scoring-guide or a rubric for the performance-tasks and projects studies on her own. Instead, she used the prepared ones from internet or from mathematics department suggestions. She announced the results in 10-days but did not give students permission to check their papers, tasks, and projects. She also gave common written exam report to mathematics department. However, it was indicated with the documents that she did not use any criterion for assessing students' mathematical skills in performance-tasks and project studies directly.

4.2.2 Ms. Solmaz's Use of Assessment Results

The interview data, the observational data, the document analysis, and the field notes indicated that, for summative purpose, Ms. Solmaz practiced formal

assessment such as paper-and-pencil exams, performance-tasks, and projects. For formative purpose, on the other hand, Ms. Solmaz practiced both the formal and the informal assessments. The informal assessments included observations, whole-class worked examples, journals, and homework. As a result of the related literature and the data collected, Ms. Solmaz's ways for using assessment results will be explained in the following subsections. By the current results, the answers to the following research questions were investigated:

1. In what way are the participating mathematics teachers' formal and informal assessments related with their use of assessment results in 5th grade classrooms?
2. How do the participating mathematics teachers use the results of their assessment practices formatively in 5th grade classrooms?

4.2.2.1 Ms. Solmaz's Use of Assessment Results for Making Decisions on Her Instructional Practices

According to the interview data and field notes, Ms. Solmaz used assessment results in order to make decisions about the effectiveness of her teaching or about repeating a topic in general. Besides she used project results for teaching the related topic, too.

To begin with; Ms. Solmaz used whole-class worked examples and her observational data for understanding whether she had taught mathematics efficiently. She stated that when the students solved the questions like the way she did in the past, she became sure about her teaching efficiency. She continued:

> There are a few students who are very good at mathematics. When I observe that they solve the questions as the same way as I do in the classrooms, I understand that I could teach the topic and I become happy (q76).

It can be seen in her explanation that; according to Ms. Solmaz if a student solved a question as the same as she did during her previous teaching, then she was sure about the effectiveness of her teaching.

An example about the way she decided on her teaching efficiency was took place during the ''addition of fractions activity''. In the activity one of the sub-items was asked to do the following operation:

$\frac{2}{4}+\frac{1}{8}$

The students' activity papers showed that, most of the students found the correct answers by doing the following operations:

$\frac{2}{4}+\frac{1}{8}=\frac{4}{8}+\frac{1}{8}=\frac{5}{8}$

It was observed in the operation that, for adding $\frac{2}{4}$ and $\frac{1}{8}$, they equalized the denominators of $\frac{2}{4}$ and $\frac{1}{8}$ by enlarging $\frac{2}{4}$ with 2 and they found the common denominator as 8. Then, they added the numerators and wrote the result with the common denominator. According to Ms. Solmaz, the answer showed that her teaching was efficient enough to make students learn to equalize denominators. Moreover, according to her thoughts, some students gave wrong answer to the item since they did not listen to the lessons carefully. Her related words were as follows: ''most of the time in the classrooms, the high achievers responded the questions but during the activity I could also observe them. I understood that my teaching worked and I am glad for that'' (q77).

In addition to the ''addition of fractions activity'', Ms. Solmaz stated that performance-task evaluations also gave her idea about her teaching effectiveness. She assigned a task about ''modelling fractions and representing them in their decimal and percentage forms '' because she thought that students had difficulties mostly on fractions, showing fractions through models, changing a fraction to its decimal form and percentage form. After she evaluated the results, on the other hand, she thought that since she did not teach the topic efficiently, some students still had problems on changing a fraction to its percentage form. She explained her thoughts with an example:

> Actually students had difficulties on fraction unit. Then the decimal numbers and percentages topics were taught and they were hard topics, too. Therefore I thought that such a task would seem like playing a game and the topic would be more meaningful to them by that game. However some students wrote statements such as ''the percentage form of $\frac{2}{5}$ is 0.30'' and since I observed such irrelevant results I had a suspicion on my teaching effectiveness. (q78).

Ms. Solmaz stated that she understood whether teaching fractions through models was an efficient method with the help of the classroom exercises, too. For

instance in ‘‘the quiz activity’’, the following item was asked to the students:

Show an equivalent fraction to $\frac{3}{5}$

The document analysis showed that, Figure 4.16 was some students’ answer to the item above:

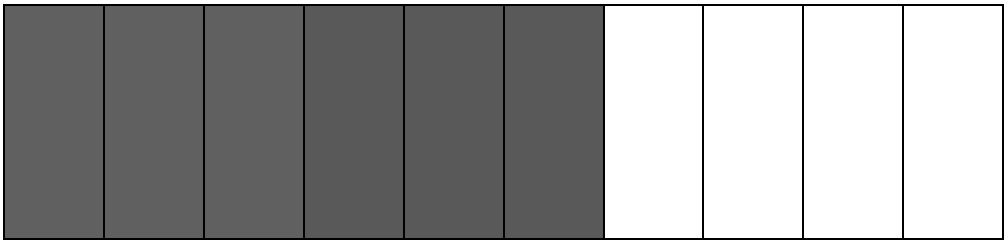


Figure 4.16: An example answer for showing equivalent fraction to $\frac{3}{5}$ in Ms. Solmaz’s class

It can be seen in Figure 4.16 that the students modelled $\frac{6}{10}$ as an equivalent fraction of $\frac{3}{5}$. According to Ms. Solmaz, students modelled $\frac{6}{10}$ correctly and this answer indicated that teaching fractions through models was an efficient method of her. She decided on that, teaching fractions through modelling was efficient, so she would use the method in her further teaching of fractions.

Ms. Solmaz also said that her teaching efficiency developed by getting experience on teaching a topic. According to her classroom observations, teaching a topic became more efficient if she gave the same lesson to more than one class. She continued with the following:

> I teach mathematics to four 5th grade classes. Although I teach the same topic, there are differences in the learning speed of the 5th grade class that I give lesson firstly and the last one. In the time that I teach a topic firstly, I realize that some teaching methods can be more efficient on students’ learning. For instance, sometimes I teach a hard topic and say to myself that in the next class I need to concretize some issues. Sometimes, on the other hand, students’ questions and ideas give me idea for increasing efficiency. For example they connect their previous knowledge with the topic and compare the issues with the previous one. Therefore I tried another method in the subsequent class and observed that students learned faster than the previous class. (q79*)*.

Second, Ms. Solmaz used assessment results in order to make decisions about repeating a topic. The interview data and the field notes indicated that if she observed that students could not answer the questions correctly, she repeated the related topics by solving similar questions or by summarizing the topic. For instance after the ‘‘quiz activity’’ she realized that a few students made mistakes in the answer of the following item:

> *Decide whether the fractions* $\frac{2}{3}$ *and* $\frac{4}{5}$ *are equivalent or not. Explain your answer. You can show your operations through model, too.*

Ms. Solmaz stated that some of the students answered the item correctly and stated that $\frac{4}{5}$ is bigger than $\frac{2}{3}$ but they explained their reason by writing on their papers that ‘‘because 4 and 5 are bigger than 2 and 3’’. She stated that in order to correct this mistake, she repeated the topic by solving the item in the classroom and showed $\frac{2}{3}$ and $\frac{4}{5}$ through models. Then she solved a few similar examples in the classroom, too.

Another situation in which Ms. Solmaz decided to repeat the topic was took place in the ‘‘problem solving activity’’ which was represented in Appendix E. In the problem there were two price lists for the equipment of two different puppet trademarks. By using the lists, students were asked to find the minimum cost of the equipment for constructing the puppet. The lists of the two trademarks are listed in Table 4.2:

Table 4.2: The price lists of the two trademarks listed in the ‘‘problem solving activity’’ (In Ms. Solmaz’s Class)

Product	Price of Trademark A (Turkish Liras)	Price of Trademark B (Turkish Liras)
The puppet	20	26
Linden made puppet stem	7, 75	11,25
The dress kit for the puppet	4	9, 5
The dye kit for the puppet	3, 5	6
Equipment for pulling the wires of the puppet	3	5, 5

After the activity, the document analysis showed that some of the students did not do the addition operation correctly. The following operation was a part of a wrong answer on that activity:

$$\begin{array}{r} 11.25 \\ 9.5 \\ 6 \\ 5.5 \\ + \\ \hline 1281 \end{array}$$

Such an operation was also observed in the 2nd paper-and-pencil exam, too. In one of the items the following operation was asked to students:

47.8+6.28+412.09=?

In some of the papers, it was observed that like they did during the ‘‘problem solving activity’’, students solved the item like the following:

$$\begin{array}{r} 47.8 \\ 6.28 \\ 412.09 \\ + \\ \hline 42305 \end{array}$$

It can be seen in both of the operations that the students were not careful on writing the decimal part one under the other or the fractional part one under the other. Moreover they did not put the point sign in its proper place on the answer. As a result of that they did not find the correct results. Ms. Solmaz stated that she also observed this mistake during her past teaching sessions on addition operation of decimal numbers and continued with saying that:

> Actually the students of that class were high-achievers but there were 4 or 5 students who were not good at addition operation on decimal numbers during the class sessions. I had foreseen that they would have problems on doing addition operation but I had not thought the mistake would be as big as that. I think I need to repeat doing addition operation on decimal numbers which were written one under the other because most of the difficulties were on doing such operations. (q80).

According to the field notes, also, after the ‘‘problem solving activity’’ Ms. Solmaz emphasized on the point sign in decimal numbers. Moreover she reminded

students that, they needed to write the whole part and the decimal part one under another in order to do the addition operation correctly. Then she solved the current item in the classrooms and continued with similar exercises in one lesson hour. After the paper-and-pencil exam, on the other hand, she did not repeat the topic because of time limitation, instead she gave students exercise sheets including items about addition operation with decimal numbers.

An example of Ms. Solmaz's practice on repeating a topic was observed after the ''constructing a rectangle activity''. In one of the items during the activity, it was asked the students to decide whether 3 units, 1 unit, 3 units, and 5 units construct a rectangle. Then, by using geometry sticks, students tried to construct a rectangle with the given lengths. It was observed that lots of the students constructed similar shapes with figure 4.17:

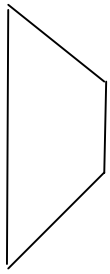


Figure 4.17: Example shape constructed by Ms. Solmaz's students in ''constructing a rectangle activity''

Although Figure 4.17 was not a rectangle, some of the students could not answer the item. They said that the figure was a quadrilateral but they could not decide whether it was a rectangle or no. As a result of that, Ms. Solmaz repeated the properties of a rectangle by emphasizing on that ''the opposite sides of a rectangle were parallel and equal to each other''. Then she read the item and asked students to try to decide whether that quadrilateral was a rectangle or not. Students responded with the following sentence: ''this is not a rectangle because the lengths with 1 unit and 5 units are in opposite sides but they are not equal to each other''. Therefore it can be said that, in addition to the field notes and interview data, the video records also indicated that Ms. Solmaz used assessment results for repeating a topic such as the properties of the rectangles.

Last of all, it was shown by the interview data and the field notes that Ms. Solmaz used students' project results in her teaching of prism topic. It was observed during the data collection process that Ms. Solmaz gave projects on the prism topic before she taught the related lessons. She stated that as a result of that she observed that students failed mostly on identifying rectangular prism and square prism. ''This mistake gave me idea that I need to be careful on teaching how a prism is named'' she said and added that students had made such a mistake since they did not realize that a prism was named by its floor shape. Thus she put emphasis mostly on that property during her lectures on prisms.

In summary; it was shown in the interview data and field notes that Ms. Solmaz used assessment results for deciding on her teaching effectiveness, repeating a topic, or teaching a topic. She repeated a topic if there were common mistakes about it. In order to understand the effectiveness of her teaching, on the other hand, she checked whether the students solved the questions as the same way as she did in the classrooms**.**

4.2.2.2 Ms. Solmaz's Use of Assessment Results for Making Decisions on Her Assessment Practices

According to the interview data and field notes, Ms. Solmaz used assessment results to decide on the adjustments of her further assessment practices.

An example of her decisions on her further assessment practices took place before assigning performance-task. For performance-tasks, students were assigned to prepare cards for representing fractions by cutting 10 small, square shapes from cartons and to determine 10 fractions. For each fraction they would prepare one piece of carton. On the front face of each carton piece, they would write the fraction and show it through model. On the reverse side, on the other hand, the decimal and the percentage representations of the fraction would be written. Ms. Solmaz stated that she did not ask students to show the decimal and percentage forms of the fractions through model because she observed during the whole-class worked examples that students made mistakes on that issue and so they were not ready to prepare such a task by themselves, she added that ''They would make mistakes if I would ask them

to show the percentages and decimal representations of the fractions through models'' (q81). Therefore it was indicated with the interview data and field notes that she used whole-class worked example results for making adjustments on the performance-task implementations.

According to the interview data, like she did for the performance-task practices, whole-class worked examples, her classroom observations, and paper-and-pencil exam results affected her decisions about the degree of the difficulty of the items she used in paper-and-pencil exams. She stated that if she could get enough data to identify students' achievement levels, she prepared more effective items for the paper-and-pencil exams. Her related words were as follows:

> I was expecting that high-achievers could give correct answers to some of the items whereas low-achievers could not. These thoughts affected me while I was preparing the paper-and-pencil exam items because I knew who would answer correctly or who would make mistakes. Therefore, in the exams, I tried to ask some of the items easier than the other ones in order to let low-achievers give more correct answers (q82).

For instance after the 3rd paper-and-pencil exam, a part of which was represented in figure 4.18, Ms. Solmaz stated that she understood that some of the items of the current exam were not suitable for the students' achievement levels:

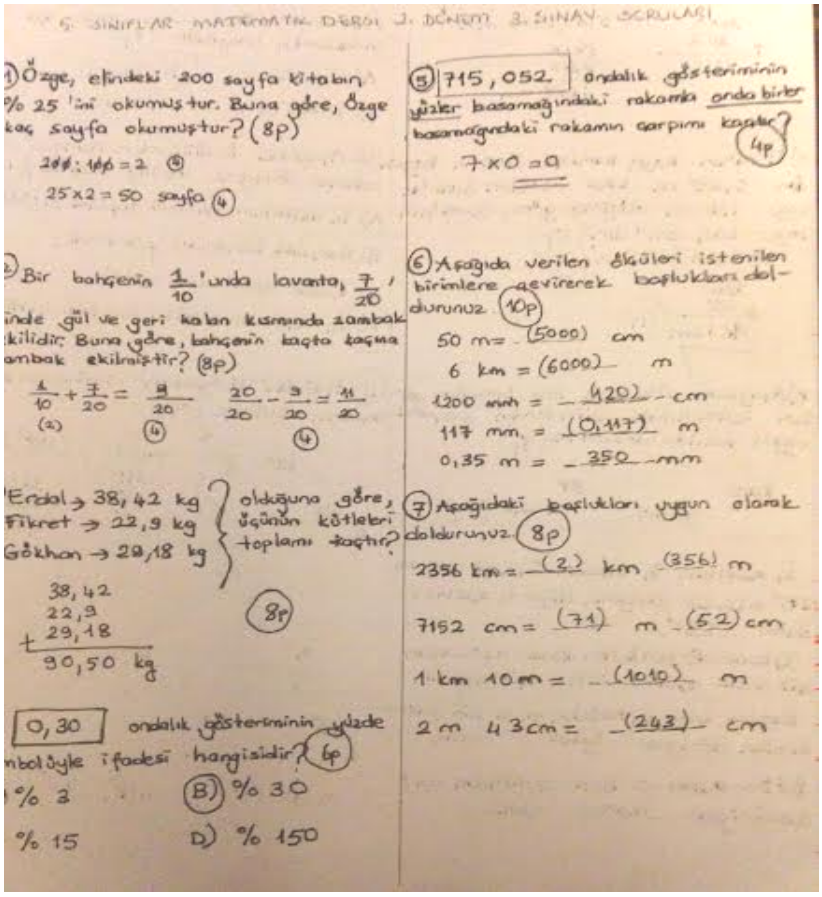


Figure 4.18: A part of the 3rd paper-and-pencil exam that Ms. Solmaz implemented

It can be seen in in figure 4.18 that, the 3rd item is as follows:

In $\frac{1}{10}$ of a garden, lavenders were planted and in $\frac{7}{20}$ of the garden, roses were planted. In the rest of the garden, lilies were planted. Find the fraction for the lilies.

According to the document analysis, some of the students did the following operations for solving the item:

$$\frac{1}{10} + \frac{7}{20} = \frac{2}{20} + \frac{7}{20} = \frac{9}{20}$$

It can be seen in the answer that the answer is incomplete since the following operation was not done:

$$\frac{20}{20} - \frac{9}{20} = \frac{11}{20}$$

According to Ms. Solmaz students could not reach the solution since they did not realize that $\frac{20}{20}$ was representing the whole. She stated that the item was longer

than the students expected, so it was not suitable for some of the students. ‘‘Therefore’’ she said ‘‘I will ask shorter items in the classrooms in order to reach the aim of the objective. That item was asked to assess whether students could understand the meaning of a whole in a fraction problem’’.

Ms. Solmaz also stated that sometimes she used assessment results to make intentions for her further assessment practices. Such a situation was observed after the ‘‘addition of fractions activity’’ on 04.04.2014. In order to do the addition operations given in the activity, students used fraction bars. During the activity it was observed that most of the students answered correctly to the items and they used the fraction bars efficiently. For instance in the 20th minute, the spokesman of a group explained their work to Ms. Solmaz. He waited for the approval of Ms. Solmaz for their modelling of 2/4 + 1/8. On their activity paper the model was as follows:

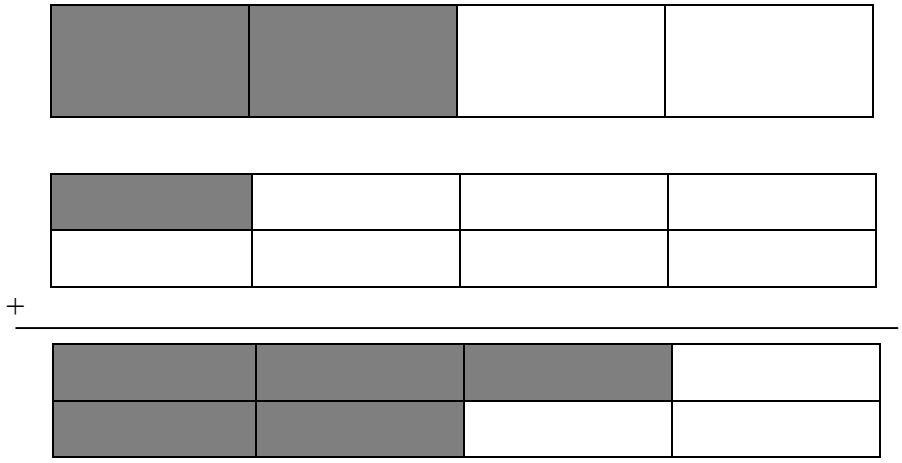


Figure 4.19: An addition operation model in Ms. Solmaz’s class

It can be seen in the Figure 4.19 that, the students were careful about using the same amount of whole for modelling $\frac{2}{4}$, $\frac{1}{8}$, and their addition. As a result of that they showed the operation through model correctly. Like it was expected, Ms. Solmaz approved the operation by telling student that their answer was correct and they could continue like that.

After the activity Ms. Solmaz stated that such results took place because materials facilitated students’ studies and they were happier in doing group activities

with using materials, so she decided on using materials and encouraging group works in her further assessment practices in the following academic years.

In conclusion; the interview data and field notes revealed that Ms. Solmaz used assessment results in order to make adjustments on the items of the paper-and-pencil-exams or performance tasks. Moreover, like she did after the ‘‘addition of fractions’’ activity, she determined long term intentions on the adjustment of her further assessment practices.

4.2.2.3 Ms. Solmaz's Use of Assessment Results for Improving Students' Learning of Mathematics

According to the interview data, document analysis, and field notes, in order to improve students' learning of mathematics, Ms. Solmaz monitored the students' progress; assigned their overall grades for the whole year; gave formative feedback to students; tried to prevent students from feeling anxious; encouraged them to study; prevented them from cheating; diagnosed their areas of strengths and weaknesses; and rewarded them.

First of all; the interview data indicated that in order to monitor students' progress, Ms. Solmaz relied on her observational data and students' journals:

> Zehra is one of my high-achiever students. She brought her home notebook (journal) today. I observed that she had kept her journal painstakingly. I am sure that she has been keeping the journal herself because I have been observing her during my classes; she finishes the mathematical operations before me. (q83).

In the manner of monitoring students' progress, she compared her observational data with the classroom activities results which were offered by the researcher, too. For instance after the ‘‘addition of fractions activity’’, she stated that some students who were unwilling in the previous classroom activities studied harder during the current activity whereas some of them continued to behave unwillingly. Her words were as follows:

> One of the students behaved like he was the spokesman of his group during the activity but he was not an active student in the previous classroom exercises. Another one, on the other hand, was not interested in the activity like she had been doing during the classroom activities. I can monitor their progress by observing them. (q84).

The interview data also indicated that Ms. Solmaz mostly used the paper-and-pencil exam results for monitoring students' progress. For instance, the following operation was asked to the students in the 2nd paper-and pencil exam:

47.8+6.28+412.09=?

In some of the papers it was observed that some students solved the item like the following:

$$\begin{array}{r} 47.8 \\ 6.28 \\ 412.09 \\ + \\ \hline 42305 \end{array}$$

It can be seen in the operation that the integer part and the decimal part were not separated during the addition and the point sign was not in its proper place on the answer. Ms. Solmaz stated that she also observed such a mistake during her past teaching sessions on addition operation of decimal numbers. She went on to say that ''I knew 4 or 5 students who made similar mistake during the class sessions, so I observed that there is not a change in their progress'' (q85).

After the 1st paper-and-pencil-exam, also, she stated she monitored students' mathematical progress. For instance she observed during her classroom practices that students could classify triangles according to their angles. In the exam there was an item asking students to classify the given triangles and all the students answered the item correctly as she was expecting.

It can be seen by the interview data and document analysis that Ms. Solmaz used both the formal and informal assessment results for monitoring the students' progress in mathematics however it was also observed that she did not keep any written records for her monitoring.

Second, Ms. Solmaz stated that she used both summatively purposed and formatively purposed assessment results during the overall grading process. According to the interview data, her grading process started with getting the observational data for the students. She stated that she learned each student's mathematical progress by observing them in class but she did not keep a written record for the classroom observations. She stated that she relied on her memory. In

that manner she specified that, none of the assessment results had a pre-determined proportion on the overall grades for the whole year. On the other hand she added that she used the observational data, journals, and homework as contributions to the overall grade at the end of the semester. She explained her practice with the following words:

> I use all assessment results for giving the overall grades at the end of the semester. Students' paper-and-pencil-exam grades or project grades cannot be changed. For their performance tasks, on the other hand, they get higher grades if they do the tasks well. If their tasks are not good enough to get high marks, they get lower grades. These results cannot be changed. However if a low-achiever student's behavior in the classroom is good, s/he can also get good grades for her/his in-class performance. In that manner, students' participations in the lessons, their behavior, their mathematical knowledge, their ways to express themselves contribute to the overall grade. (q86).

She explained her system with the assessment results of Student Ece. According to the document analysis, Ece had an overall grade of 67 from the formal assessment results but she got 70 for mathematics in her school report. Ms. Solmaz explained this example in the following quotation:

> Ece had deserved that grade. She would get 4 (scores between 70 and 84) as a grade but unfortunately she got 3 (scores between 55 and 69). But if she would get 3 points more, the grade would be 4 instead of 3. Therefore I reflected the in-class performance of the student as a contribution to her overall grade. On the other hand all the students are not the same. If a student does not do anything in the lessons, s/he cannot increase her/his overall grade although s/he gets 42 or 43. (q87).

Third, Ms. Solmaz stated that giving formative feedbacks motivated students and increased their ambitious towards mathematics, so she used assessment results for giving formative feedbacks to the students. Her related words were as follows: "Sometimes low-achievers make good works in classroom practices. Actually I appreciate those students by using words such as: good for you, what you did is very nice, your thoughts are correct". (q88).

For instance the video recordings of the ''addition of fractions activity'' on 04.04.2014 showed that, a group finished the item which was asking to add two fractions with the same numerators before their classmates. It was observed that they chose $\frac{1}{3}$ and $\frac{1}{6}$, and added them with the following operation:

$\frac{1}{3}+\frac{1}{6}=\frac{2}{6}+\frac{1}{6}=\frac{3}{6}$

Moreover it was observed that they showed the operation through model and explained their work like in Figure 4.20:

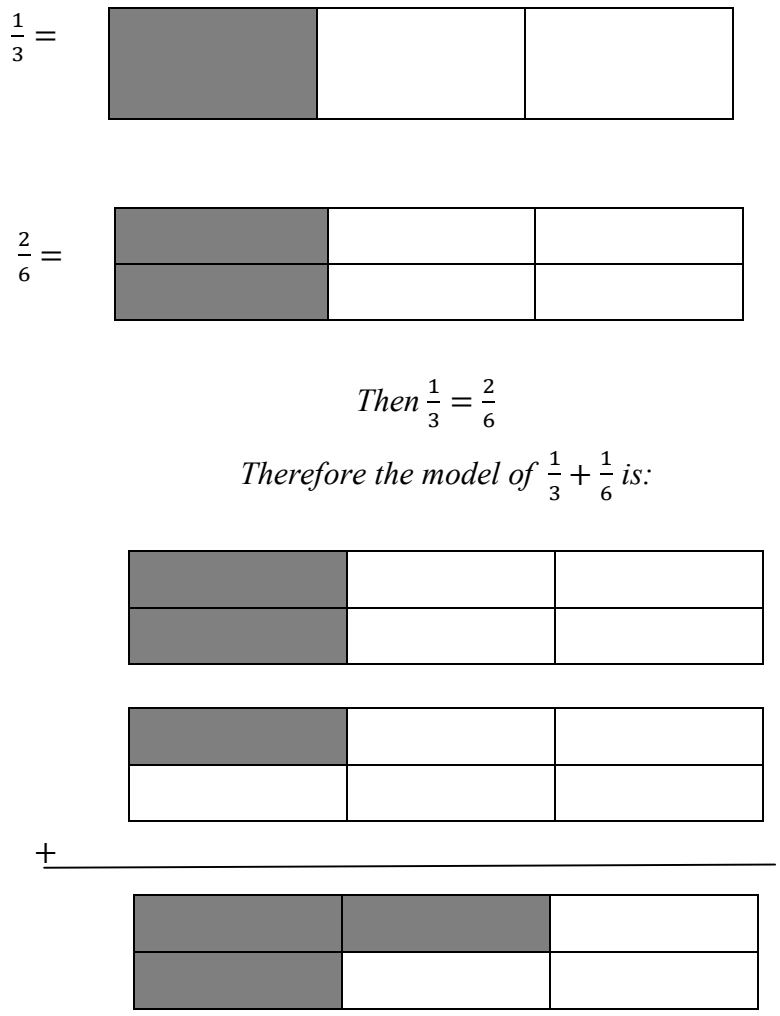


Figure 4.20: Another addition operation model in Ms. Solmaz's class

It can be seen in the operation and model represented in Figure 4.20 that, the students did the operation correctly. In order to model the current mathematical operation, on the other hand, they used the same amount of whole for modelling $\frac{1}{3}$, $\frac{1}{6}$, and their addition. As a result of that it can be said that they gave correct answer to the item. After that, it was observed that Ms. Solmaz made the following sentence to

them as a formative feedback, ‘‘good for you, you have finished your work properly and did the related operations for $\frac{1}{3}$ and $\frac{1}{6}$ correctly. That means you have understood equalizing the different denominators’’.

According to the interview data, Ms. Solmaz did not only appreciate students’ correct answers, she also criticized their wrong answers. For instance during the second paper-and-pencil exam she asked students the following item:

$$\frac{7}{13}+\frac{11}{13}$$

It was observed in some of the students’ papers that, they did the following operation as an answer:

$$\frac{7}{13}+\frac{11}{13}=\frac{18}{26}$$

It can be seen in the answer that students added the denominators, too. Ms. Solmaz stated that she had given formative feedback to the students with the following words: ‘‘I criticized them for that mistake and reminded them that I taught that topic’’ (q89).

On the other hand, Ms. Solmaz stated that there was not enough time to give formative feedback to each student separately after each assessment practice. In addition she said that only the high-achievers wonder their mistakes. ‘‘Therefore’’, she added, ‘‘if the high-achievers could not answer an item, I explained them their mistakes. Then I solved those items in the classroom’’. (q90). In that manner she gave example from the third paper-and-pencil-exam. In the exam most of the students made mistakes in answering the following sub-item:

$117\ mm = \ldots\ldots m$

Ms. Solmaz determined that even high-achievers could not answer the question because they had difficulties on transferring a length measure to the higher length units. It was seen in the exam papers that, most of the students passed the current sub-item. Therefore Ms. Solmaz stated that, after she announced the results, she emphasized on the difference between transferring a length measure to the higher length units and to the lower length units. Then she solved the item in the classroom. In other words, she gave formative feedback about transferring a length measure to the higher length units since the related item could not have been solved in common. In order to give feedback, on the other hand, she explained what they did wrong and gave the correct answer to students.

Another example for Ms. Solmaz's formative feedback was observed during the ''constructing a rectangle activity'' on 09/05/2014. In the activity the students were asked to determine whether rectangular shapes could be constructed with the given measures and they would use geometry sticks for that aim. However, it was observed on the recordings that students were confused about the usage of the geometry sticks. Some of them counted the holes whereas others counted the segments between the holes. According to the interview data, Ms. Solmaz thought that some students could not answer the items because of the wrong usage of the material. She added that students also was confused about the ''unit'' concept. Therefore she gave the following formative feedback about the correct usage of the geometry sticks and the ''unit'' concept in the 9th minute of the activity:

> *.....Some of you counted the holes (Then she took a geometry stick and continued her explanation). You need to count the segments between the holes, not the holes themselves. Look at that stick (She showed the stick and put her fingers on two subsequent holes and continued). The segment between two subsequent holes means a unit.*

It can be observed in the conversation that, Ms. Solmaz gave formative feedbacks about the wrong usage of geometry sticks and the lack of knowledge about the ''unit'' concept. Her relevant words were:

> Students could not get the correct answer because they counted the holes instead of segments between the holes. I expected that 2 or 3 students would have difficulty on answering the items. However I thought that they would have difficulty on doing another item which was asking to try a rectangle with 3 edges, I did not expect that they would get confused about counting a segment as a unit. Therefore, by using a geometry stick, I showed them how to determine a unit. (q91).

Fourth of all, the interview data indicated that Ms. Solmaz used informal assessment results, mostly the observational data, to prevent students from feeling anxious. Her words for a 5th grade student Aysun were as follows:

> She is a quiet student in every course. Although she does not volunteer for participating in the lessons, she is an ambitious student. Moreover she does her homework regularly. On the other hand, if I ask her to answer a question, she seems anxious. Even she cannot talk when I only ask her opinion about a topic. Besides, there are students who can hurt her feelings when she says a wrong thing. Furthermore she can loose interest in mathematics. Then, how can I force her for talking? I do not want to make her feel anxious or unhappy. (q92).

Fifth of all; Ms. Solmaz stated that she used the results of the classroom observations and whole-class worked examples to encourage students to study. She gave an example with the following words:

> One of my students has learning difficulty but I have observed that he has ability to memorize license plates or the school numbers of his classmates. He is good with numbers. Therefore I encouraged him to attend the race for memorizing the pi number. I wrote the 50 steps of the number and gave it to him. As I expected, he memorized all 50 steps. Actually I cannot state all these steps in my memory, I am serious. (q93).

Ms Solmaz used her classroom observations for encouraging students' self-studies, too. She stated that, when she observed that students were unwilling for the classroom exercises, she reminded them their home-notebooks (journals) and wanted them to bring these journals to classroos. She thought that encouraging students to complete their journals, improved their self-studies.

According to the field notes and document analysis, Ms Solmaz also used her classroom observations to encourage self-study on project topics. In that manner, she used assessment results for attending students' project topics. According to her, the low-achieviers would want to complete a project-study for mathematics course. Therefore she gave the projects before she taught the related lectures. Her related words were as follows: ''actually project-studies were mostly requested by the low-achievers, so I wanted them to work by themselves and to show their labour through their projects''. (q94).

Sixth; the interview data indicated that Ms. Solmaz used assessment results in order to prevent cheating, too. She said that she used her classroom observations and homework checking for preventing cheating. She claimed that if a student could not give correct answers during the classroom activities or homework practices, s/he would respond to the paper-and-pencil exam items wrongly, too. She added that when she questioned such students orally, she could identify whether the student cheated. Therefore she had asked them some of the items after the submission. According to her words, she chose the items which were hard but were responded correctly by the current students. In order to clarify her practice, she gave an example from her experiences. Her experience was about the student Ersoy. Ersoy had 56 points from the common paper-and-pencil exam. However Ms. Solmaz stated that

Ersoy was not a hard-working student. For instance he had not taken regular notes during the lectures, had not done his homework, and was not interested in the classroom exercises. Besides he had problems doing multiplication and division operations. On the other hand, he had answered some of the common paper-and-pencil exam items correctly although he could not solve the similar items during the mathematics lessons. For instance Ms. Solmaz got surprised with the following solution which was done by Student Ersoy on his paper:

> *Anıl has 800 TL (Turkish Liras) salary. He paid his bills with 10 % of that salary. How much money is left?*
>
> *Solution of Ersoy:* $800 \div 100 = 8$
> $8 \times 10 = 80$
> $800 - 80 = 720$ *TL*

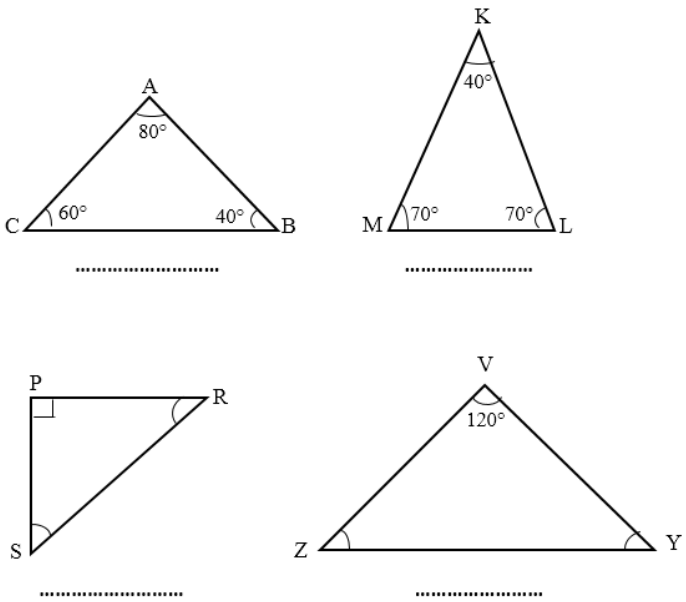
According to the previous classroom assessments, Ms. Solmaz emphasized that Student Ersoy had serious problems with division and multiplication operations, so she had suspicions about a cheating situation. She continued to explain the process:

> I examined his paper and observed that he had answered some of the items correctly although this was not possible for him. I know that because during my classes I observed his learning capacity and realized how he responds to the questions. I knew that he could not get 3 from the exam but he got that grade. Therefore, after I graded the papers, I asked him that item from the exam. I wanted him to explain his solution method but he could not resolve the item. He said he had solved the item during the paper-and-pencil exam but at that time he could not resolve it. He was ashamed and offered me to cancel his grade if I did not believe him. No matter I insisted him to resolve, he could not. However, in order to be sure, I implemented him the same exam again. He got 1 from the exam although it was her second time with the same items. (q95).

Seventh of all, the interview data and the document analysis pointed out that Ms. Solmaz used assessment results to know students better. In that manner she tried to diagnose the fields of mathematics that the 5^{th} grades were weak or good, and tried to know students' personal distinctions. She stated that she mostly used classroom observation results, paper-and-pencil exams and students' mathematics journals (home-notebook) for that aim.

According to her assessment practices, Ms. Solmaz gave examples about the mathematical areas that students were good. For instance after her first paper-and-pencil exam, she identified that most of the students were good at geometry topics. She came to this point with the students' correct answers for the following geometry items in Figure 4.21:

I1: Write down the names of the triangles in the blanks below.



I2:Which one(s) is/are polygon(s)?

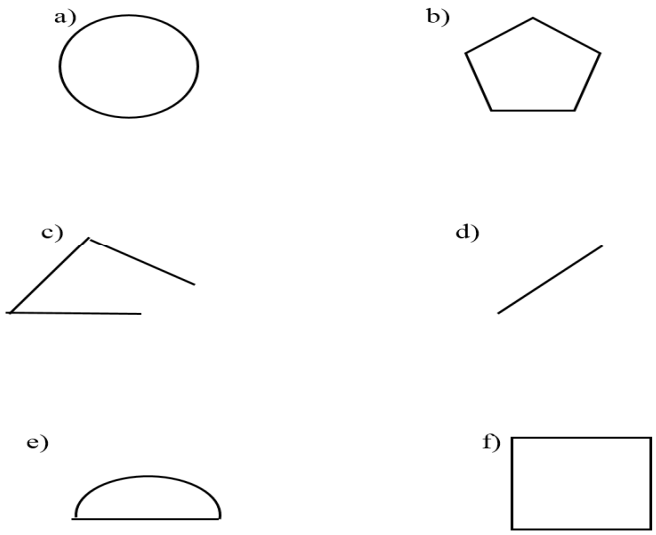


Figure 4.21: Geometry items in Ms Solmaz's first paper-and-pencil exam

As it can be seen in the figure 4.21, the item-1 (I1) and item-2 (I2) were about classifying the triangles according to their angles and identifying polygons. According to the document analysis, most of the students responded the current items correctly. As a result of that, Ms. Solmaz stated that the 5th grades in her classrooms were good at classifying triangles and identifying polygons.

In addition to detecting students' strengths about geometry, Ms. Solmaz acknowledged that students were good at writing the decimal and percentage forms of the fractions, too. She gave students' performance-task studies as examples for her interpretation. During their tasks, students were responsible to determine 10 fractions and to write them in decimal and percentage forms. According to Ms. Solmaz and the documents, most of the students wrote the fractions in decimal and percentage forms correctly. A part from the task of Student Murat is shown in Figure 4.22 as an example for the correct responds:

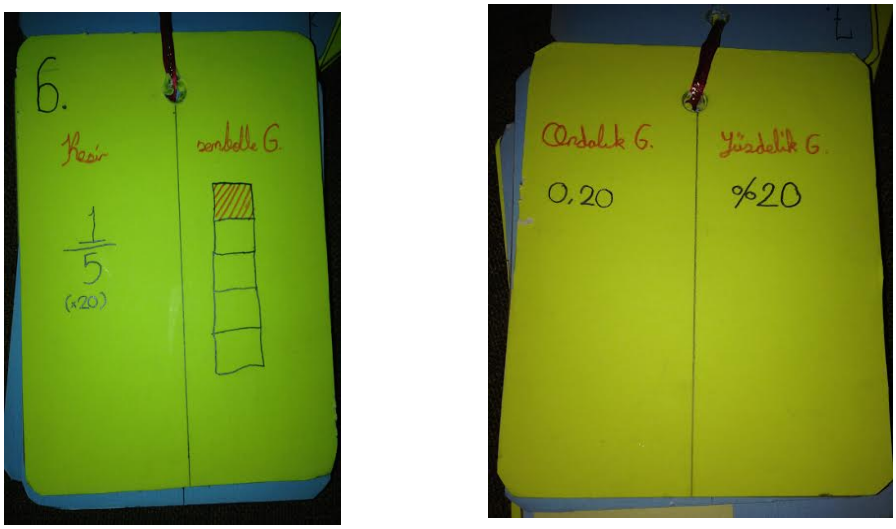


Figure 4.22: The decimal and percentage forms of a fraction done by Student Murat

It can be seen in Figure 4.22 that Student Murat determined $\frac{1}{5}$ as a fraction and wrote the decimal and percentage forms of the fraction in correct forms. In most of the students' performance tasks similar correct answers were also observed. Therefore, according to the interview data and document analysis Ms. Solmaz

thought that her 5th grades had strengths on writing fractions in decimal and percentage forms.

In the manner of knowing students better, Ms. Solmaz stated that some of the students had weaknesses on fraction topic. She went on to say that they had problems on enlarging the fractions. Such examples were observed in the 1st paper-and-pencil exam. For instance in the exam Ms. Solmaz asked students the following item:

Rewrite the following fractions in increasing order:

$\frac{3}{5}, \frac{6}{20}, \frac{32}{80}$

According to the document analysis, most of the students were aware of equalizing the denominators firstly. However, in order to enlarge the fractions, some of the students did not multiply both the denominator and the numerator of a fraction with the same number. An example solution that was made by a student was as follows:

When we enlarge the fractions they became like $\frac{3}{80}, \frac{6}{80}, \frac{32}{80}$. *Then the order should be as follows:* $\frac{3}{80} < \frac{6}{80} < \frac{32}{80}$

It can be seen in the answer that the student had thought to equalize the denominators of the fractions before writing them in increasing order. In that manner she determined number 80 as the common multiplier of the denominators. Then, in order to make the denominators 80, she multiplied each denominator by a different number. On the other hand, she had not realized that the fractions changed when she multiplied only the denominators. Thus, according to Ms. Solmaz and the document analysis, that 5th grade was weak on enlarging the fractions.

In addition to enlarging fractions, Ms. Solmaz observed that some of the students were also weak on finding the amount of the whole when the fractional part of the whole was given. She stated that her inference was depended on the results of the 1st paper-and-pencil exam and her classroom observations. After the 1st paper-and-pencil exam, her words were as follows:

> The results of the exam were as I expected. The students who were good at classroom activities also showed good performance in the paper-and-pencil exam. The low-achievers, on the other hand, seemed to be mixed up in choosing correct operations for the following fraction problems: calculating

the whole amount when a fractional part of it was given, or calculating the amount of a fractional part when the whole amount was given. (q96).

Like it was stated by Ms. Solmaz, the document analysis also showed that some of the students mixed the operations in solving both type of the fraction problems. An answer to the following item was an example for that observation:

Solve the following problems:

a. Find the number, $\frac{8}{9}$ of which is 248.

b. Find $\frac{3}{4}$ of 124.

It was observed that the student gave correct answer to the problem 'b' and he made the following operations:

124÷4=31
31×3=93

In order to solve the problem 'a', on the other hand, he made operations as if he would calculate the fractional part of a whole amount, again:

248÷9=27
27×8=216

It can be seen in the operations that, although there was a remaining in the division operation 248÷9, the student continued with the operations. However the operations were not the solution of the problem 'b'. Therefore, according to her classroom observations and paper-and-pencil exams, Ms. Solmaz stated that the student was weak on finding the amount of the whole when the fractional part of the whole was given.

Ms. Solmaz also realized that some of the students could not do fractional operations if they were asked through a problem. In that manner the following items of the 1st paper-and-pencil exam were the examples:

Item 1: Fing two equivalent fractions to $\frac{3}{7}$

Item 2: Mehmet gave his friend the following information:

$\frac{12}{42} = \frac{A}{7}$ *and* $\frac{4}{B} = \frac{36}{99}$

Then he asked his friend to find the sum of A and B. Can you help Mehmet's friend with finding the sum?

The document analysis showed that most of the students enlarged $\frac{3}{7}$ with 2, 3, or 4 and found the correct answers for the Item1. However they had difficulties on solving Item 2. Ms. Solmaz stated that she observed the students' weaknesses on the fraction problems and interpreted the situation with the following words:

> When I asked a fraction operation they responded it correctly but if the operation was asked through a problem they had difficulties to find the correct answer. For instance in order to solve $\frac{12}{42} = \frac{A}{7}$, some of them had divided 42 by 6 but they multiplied 12 by 6. They were mixed up. Although they practiced similar questions in the class sessions, I monitored that some of them still had difficulties on the items about equivalence topic, mostly if the item was a kind of problem. (q97).

Ms. Solmaz also determined that most of the students were weak on transferring a length measure to the higher length units, too. She came to this conclusion with the results of the 3rd paper-and-pencil exam and her classroom observations. For instance it was seen in the students' exam papers that, some of them passed the sub-items asking *''117 mm = ...m''and ''7152 cm =.....m....cm''* whereas some of them gave incorrect answers to them. For instance they wrote that *7152 cm = 7 m 52 cm*. According to Ms. Solmaz such an answer was caused from the students' weak knowledge about the related topic.

According to Ms. Solmaz, in her classroom activities, some of the 5th grades were weak on making addition operations with decimal numbers. Her inference was also observed on the students' activity papers after the ''problem solving activity". The activity was practiced by Ms. Yılmaz on 11.04.2014 and was represented in Appendix E.

In the problem there were two price lists for the equipment of two different puppet trademarks. By using the lists, students were asked to find the minimum cost of the equipment for constructing the puppet. The lists of the two trademarks are listed in Table 4.3:

Table 4.3: The price lists of the two trademarks listed in the ‘‘problem solving activity’’ (Ms. Solmaz’s practice)

Product	Price of Trademark A (Turkish Liras)	Price of Trademark B (Turkish Liras)
The puppet	20	26
Linden made puppet stem	7, 75	11,25
The dress kit for the puppet	4	9, 5
The dye kit for the puppet	3, 5	6
Equipment for pulling the wires of the puppet	3	5, 5

The following operation was a part of a wrong answer on that activity:

$$\begin{array}{r} 11.25 \\ 9.5 \\ 6 \\ +\quad 5.5 \\ \hline 1281 \end{array}$$

Such an operation was also observed in the 2nd paper-and-pencil exam, too. In one of the items the following operation was asked to students:

$$47.8+6.28+412.09=?$$

The following operation was a part of a wrong answer on the current exam:

$$\begin{array}{r} 47.8 \\ 6.28 \\ 412.09 \\ +\quad\quad\quad \\ \hline 42305 \end{array}$$

It can be seen in both of the answers that the students did not do the addition operations correctly. They did not write the integer part one under another or the fractional part one under another. Furthermore they did not put the point sign in its place on the solution. Ms. Solmaz commented on the answer after the 2nd paper-and-pencil exam:

> I was expecting that students would make mistakes on doing the addition operation. For instance that answer was given by a student whose level was under the average of her classroom. As I expected, she had answered the item wrongly. (q98).

Therefore, according to the interview data, Ms. Solmaz inferred that the students who gave such wrong answers were weak in doing addition operations with decimal numbers.

During the interviews Ms. Solmaz stated that she used assessment results for determining the students who showed weak performances in the lessons but got high marks in the paper-and-pencil exams, too. She continued with an example and told one of her student called Emir. She told one of her experience with student Emir. According to the interview data, in the beginning of the academic year Ms. Solmaz made an informal paper-and-pencil exam and tried to diagnose students' weaknesses and strengths about mathematics. She went on to say that, since Student Emir had responded all of items correctly in that informal paper-and-pencil exam, she thought that he was a high-achiever in mathematics. On the other hand, Ms. Solmaz stated that, Student Emir did not volunteer for answering the questions during the classroom activities. According to her observations, Ms. Solmaz came to the point that Emir was not willing to answer the questions in the classroom because he was a shy child. In other words it can be said that, her assessment results helped Ms. Solmaz to notice and know Emir better. She supported that inference with the following quotation:

> Emir also got good grades from the subsequent paper-and-pencil exams. All of them were over 90 points, even 100. He got grade 5 in his first semester report. As I said before, paper-and-pencil exam results give idea about the students. I can understand who can solve or who cannot solve the items. Actually that informal exam also gave me pre-ideas about the Student Emir. Before the exam, I had thought that he would not do anything because I did not know him. In that manner the exams showed me that the mathematics achievement level of Emir was very different than I thought. (q99).

Last of all; According to the interview data Ms. Solmaz used assessment results for rewarding students. In that manner, she supported students' final grades as a reward. She stated that, during the in-class activities, there were questions which could be answered only by a few students, so she wanted to reward these students.

She continued with the following words:

> I tell them that those questions would be the starred questions. Therefore I reward the students who can solve these questions correctly. Even one or two students can answer, I make proud to them with giving 100 for their in-class performance grades. Sometimes, on the other hand, I tell them that three stars make 100 as a grade and give them a star for each correct answer. (q100).

She explained her rewarding practice with the following sentences:

> In the beginning of the first semester, I gave them my word about rewarding if they could get 85 and over in all the paper-and-pencil exams. Some of the students got 85 and over. Moreover there was a student who got 100, 100, and 98 from his first semester exams. I gave them some small gifts and I observed that my rewarding practice had been effective. This semester, on the other hand, I practice another template and attach importance to the homework. If they do their homework regularly, I will reward them with giving higher marks for their in-class performance grades. In that manner I check the homework checking lists. When a student does her/his homework, s/he gets a plus sign in the checking list and 10 plus signs make a star. I told them that any student who gets 10 stars on the homework checking list will get a 100 for in-class performance grade. (q101).

According to the document analysis Ms. Solmaz rewarded some of the students by giving them high in-class-performance grades. She said that her practice was valid for the students who highered their paper-and-pencil exam grades rapidly. For instance a student got 60, 50, and 80 from the exams. According to Ms. Solmaz such grades should be rewarded by supporting the report grades because the student had not quit studying. Therefore, she added, ‘‘she got 90 for her in-class-performance and that made her final grade 4 instead of 3’’.

As a result of the example quotations above, it can be said that Ms. Solmaz used 5th grades’ assessment results in order to reward them, too. Her rewarding practice, on the other hand, was mostly related with grades. In that manner she focused on the students’ the paper-and-pencil exams. If they increased their grades, then Ms. Solmaz rewarded them by giving high grades for their in-class performance. The field notes also indicated that, she gave small gifts to students, too.

To sum up; Ms. Solmaz used assessment results in order to improve students’ learning of mathematics by monitoring their progress; assigning their overall grades for the whole year; giving formative feedback to them; preventing

them from feeling anxious; encouraging them to study; preventing them from cheating; and diagnosing the areas of strengths and weaknesses.

4.2.3 Ms. Solmaz's Views

In this section Ms. Solmaz's views about the students' learning of mathematics, factors affecting teaching mathematics, and assessing students' learning of mathematics will be explained. The results will be used to answer the following research questions:

1. To what extent are the participating mathematics teachers' classroom assessment procedures related to their views about the students' learning of mathematics, about the factors affecting teaching mathematics, and about assessing students' learning of mathematics?

2. What are the discrepancies between the participating mathematics teachers' views about assessing the 5th grades' learning of mathematics and their perceived classroom assessment practices?

4.2.3.1 Ms. Solmaz's Views about Students' Learning of Mathematics

According to Ms. Solmaz, 5th grades learned mathematics mostly by questioning. She explained her observations with the following words:

> They ask questions before doing anything because they are children. Therefore most of the times, I have repeat my words more than once. Even, sometimes, I need to repeat the instructions of the homework. For instance I ask them to do their homework in their notebooks, however they ask me again whether they would do the homework in their notebooks. Although I answer such questions all the time, some other students may ask the same questions again. On the other hand, I am glad that they ask questions because it shows that they are interested in the lessons. (q103).

Ms. Solmaz continued with explaining her pleasure about the students' questioning habits. In one of her 5th grades, for instance, she had observed that students did not hesitate to ask questions during their learning process. With the following words, she explained the positive effects of such an environment on students' mathematics learning:

> In the current classroom, I observe the following situation: I explain a topic and we solve questions about the topic. After that, the class questions what I taught or asked. For instance they wonder how the answer changes if the question was asked in different way. In other words, they are not contended with my teachings, they also question them. I get feedback about their learnings mostly by the help of such questionings. (q104).

Ms. Solmaz argued on the factors that affected the 5th grades' learning of mathematics, too. In that manner she stated that students' natural ability about mathematics was important in learning mathematics. She said that ''in some of the classes, there is not any student who has the ability to answer higher order questions'' (q105).

Ms. Solmaz also thought that background knowledge was needed for achieving mathematics. During the interviews, she emphasized on the importance of basic mathematics knowledge for becoming good at mathematics. For instance, she claimed that students who had a strong background knowledge in mathematics learned new topics easily. She continued with an example:

> For instance there are 5th grade students who have learning difficulty. According to the legal obligations, we give them supportive lectures. In these lectures I observed that students who had background knowledge about multiplication operation could learn division operation. Moreover they could learn multiplication operation between the multiple digit numbers and got the ability of problem solving. (q106).

In addition to her experience with the students who had learning difficulty, Ms. Solmaz told that she could better monitor the students who had background knowledge. Otherwise, she continued, she needed to teach primary school subjects and could not assess students efficiently. Besides, she added, she had to spend much effort for teaching 5th grade mathematics topics since the students could not understand the new ones.

Moreover Ms. Solmaz argued that students' enthusiasm affected their study habits. According to her, students who liked to study mathematics learned easier than the ones who did not. In order to clarify her thoughts about the obstacle for getting enthusiasm, on the other hand, she took attention to the students' prejudice about mathematics. She claimed that some of the students thought that mathematics was too hard and they would never be successful in mathematics. Therefore, she added,

they did not have an enthusiasm about learning mathematics. However, she disputed, enthusiasm could be provided by external additions. In that manner she gave the ‘‘addition of fractions activity’’, which was implemented on 04.04.2014, as an example. In the current activity students were asked to make addition operations by using fraction bars. According to Ms. Solmaz, using materials, being a member of a group work had positive effects on students’ enthusiasm, so most of the students responded the items correctly.

According to Ms. Solmaz, teachers could not teach all the things that they wanted to because of the crowded classrooms and time limitation in a mathematics class, so, in learning mathematics, a student’s individual regular practice was as important as natural ability, background knowledge, or enthusiasm. She asserted that some students could not achieve mathematics because they did not repeat the topics regularly. Although they could understand mathematics or had a mathematical background, they could not be successful in mathematics.

Moreover she stated that, because of the lack of regular studying, there were even 8^{th} grade students who could not do multiplication operations without help. Besides, she observed some students who could add the fractions with the same denominators correctly in the classroom but could not do the same operations in the paper-and-pencil exams. Instead they added the denominators to each other and as a result of that they responded the item wrongly. Ms. Solmaz related such situations with the lack of repetition and thought that they could be corrected by studying regularly.

Ms. Solmaz thought that the number of items that a 5^{th} grade student solved about a topic was important to encourage her/him for studying regularly. Therefore, according to the field notes, she asked students to solve 50 or 100 multiple-choice items in the weekends. In that manner, she determined the topics and asked students to find and solve 50 or 100 questions about the related topics during the weekends. According to her, such a practice would help students to gain individual study habits and to learn mathematics.

According to her, regular repetition was also provided by keeping mathematics journals, too. She named the mathematics journals as home-notebook and explained her aim with the following words:

> I think that students' learnings become permanent when they go home and question what I taught to them. Besides, some of them do not have source books other than course textbooks. Therefore keeping journals should provide them regular repetition. Moreover they may get the ability of solving questions by themselves. Suppose we solved 3 questions in a lesson. If the student can solve 2 of these questions herself/himself at home, then I would be glad. Because of these reasons I prefer to make them keep home-notebooks. (q107).

Lastly; Ms. Solmaz pointed out the importance of home environment on the students' mathematics learning, too. She supported her thoughts within the context of the current school. She said that, in the current school, family problems existed. For instance divorced parents, economic problems and unconcerned mothers-fathers were among some of these problems. According to her such family characteristics affected students' learning habits negatively. At the same time, she added that parental support at home made positive effect on students' learning. In order to explain the positive effect of a family she told one of her students as an example:

> She is a student who has learning difficulty. She was good at multiplication but did not know division operation. As a result of these, she did not have the ability of problem solving. According to the obligations of the Ministry, I implement her a personal education plan which is adequate to her individual differences, so I make supportive studies with her. On the other hand, with the help of her parents, she learned division operation. Furthermore she can solve the problems including multiplication-division operations. I think her supportive parents affected her learning positively. (q108).

In summary; According to Ms. Solmaz, although the 5^{th} grades learned by questioning, their natural ability about mathematics, background knowledge, enthusiasm, regular practice in mathematics, and whether they have questioning habits affected their learning of mathematics. On the other hand, parental support or socioeconomic levels of their parents were distinctive factors on the 5^{th} grades' learning of mathematics, too.

4.2.3.2 Ms. Solmaz's Views about the Factors Affecting Teaching Mathematics

First of all; According to Ms. Solmaz classroom management was at the core of mathematics teaching. Therefore she put emphasis on providing management both on classroom behavior and study habits. She thought that she could teach more efficiently if she could provide management in a classroom.

Second; during the interviews Ms. Solmaz also claimed that, students' enthusiasm towards mathematics made positive affect on teachers' teachings. She continued with the following sentence ''if the student has the enthusiasm, you have no chance other than teaching and giving feedback to her/him'' (q109). Therefore it can be said that, according to Ms. Solmaz students' enthusiasm towards mathematics was an efficient factor on teaching mathematics.

Third of all; Ms. Solmaz stressed that students' Turkish language skills affected her teaching of mathematical concepts. She gave an example from the fraction topic and said that she had problem on teaching what ''simplification'' meant because of students' inadequate skills in Turkish language. Then she continued with the following sentence ''although their Turkish language skills are weak, I am trying to teach mathematics to them. That is hard''. (q110).

Fourth of all, according to the interview data, Ms. Solmaz's teaching process was also affected by the students' learning capacity. In that manner she said that if the students did not understand a topic, then she needed to continue with that topic and could not teach a new topic. Her explanation is in the following quotation ''For instance I prepare myself for teaching the new topic but when I go into the classroom, I realize that students could not understand the previous topic. In such a situation, I keep on teaching the previous topic'' (q111).

Last of all; according to the overall interview data, it can be said that Ms. Solmaz had clear thoughts about the changes in the 5^{th} grade curriculum and the textbook. In this sense she stated that 5^{th} grades' curriculum was efficient for both the teachers and the students. For instance, she continued, teaching fewer topics was

a positive innovation for 5th grades. Moreover she told that the information and the instructions in the textbook were understandable for both teachers and students. Her views about the curriculum and the textbook were as follows:

> Before the new curriculum, I had to tell the topics in a hurry and I could not monitor students' understandings one by one. As a result of that, I and my students could not show all of our performances during the lectures. Now, with the new curriculum, I think that my teaching is much efficient because of the positive changes in the curriculum. There are fewer topics in the new curriculum. For instance multiplication operation with the fractions is not in the 5th grades' curriculum anymore, it is in the 6th grades'. I also think that the topics became more understandable than they were in the old one. For instance it is aimed to go ahead step by step in the expressions. All these changes provided me much time for teaching. Moreover students' prejudice or fear towards mathematics decreased. The textbook, also, is better than the last year's. In my opinion the instructions, exercises, or expressions had been prepared deliberately. The concepts are explained definitely, there are more activities and questions. Some activities are offered for classroom activities, so we can do them together with the students. The characters of the letters, also, are bigger than they were in the last year's textbook. There is no need for a teacher's book, I can understand what I need to teach with the help of the textbook. All of these positive innovations showed that the curriculum developers realized that in order to get the targets we need to take it slowly. A mathematics curriculum with lots of topics is not efficient. (q112).

To sum up; Ms. Solmaz claimed that classroom management, students' enthusiasm towards mathematics and the changes in the curriculum had positive effects on her teaching of mathematics. Students' weaknesses on Turkish language skills, on the other hand, influenced her teaching efficiency in negative way. Furthermore, her teaching schedule was also affected by the students' learning capacity.

4.2.3.3 Ms. Solmaz's Views about Assessing Students' Learning of Mathematics

To begin with; it can be said that Ms. Solmaz is a teacher who mostly relies on classroom observations in assessing students' learning of mathematics. According to her, there is an order of importance between assessment methods. She thought that, in order to assess students' learning of mathematics, students' participating in classroom exercises and their behavior during lessons is more important than paper-

and-pencil exams, performance-tasks or project studies. She put much emphasis on a student's participation in the classroom exercises and raising her/his hand to volunteer for responding to the questions. She explained the reason of her thoughts:

> I attach importance mostly to my observations because I can see what is going on directly. Of course I implement paper-and-pencil exams. However I can predict a student's performance on an exam by the help of my previous classroom observations, so I think my classroom observations are more realistic than the other assessment methods. (q113).

Second of all; Ms. Solmaz told her views about the assessment methods that were offered by the curriculum. For instance she thought that paper-and-pencil exams were important in understanding how much students' learn and what could a teacher teach. Moreover she stated that paper-and-pencil exams encouraged students to study because students knew that they would get grades at the end of the exams. She gave an example from a selective course. The name of the course was 'mathematics applications' and 5^{th}, 6^{th}, and 7^{th} grades took that course. The curriculum of that course did not offer a paper-and-pencil exam, so Ms. Solmaz thought that students did not study enough for that course. She explained her views with the following sentences:

> There is not a paper-and-pencil exam or a grade, so there is no enforcement. Of course I do not want to focus students only for grades. Of course the important issue is gaining the objectives. However students do not care a course if they do not get a grade at the end. Teacher teaches the topic but students do not feel responsibility for studying. Even some of them do not come to the lessons. Therefore I think that there should be paper-and-pencil exams for the selective courses, too. (q114).

According to Ms. Solmaz, keeping journals encouraged students to study, so she asked students to keep mathematics journals. Her students practiced that method by keeping 'home-notebooks' and she had observed that the exercise encouraged students to study. She explained her observations with the followings: "I observed that the students made regular reviews. My teachings became more permanent and the students became more responsible persons. I think it helped students for getting the ability of self-study". (q115).

Ms. Solmaz stated her views about the project studies and performance-tasks, too. She thought that projects were the assessments by which students' higher

order skills could be improved. Performance-tasks, on the other hand, were classroom exercises that should provide students learning by daily life activities. For instance she talked about the meaning of a performance-task with the following words:

> During the lessons, we mostly teach theoretical part of the knowledge. Students can combine this knowledge with their abilities during their performance-tasks and create a concrete reflection of what they have learned. In that manner, student should think and express herself/himself by the task. Moreover s/he should use handcraft. Maybe they should show more other abilities. When we look at the tasks, we should monitor all these works. (q116).

However her thoughts about the projects or performance-tasks, which were prepared in her teaching career, were not as positive as her thoughts about the classroom observations and paper-and-pencil exams. Although she thought that performance-tasks were concrete materials to grade students' performances, she thought that they did not have too much effect on students' success actually. Besides it was indicated with the interview data that Ms. Solmaz implemented performance-tasks and projects since it was an obligation. She did not think that the tasks and projects completely reached their aims. She remarked that if she were the one who developed the curriculum, she would remove the performance-tasks. She continued with the followings:

> I think performance-task grade is a kind of in-class-performance grade. I do not think that these tasks are very efficient. Project studies, on the other hand, are not done in convenient with the instructions; students get help from their parents, they do not complete the projects by themselves. (q117).

She underlined the importance of a collective study between students and teachers. In order to produce more efficient projects, on the other hand, she offered a solution: students could go to the school three days for routine programme and two days for preparing projects. According to her by such a practice students would learn all the steps of a project. On the other hand, they would have much time and possibility to ask their teachers' guidance.

According to Ms. Solmaz assessing a student's performance referred to implementing performance-tasks. She explained her thoughts about performance assessment with the following quotation:

> I use performance-tasks as performance assessment. I give usual tasks. For instance last semester I asked them to identify a research question, to prepare a questionnaire for investigating this research question and to gather data by the questionnaires. Moreover they were responsible to construct a score table, a frequency table and a bar graph about the related data. Last of all they wrote reports related with the data that they gathered. I believe that students can learn by living or practicing but I cannot provide such an environment for the performance tasks because they get help from their parents. I am sure they would be available assessments if students themselves would do them. However most of the students do not do performance-tasks by themselves. (q118).

Although she did not practice all of them, Ms. Solmaz made comments on the assessment methods that she did not use during the data collection process. For instance, according to her, student portfolios were useful resources for monitoring what students had done during a mathematics course. A teacher could check what students have done about a topic by using their portfolios. Furthermore, she said that concept-maps visualized the information by a kind of map and so took the students' attentions to the topic. For constructed-grid, on the other hand, Ms. Solmaz thought that it would help students to draw parallel lines, line segments, and equal segments. She said that, students had difficulties in drawing such shapes but if she used constructed-grid in the lectures, it would be timesaving and practical for both her and the students. On the other hand, she thought that constructing a poster provided students to improve their handcrafts and to organize their knowledge on an area. Moreover presentation and drama study could motivate students to become social in real life situations. In that manner she thought that, by the help of drama study, students could learn as if they were playing games. Moreover they would have permanent knowledge and express themselves easily. However she thought that drama study was not suitable mostly for mathematics course.

Thirdly; Ms. Solmaz also made comments about the contribution of assessment results to students' learning of mathematics. In that sense she argued that paper-and-pencil exams gave feedback to both the teachers and their students. For instance, she claimed that teachers could understand their teaching effectiveness and could repeat or teach a topic by the help of assessment results. She also claimed that teachers could understand students' strengths and weaknesses by the help of

assessment results and they could make adjustments for their further assessment practices. Students, however, could study regularly to make up for their lack of knowledge in mathematics.

Last of all; Ms. Solmaz discussed the factors that affected the assessment of students' learning of mathematics. In that manner she mostly complained about time-limitation and crowded classrooms. For instance she stated that she checked students' homework regularly at the beginning of the academic year but she could not continue that practice for all sessions because of limited time. As a result of that, she added, she charged some students for checking homework. According to the document analysis, also, it was observed that Ms. Solmaz prepared templates for homework checking and gave them to three students in each class. Then she divided each 5^{th} grade class in three groups. After that she charged the attendants for checking their friends' homework and put minus or plus signs on the templates for the checking. Ms. Solmaz evaluated these templates for her assessment process. On the other hand, she checked the attendants' homework herself.

She also stated that because of time-limitation and crowded classrooms, she could not implement assessment methods such as presenting a poster or portfolio. She added that she wanted to use such assessment methods but too much time was needed for monitoring students' work in such methods. Therefore, she added, time limitation and crowded classroom factors prevented her from practicing such assessment methods.

Time limitation affected Ms. Solmaz's way of using assessment results, too. For instance after the second paper-and-pencil exam she realized that some of the students did not understand a part of the fraction topic. They could not do the addition operation with different denominators. In that manner the document analysis indicated that they added the numerators with each other and then they added the denominators with each other. According to Ms. Solmaz this was a big misunderstanding, so she repeated the topic. However she remarked that she should reteach the topic and should use a larger time interval. On the other hand, she continued, if she would have retaught the topic again, she would stay behind the annual plan.

In addition to time limitation and crowded classrooms, Ms. Solmaz stated that students' personal characters were effective in assessing their learning of mathematics. For instance, she said that some students did not say anything during the classroom activities, so she could not decide whether they had any idea about the exercises. Her words were as follows:

> Some of them do not say anything, they do not talk. Such situations are hard for me. For instance, after the homework I ask something about their answers. Some of the students do not say anything, they do not respond to my questions with a word. I think that it is important for a student to make comments whether they are correct or wrong because I can understand what s/he knows and what s/he does not know. Moreover, a comment means that the student thinks about the exercise and s/he has an idea about it. When they state their ideas, I can have the chance of correcting their mistakes. (q119).

At the same time Ms. Solmaz asserted that 5th grade students' maturity level was an obstacle on assessing their learning of mathematics. She claimed that if she would want them to prepare a poster, for instance, 5th grades would not have prepared efficient ones. According to Ms. Solmaz, that was because of their ages. She thought that they were too young to prepare a poster because of their lack of maturity and added the followings: ''the posters give visuality to the expressions. Students, also, get manual skills or the other visual, audial abilities. However I think 5th grades' levels are not mature enough to do posters. I do not think that they can produce good ones because they are still children. They still play with toys (q120).

She claimed that parental help on performance-tasks and project studies was also a problem on assessment process. She reminded that some part of the performance tasks and all parts of the projects were completed at their homes by students. However, she continued:

> In order to get higher grades, students get help from their parents. They, also, do not focus on the content of the tasks, instead they put emphasis on the appearance of them. For instance there is a student in my class. He is not interested in the lessons too muchand does his homework seldomly. However his performance task was done by his parents last semester. I understood that from the characters of the letters used in the task; they did not belong to him. The homework was about constructing a graph. I observed that on the cover of the task, that student drew a bar graph as a decor. His name was written on the vertical line of the graph and his surname, on the other hand, was written on the horizontal line. These were not his handwriting, so I understood that the work was not done by the

> student. As a result of that, I think that performance-tasks become inefficient for the students. (q121).

According to the interview data, the socio-economic status of the students was also a factor that affected Ms. Solmaz's assessment activities. She said that most of the students in the current context could reach internet or some mathematical materials, so she could give them project studies in which making research was a need. In reverse situations, for instance if students had limited resources, she stated that she could not give research as a homework or as a project.

The interview data also revealed that, while she was preparing the items of the paper-and-pencil exams, Ms. Solmaz was affected by the students' achievement level. She stated that although she did not believe that true-false or fill-in-the-blanks type items were suitable for mathematics exams, she used them in the current school. She explained her practice by the students' low achievement-levels in mathematics. By this way, she added, lots of the students could answer some of the items in the exams.

As a suggestion of the mathematics department, 5^{th} grades' second paper-and-pencil exams were implemented in common. According to Ms. Solmaz, another factor that affected the grading process was the common paper-and-pencil exams. In Ms. Solmaz's opinion, common-paper-and-pencil exams caused problems. For instance she stated that in some of the classes, mathematics teachers solved very similar items with the common paper-and-pencil exam items, so such a practice made the exam an invalid assessment.

Ms. Solmaz told her views about the factors that affected her grading process, too. She stated that, in grading process her conscience was efficient. According to her, some of the students attended to the lessons and tried their bests for mathematics but they could not get high marks from the paper-and-pencil exams. On the other hand, she added, some students did not study, did not do homework, and did not attend to the lessons. They, also, got low marks from the exams. In such situations, she continued, her conscience interfered in the grading process. In that manner she reflected students' classroom performances to the grading process and gave higher in-class-grades to the students' who were active in the classrooms. She advocated her practice with the following:

> Some of the students do their homework but cannot express themselves in the paper-and-pencil exams. They make the effort but their intelligence or capacity is not high enough for getting high marks. Therefore they get low marks from the exams. As a result of that, I cannot ignore their effort. In all conscience, I think that they deserve a higher in-class-performance-grade. (q122).

Ms. Solmaz also claimed that the grading issue affected students' behaviors and providing honesty became a problem during her grading process. For instance, she said that some of her students wrote only the questions of the homework in their notebooks and they did not solve the items. They tried to seem as if they did their homework. She claimed that such behaviors were because of the grading issue and continued ''they cannot solve the questions but they show the questions or irrelevant information as if they are the homework. They lie to me or deceive me for getting a grade'' (q123).

Ms. Solmaz did not only talk about the negative factors that affected assessment process, she also talked about the positive ones. For instance according to her, using materials or working in groups were positive effects on students' performances in assessment activities. After the ''addition of fractions activity'', for instance, she observed that students showed higher performances than they did in personal assessment activities. She explained that result with having much fun with materials in group works.

She also claimed that if the projects were given about the geometry topics instead of the mathematical operations, students showed good performances. During the data collection process, on the other hand, she gave projects about the prism topic. The documents showed that although they did not learn the prism topic at that time, most of the students could do the projects correctly. Ms. Solmaz also added that, while she was teaching the prism topic, the students who had prepared projects were active and volunteered to make the exercises. She continued:

> During the lessons, they remembered the number of vertices or edges of the prisms. I was thinking that preparing performance-task would be easier for them because I had taught the related topic with the tasks. Although they did not learn the prisms, their projects are better than their performance-tasks. Geometry is visual. Besides, the students did not have to do mathematical operations in their projects. I think these were the reasons of their success on project-studies. (q124).

In summary; Ms. Solmaz's views showed that, in order to assess students' learning of mathematics, she placed the much emphasis on her classroom observations. According to her, performance tasks provided students to learn by daily life activities. She also taught that performance assessment could be done by performance-tasks. On the other hand, she advocated that projects were the assessments by which students' higher order skills could be improved. She stated that journals encouraged students to study, so she preferred that informal assessment method. Although she had positive ideas about presentations, posters, constructed-grid, concept-map, drama study and student portfolios, she did not prefer to use them. She explained her reasons by the limitation of time, the workload of the curriculum, and the maturity levels of the students. Moreover, as they were affecting the assessment process, she disputed the negative contributions of parent help, personal characters of the students, the socio-economic status, and the achievement levels of the students. She added that the grading process was under the pressure of her conscience and the common paper-and-pencil exam obligation. However Ms. Solmaz did not only discuss the negative factors but also the positive ones that were effective on assessment process. In that manner she stated that students showed high performances in assessment practices including materials, group works, or geometry topics.

4.2.4 Summary of Ms. Solmaz's Views and Assessment Implementations

Ms. Solmaz implemented both formal and informal assessments in her classes. For informal assessment she used observational data, whole-class worked examples, mathematics journals, and giving homework. For formal assessments, on the other hand, she used paper-and-pencil exams, project-studies, and performance-tasks.

In the scoring part of the assessment procedure, on the other hand, Ms. Solmaz used answer keys or scoring-guides. In developing the scoring-guides, she was depended on the decisions of mathematics department**.** She was in touch with the parents during the assessment stages.

She used assessment results for several purposes: to understand her teaching effectiveness, to make decisions on repeating a topic, to teach a topic, to make adjustments for her further assessments, to monitor students' progress, to assign students' overall grades at the end of the year, to give formative feedback to students, to prevent students from feeling anxious, encouraging students to study, to prevent cheating, and to diagnose the areas of strengths and weaknesses.

Ms. Solmaz stated her views about the 5th grades' learning of mathematics. According to her observations, 5th grades learned mathematics mostly by questioning. Moreover, she claimed that, in order to learn a topic the 5th grades needed to solve as many items as they could. She also made comments on the factors which were effective on learning of mathematics. According to her, natural ability was important in learning mathematics. Besides, background knowledge and making regular practice were needed for achieving mathematics. At the same time, students' enthusiasm about mathematics; their questioning habits; socioeconomic status and parental help were also effective on mathematics learning.

Ms. Solmaz did not place much emphasis on performance-tasks and projects because of the high parental help on those studies. According to her, in order to assess the students' learning of mathematics, participating in the class and the students' behavior during the lessons were more important than the paper-and-pencil-exams, the performance-tasks, and the project studies. Besides she claimed that common paper-and-pencil exams had negative effect on assessing students' learning of mathematics. On the other hand, she observed that students' were successful on the assessment activities which included material support, group works, or geometry topics.

Ms. Solmaz agreed on that, the purposes of the activities such as performance-tasks and projects were to improve students' learning of mathematics. However it was understood by the interview data that she implemented them because of the legal obligation. Her complaints were mostly about these two assessment methods. She thought that she could not implement these methods effectively because of the students' ages, difficulty in preventing parental help, crowded classrooms, and time limitation.

In the grading process, on the other hand, her conscience and students' honesty problems were effective. She stated that she did not ignore a student's classroom studies although s/he took low grades from paper-and-pencil exams. Her conscience directed her. Furthermore, she advocated, providing honesty on students' homework was too hard since they did them at their homes.

Last of all; Ms. Solmaz thought that 4+4+4 curriculum and the 5th grades textbook were efficient on teaching and learning mathematics. In that sense, she thought that the 5th grades' curriculum had the following positive effects on teaching and learning: there were less topics and much time to teach or study, the information and the instructions in the textbook were understandable for both the teachers and students, the topics were more understandable than they were in the old ones, the students' prejudices or fears towards mathematics decreased. For the textbook, on the other hand, she made the following evaluations: the instructions, concepts, exercises, or expressions were clear and sufficient, the font size were bigger than the ones in the last year's textbook, and it was adequate enough for both the students and the teachers.

4.3 Case Three: Ms. Yılmaz

To begin with; Ms. Yilmaz had been teaching mathematics to three 5th grade classes during the data collection procedure. She stated that her 5th grades did not have similar levels in mathematics achievement. In one of them, there were mostly low-achievers. In her other two classes, she added, there were high achievers. She stated that her high-achiever students were also compatible with the school environment.

In order to observe classroom practices of Ms. Yılmaz, on the other hand, the researcher offered four formative classroom activities to her. As it was explained in the methodology chapter, she applied all of these activities like Ms. Kaya and Ms. Solmaz did. The name of the activities were ‘‘the quiz activity’’, ‘‘addition of fractions activity’’, ‘‘problem solving activity’’ and ‘‘constructing a rectangle activity’’. The video recordings of the ‘‘addition of fractions activity’’ and the ‘‘constructing a rectangle activity’’; the interview data; the field-notes and the

documents were all used to explain Ms. Yılmaz's classroom assessment procedures; to determine in what ways she used the assessment results; and to clarify her views about the students' learning of mathematics, the factors affecting teaching mathematics and assessing students' learning of mathematics.

4.3.1 Classroom Assessment Procedures of Ms. Yılmaz

As assumed in this dissertation, like the other participant teachers, Ms. Yılmaz had been making use of both formal and informal assessments in her 5th grade classrooms. The interviews and the video data indicated that, Ms. Solmaz used observations, whole-class worked examples, homework and quizzes for informal data. Her formal assessments, on the other hand, included paper-and-pencil exams, performance-tasks, and projects. In the following two sections, the informal and formal assessment procedures of Ms. Yılmaz will be explained respectively. During the explanation, the following research question will be naswered:

"What assessment procedures do the participating mathematics teachers use in the 5th grade classrooms?"

4.3.1.1 Informal Classroom Assessment Procedures of Ms. Yılmaz

It was revealed by the interview data, the field notes, and the video data that Ms. Yılmaz's informal assessment data included observational data, whole-class worked examples, quizzes, and homework during the 5th grades' mathematics classes.

During her in-depth interviews Ms. Yılmaz stated that she could evaluate students' understandings during the informal assessments. She explained her informal practices with the following sentences: ''sometimes I give them permission to solve the exercises on the board. During my practice, I do not choose the students who volunteer to come to the board. Instead I ask the ones who do not raise hand to respond''. (q125).

To begin with; according to the interview data, Ms. Yılmaz got observational data in her mathematics lessons of the 5th grades. She said that she did not grade the observational data, she only checked students' understandings. Her

words were as follows: ‘‘I sometimes observe that some of the students do not volunteer for answering the questions. Then I ask them to respond to my question, so I can evaluate their understandings’’ (q126).

The video records of the classroom sessions on the dates 03.04.2014 (addition of fractions activity) and 09.05.2014 (constructing a rectangle activity) showed that Ms. Yılmaz observed students by walking around the classroom. It was observed that Ms. Yılmaz tried to understand whether the items of the activities were responded or not. She preferred to let students work in groups. Then she also kept a written record for examining students' classroom activities and for identifying the amount of work put by each student. During the post-activity interview of the activity she explained her practice by the followings:

> In order to take notes, I drew columns on my paper for each group and took notes about the amount of work put by each student. I wrote my observations for each student's work. For instance I recorded the ones who did not work. Moreover, for the activity, they had to show the addition of the fractions through model and they had to show their work on their activity paper. In my observations, I kept written records about their models, too. For example, I recorded the groups who modelled the operations correctly and carefully, or who put better works than the other groups. (q127).

It was seen by the video data that, during her observation processes, Ms. Yılmaz interfered in the students' works. In that manner, she became involved in the exercise by giving related examples with the activities, or by directing the students towards the correct answers. Such an example was observed during the ‘‘addition of fractions activity’’. In the activity one of the items was as follows:

> *Try to add* $\frac{1}{3}$ *and* $\frac{2}{3}$*with the help of the fraction bars. Then show the operations through models.*

It was observed that some groups could not show $\frac{1}{3}$ through model correctly. Although they could model $\frac{1}{3}$ by the bars, they could not show it in written form correctly. For instance, the following shape was constructed by a group with the help of the fraction bars:

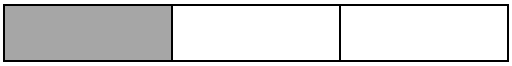


Figure 4.23: A fraction model in Ms. Yılmaz's class

While they were showing $\frac{1}{3}$ on the papers, on the other hand, they drew only the piece of $\frac{1}{3}$:

Figure 4.24: Another fraction model in Ms. Yılmaz's class

In the 36th moment of the activity, Ms. Yılmaz involved in the answer above. She made the following discussion with the group members:

> *Ms. Yılmaz: If you would show $\frac{1}{3}$, how would you draw it?*
> *Group member: Mmm...I would divide the whole 3 equal pieces and paint one of the pieces with my pencil.*
> *Ms. Yılmaz: Ok. Now look at your model on the paper. Is it what you told?*
> *(She waited. Students looked at their model on their activity paper. Then Ms. Yılmaz continued)*
> *Ms. Yılmaz: Your model does not represent $\frac{1}{3}$. Instead it seems like a whole. Do not draw the shape of the fraction bar. You need to draw the model of the fraction, like we did in our previous lessons. The shape you had drawn is wrong.*

It was understood in the conversation that, Ms. Yılmaz tried to clarify the misunderstandings about showing $\frac{1}{3}$ through model by discussing the current item with the students. It was also understood in the current conversation that, during the ''addition of fractions'' Ms. Yılmaz did not wait for the students to find their mistake on their paper. Instead, she gave the answer of the item and directed the students towards the correct answer.

Ms. Yılmaz also stated that she did not keep a written record for her observations. She said that, written records would remind her of the students' progress. However, she went on to say the following words: ''I make observations but I do not keep a record. I know I should keep but I am lazy (laugh)''. (q128).

Therefore, she did not keep written records for the observations although she thought that it was necessary.

Another informal assessment method of Ms. Yılmaz was whole-class worked examples. According to the interview data, she adapted the items from internet sources or different sourcebooks. Then, in order to complete the teaching of a new topic, she used the items in the sessions. In that manner she wrote the items on the board. The items were constructed-response or multiple-choice type items. She explained her practice with the following sentences:

> I asked my colleagues about their classroom practices. I learned that they did not make students write too much in their notebooks. That means the teachers only asked the exercises from the textbook. However my students spent one notebook until now (the end of the first semester). I think the textbook has limited questions. Of course the only thing is not the number of the pages that the students used but there are various questions in the other sourcebooks. Therefore I ask students lots of classroom exercises. I make them write the questions in their notebooks, also. I want to show them all kinds of questions so that students would not worry. They would not question whether there are other types of questions. (q129).

In addition to her classroom observations and whole-class worked example studies, Ms. Yılmaz used quizzes as an informal assessment practice. Her explanation about her quiz method was as follows: "I also implement quizzes with 3 or 4 items. Then at the end of the academic year, I assign in-class-performance-grades by the help of quiz results and the data gotten by students' in-class behaviors". (q130).

According to the document analysis Ms. Yılmaz did not plan the number of the quizzes at the beginning of the academic year. For instance she made only one quiz in the first semester. It was about the numbers and operations unit. During the second semester of the data collection process, on the other hand, she made three quizzes. Two of them were about the fractions unit and one of them was about the decimal numbers unit. She explained how she decided on implementing a quiz:

> In the first semester, it was not essential to implement a quiz on a unit other than the ''numbers and operations. Therefore I implemented one quiz and it was on that unit. The other topics were easy and students could understand them, so I did not practice any other quiz. In this semester, on the other hand, I implemented more. For instance, they had two quizzes on the fraction unit because they had difficulty on learning that topic. (q131).

According to the document analysis, Ms. Yılmaz scored the quizzes but she did not grade them. According to her words, on the other hand, when she gave the overall grades of the students in the end of the semester, she took the quizzes a kind of reference about the students' in-class-performance-grades. She explained her quiz practices of the first semester with the following words: ''I told the students my purpose for the quiz practice at the beginning of the academic year. After I scored the quizzes, I solved the items. I used the quiz scores to give in-class-performance grades" (q132). However at the beginning of her assessment practices, she did not determine the impact of the quiz scores on the overall grades.

Last of all; it is necessary to explain the fourth informal assessment practice of Ms. Yılmaz: giving homework. The homework was either the textbook exercises or the worksheets. According to the interview data and document analysis she gave worksheets with 20-22 multiple-choice items as homework. The items were about the topic that Ms. Yılmaz taught on that week and were prepared by her. The students, on the other hand, were responsible to answer the items at home in two-three days. Therefore she photocopied the sheets and delivered them to the students one by one.

The interview data also showed that Ms. Yılmaz checked students' homework in the classroom. She stated that she checked whether the students did their homework. According to the overall data she checked the homework regularly. During her classroom observations, while she was walking around the classroom, she also continued to check students' textbooks or notebooks. The following quotation was a brief explanation of her practice:

> I check their homework and I glance in their textbooks in order to realize whether they did their homework or not. Moreover I ask them to solve the homework items on the board. Sometimes I notice that some of the students do not answer the exercises or give irrelevant responds to the questions. Such a practice show me whether the students understand the related topic or not. I do not assign any grade to students' homework. (q133).

It can be seen in the quotation above that; although she controlled them regularly, Ms. Yılmaz did not keep a written record for her homework checking. During her practice, she only tried to understand whether the students understood the topic or not.

To sum up; Ms. Yılmaz observed students' classwork, applied whole-class worked examples, quizzes, and gave homework in order to asses students informally. She did not keep a written record for the classroom observations. Moreover she did not use a checklist or a scale for recording students' whole-class worked studies and homework. In other words it was revealed by the interviews, document analysis, field notes, and video data that Ms. Yılmaz only kept the quizzes. On the other hand, she did not keep any other written records for her informal mathematics classroom assessments.

4.3.1.2 Formal Classroom Assessment Procedures of Ms. Yılmaz

The overall data showed that for formal assessments, Ms. Yılmaz obeyed the regulations of The Ministry of National Education. According to the Assessment Regulations of Ministry, a mathematics teacher in a public school had to assess students with at least three paper-and-pencil exams and one performance-task per semester (MoNE, 2013b). At the same time each student had to conduct a project-study for one of the courses s/he chose in an education year (MoNE, 2013b). Therefore, as it was the obligation of Ministry of National Education, Ms. Yılmaz used paper-and-pencil exams, project-study, and performance-tasks for formal assessment.

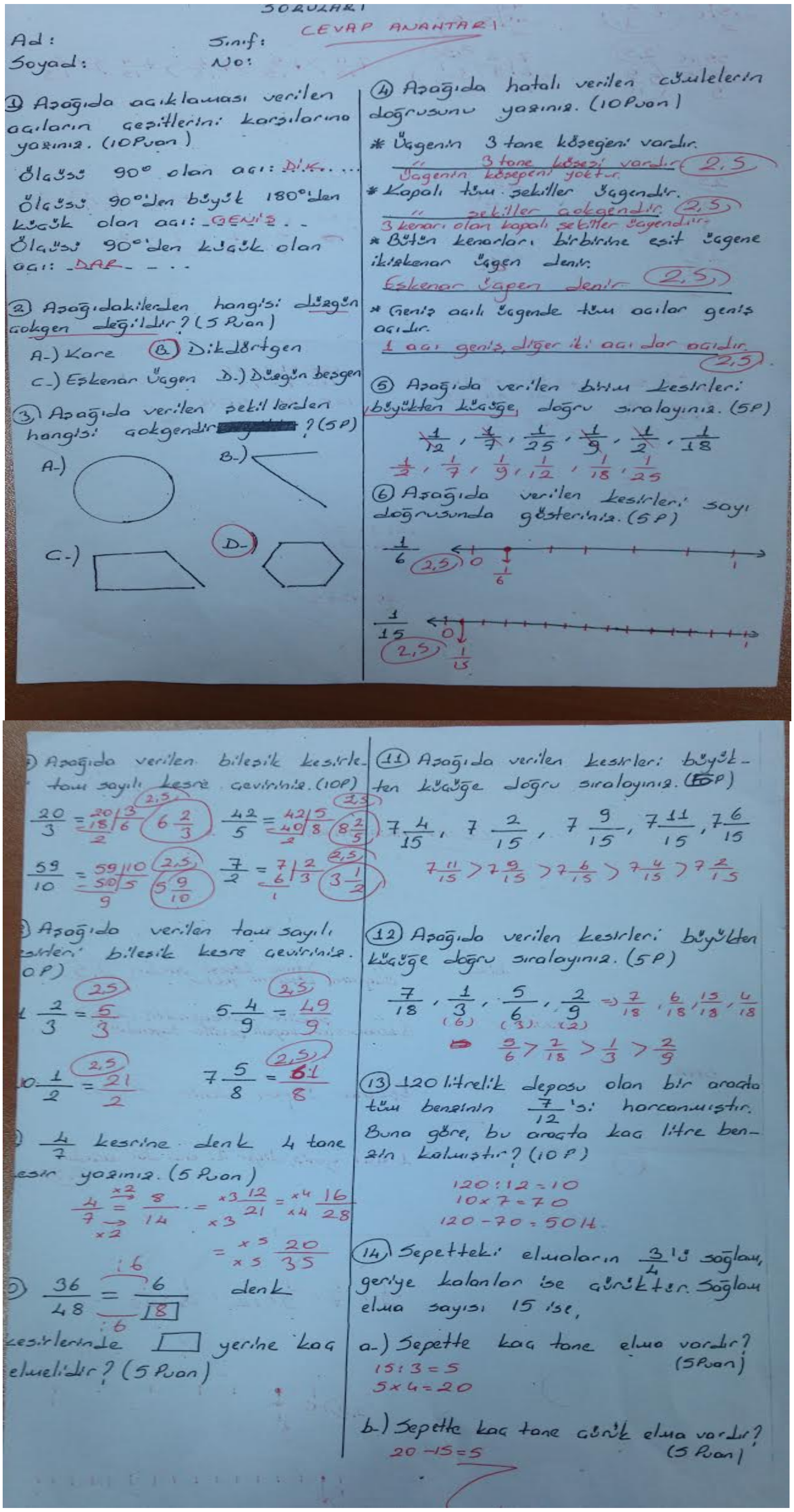
To begin with; it was revealed with the document analysis that, Ms. Yılmaz implemented three paper-and-pencil exams during the data collection process. According to the interview data, she announced the date of the exams one week before. She stated that, except common paper-and-pencil exams, she prepared the items herself and then photocopied the exams. Common paper-and-pencil exams, on the other hand, were the 2nd exams in the current school and were prepared by all mathematics teachers of the 5th grades. Common paper-and-pencil exams were implemented on the same lesson hour to all 5th grades in the current school.

Second; Ms. Yılmaz stated while she was preparing the exams, she used 5th grades' course textbook as a guide. In that manner she made use of internet and the mathematics textbooks other than the course book. Her related words were as follows:

> I use both the course book and the other mathematics source books. I prepare the items similar with the ones that I asked during my classroom practices. I also search the paper-and-pencil exams that were implemented by the other mathematics teachers. I try to understand whether they asked different kind of questions. Then I combine my interpretation with my research and prepare my own items. I try to examine different sources; I do not prepare the items only according to my own ideas. (q134).

Third of all, according to the overall data, Ms. Yılmaz gave one-lesson-hour to the students for finishing their exams but the duration of the exams was not written on the exam papers. Moreover, she stated that she had informed the students about the duration of the exam orally before the exam started. According to the field notes, her students had one lesson hour for answering the items of an exam.

Fourth, the document analysis of the 5th grades' paper-and-pencil exams showed that Ms. Yılmaz prepared four types of items: multiple-choice items, fill-in-the-blank-type items, true-false type items and constructed-response items. In order to represent example exam items, her 1st paper-and-pencil exam was shown in Figure 4.25:


SORULARI
CEVAP ANAHTARI
Ad: Sınıf:
Soyad: No:

1) Aşağıda açıklaması verilen açıların çeşitlerini karşılarına yazınız. (10 Puan)
Ölçüsü 90° olan açı: DİK
Ölçüsü 90°'den büyük 180°'den küçük olan açı: GENİŞ
Ölçüsü 90°'den küçük olan açı: DAR

2) Aşağıdakilerden hangisi düzgün çokgen değildir? (5 Puan)
A-) Kare B-) Dikdörtgen
C-) Eşkenar Üçgen D-) Düzgün beşgen

3) Aşağıda verilen şekillerden hangisi çokgendir [redacted]? (5P)
A-) B-) C-) D-)

4) Aşağıda hatalı verilen cümlelerin doğrusunu yazınız. (10 Puan)
* Üçgenin 3 tane köşegeni vardır.
Üçgenin köşegeni yoktur. (2,5)
* Kapalı tüm şekiller üçgendir.
3 kenarı olan kapalı şekiller üçgendir. (2,5)
* Bütün kenarları birbirine eşit üçgene ikizkenar üçgen denir.
Eşkenar üçgen denir. (2,5)
* Geniş açılı üçgende tüm açılar geniş açıdır.
1 açı geniş, diğer iki açı dar açıdır. (2,5)

5) Aşağıda verilen birim kesirleri büyükten küçüğe doğru sıralayınız. (5P)
$\frac{1}{12}, \frac{1}{7}, \frac{1}{25}, \frac{1}{9}, \frac{1}{2}, \frac{1}{18}$
$\frac{1}{2}, \frac{1}{7}, \frac{1}{9}, \frac{1}{12}, \frac{1}{18}, \frac{1}{25}$

6) Aşağıda verilen kesirleri sayı doğrusunda gösteriniz. (5P)
$\frac{1}{6}$ (2,5) 0 $\frac{1}{6}$ 1
$\frac{1}{15}$ (2,5) 0 $\frac{1}{15}$ 1

) Aşağıda verilen bileşik kesirleri tam sayılı kesre çeviriniz. (10P)
$\frac{20}{3}$ = $6\frac{2}{3}$ (2,5) $\frac{42}{5}$ = $8\frac{2}{5}$ (2,5)
$\frac{59}{10}$ = $5\frac{9}{10}$ (2,5) $\frac{7}{2}$ = $3\frac{1}{2}$ (2,5)

) Aşağıda verilen tam sayılı kesirleri bileşik kesre çeviriniz. (10P)
$1\frac{2}{3} = \frac{5}{3}$ (2,5) $5\frac{4}{9} = \frac{49}{9}$ (2,5)
$10\frac{1}{2} = \frac{21}{2}$ (2,5) $7\frac{5}{8} = \frac{61}{8}$ (2,5)

) $\frac{4}{7}$ kesrine denk 4 tane kesir yazınız. (5 Puan)
$\frac{8}{14}$, $\frac{12}{21}$, $\frac{16}{28}$, $\frac{20}{35}$

) $\frac{36}{48} = \frac{6}{[18]}$ denk kesirlerinde [ ] yerine kaç gelmelidir? (5 Puan)

11) Aşağıda verilen kesirleri büyükten küçüğe doğru sıralayınız. (5P)
$7\frac{4}{15}, 7\frac{2}{15}, 7\frac{9}{15}, 7\frac{11}{15}, 7\frac{6}{15}$
$7\frac{11}{15} > 7\frac{9}{15} > 7\frac{6}{15} > 7\frac{4}{15} > 7\frac{2}{15}$

12) Aşağıda verilen kesirleri büyükten küçüğe doğru sıralayınız. (5P)
$\frac{7}{18}, \frac{1}{3}, \frac{5}{6}, \frac{2}{9}$ ⇒ $\frac{7}{18}, \frac{6}{18}, \frac{15}{18}, \frac{4}{18}$
$\frac{5}{6} > \frac{7}{18} > \frac{1}{3} > \frac{2}{9}$

13) 120 litrelik deposu olan bir araçta tüm benzinin $\frac{7}{12}$'si harcanmıştır. Buna göre, bu araçta kaç litre benzin kalmıştır? (10P)
120 : 12 = 10
10 × 7 = 70
120 − 70 = 50 lt

14) Sepetteki elmaların $\frac{3}{4}$'ü sağlam, geriye kalanlar ise çürüktür. Sağlam elma sayısı 15 ise,
a-) Sepette kaç tane elma vardır? (5 Puan)
15 : 3 = 5
5 × 4 = 20
b-) Sepette kaç tane çürük elma vardır? (5 Puan)
20 − 15 = 5

Figure 4.25: First paper-and-pencil exam implemented by Ms. Yılmaz

It can be seen in Figure 4.25 that, the first paper-and-pencil exam was composed of multiple-choice type items (2nd and 3rd), fill-in-the-blank-type items (1st, 10th), true-false type items (4th), and constructed-response type items (5th, 6th, 7th, 8th, 9th, 11th, 12th, 13th, and 14th). In Figure 4.26, on the other hand, Ms. Yılmaz's 3rd paper-and-pencil exam is represented:

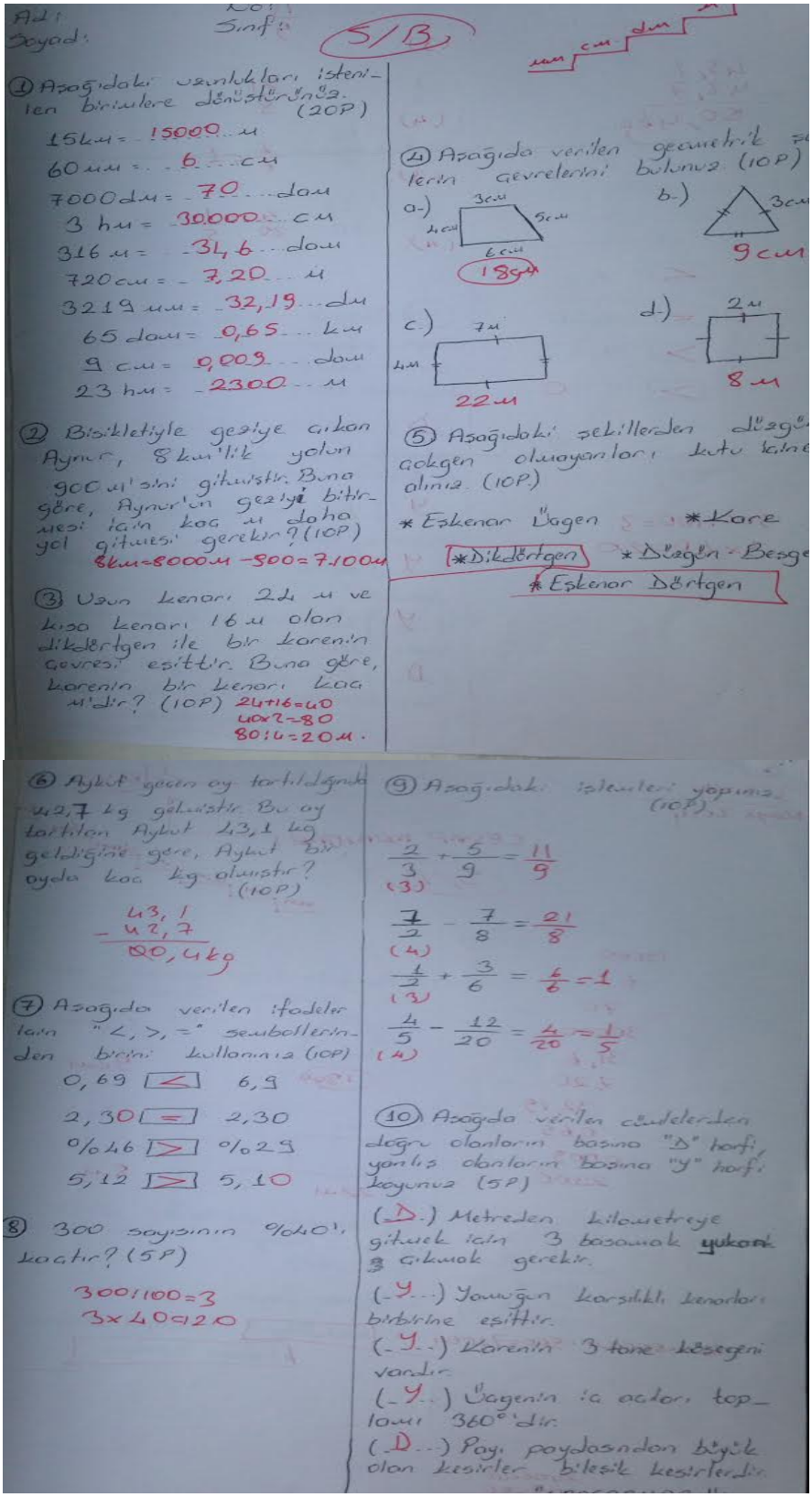


Figure 4.26: Third paper-and-pencil exam implemented by Ms. Yılmaz

In Figure 4.26, on the other hand, the third paper and pencil exam was shown. It was composed of fill-in-the-blank-type items (1st and 7th), true-false type items (10th), and constructed-response type items (2nd, 3rd, 4th, 5th, 6th, 8th, and 9th).

Figures 4.25 and 4.26 were also examples for the answer keys of the current exams. According to the interview data, Ms. Yılmaz prepared the answer keys of the paper-and-pencil exams before the implementation. It was seen in the answer keys that, she wrote the score of the completely correct answers of the constructed-response items. On the other hand, she did not assign a score to the partially correct answers. However after she graded the students' papers, it was observed that she gave points to the correct solution methods with incomplete or wrong results. Such a situation was indicated in the 3rd item of the paper-and-pencil exam which was represented in Figure 4.32. The item was as follows:

> *The width of a rectangle is 16 m and the length s 24 m. The perimeter of that rectangle is the same as the perimeter of a square. Then how many meters is the side length of that square?*

According to the document analysis, some of the students found the perimeter of the rectangle correctly. In order to calculate the perimeter, they did the following operations:

$$24 + 16 = 40$$
$$40 \times 2 = 80\ m$$

Some of them, on the other hand, did the following operations:

$$24 \times 2 = 48$$
$$16 \times 2 = 32$$
$$48 + 32 = 80\ m$$

However they did not calculate the side length of the square or some of them gave wrong answers like the following:

$$80 \div 2 = 40\ m$$

It can be seen that both of the answers were incomplete. On the other hand, they had to make the following operation lastly:

$$80 \div 4 = 20\ m$$

Ms. Yılmaz did not assign a score to such incomplete answers on the answer keys but it was seen with the document analysis that she gave 6 points to them in total. According to her the students' answers were incomplete, they were not

wrong. Therefore, she added, she attended 3 points for each operation in the following:

24 × 2 = 48 and 16 × 2 = 32 (3 points)
48+32=80 m (3 points)
Or
24 + 16 = 40 (3 points)
40 × 2 = 80 m (3 points)
And 4 points for finding the side length of the square:
80 ÷ 4 =20 m (4 points)

Ms. Yılmaz stated that she showed the answer keys to the students after she announced them the results of the paper-and-pencil exams. According to the interview data she called students to the board 5 by 5 and put the answer key on her desk. Then she let them check their papers by the answer key. She explained why she called the students 5 by 5 with the following words:

> I want to show them their mistakes or the difference between their answers and the correct answers. I do not give them their papers because the class is crowded. There can be a commotion, so it can be hard to control them. For instance one of them can add or erase something from her/his own paper. Because of that reasons, I call them on the board and deliver their papers 5 by 5. Then they check their papers with the answer key. I can follow them during that practice, also. (q135).

Ms. Yılmaz added that, she let all students check their papers but the ones who got low grades were not willing for that practice. Although she had asked them, they did not want to check their papers. Moreover, she continued, ‘‘they checked their papers without understanding the difference between their wrong answers and the correct answer”. (q136).

In addition to the paper-and-pencil exams, by the requirements of Ministry of National Education, students were assigned performance-tasks in each semester. As a result of this, Ms. Yılmaz implemented performance-tasks as a formal assessment, too. According to their decision of the department of mathematics, one performance-task would be implemented per semester in the current school. Therefore Ms. Yılmaz implemented one performance-task during the data collection process. Then she scored the tasks by using a scoring-guide which she adapted from internet sources. Last of all, she graded performance-tasks according to these scores.

First of all; Ms. Yılmaz expected students to finish their tasks at their homes on their own in order to save time. She stated that too much time was needed to control students' studies during the lesson. Moreover, she lost too much time in teaching fractions and linear measures. Therefore, she added, she wrote the instructions of the tasks on the board, and students wrote them down. Then students completed the task at home. In that manner she gave students 10 days for completing their tasks. The time interval also included the holiday of April 23th National Sovereignty and Children's Day. Therefore Ms. Yılmaz thought that the students would have enough time to complete their tasks. Moreover she did not interfere in or involve in the students' studies. In other words, during their task studies, students completed all the steps of their works at their homes without Ms. Yılmaz's intervention.

Secondly; it was indicated by the document analysis that, the 5th grades in Ms. Yılmaz's classes studied individually for their tasks. Ms. Yılmaz stated that that was not her choice. She went on to say that, all the students in her 5th grade classes wished to study individually, so she did not force them for group works.

Third of all; the interview data showed that she decided on the topic, the instructions, and the time interval of the performance-task herself before the implementation. According to the document analysis, the school mathematics department offered three performance-tasks: drawing the plan of a house, giving examples to indicate the facilitating role of graphics and determining the geometric shapes of the doors, windows, carpets, etc., but Ms. Yılmaz did not prefer to give the current topics as performance-tasks. In that manner she determined the topic according to the annual plan. She stated that she had done all the lessons about the quadrilaterals unit, so she decided on a task about that unit. The name of the task was ''explaining the properties of the quadrilaterals''. There was a long holiday and I thought that they could complete all the steps of the task at home'' she said and added: ''the tasks met my expectations. There were not big mistakes in them. I actually asked such an easy task so that all of them could do it''. (q137).

Fourth of all; the interview data indicated that, she wrote the instructions on the board in order to explain her expectations from the tasks. She also made verbal explanation about the instructions. She admitted that she interfered in the students'

works while she was explanations. In that manner, she stated that she insisted the students on using the colorful and decorative materials. “I do not like undecorated tasks”, she said and continued “Therefore I explain them everything one by one in detail and I direct them”

An example task that was completed by a 5th grade in Ms. Yılmaz’s class was represented in Figure 4.27:

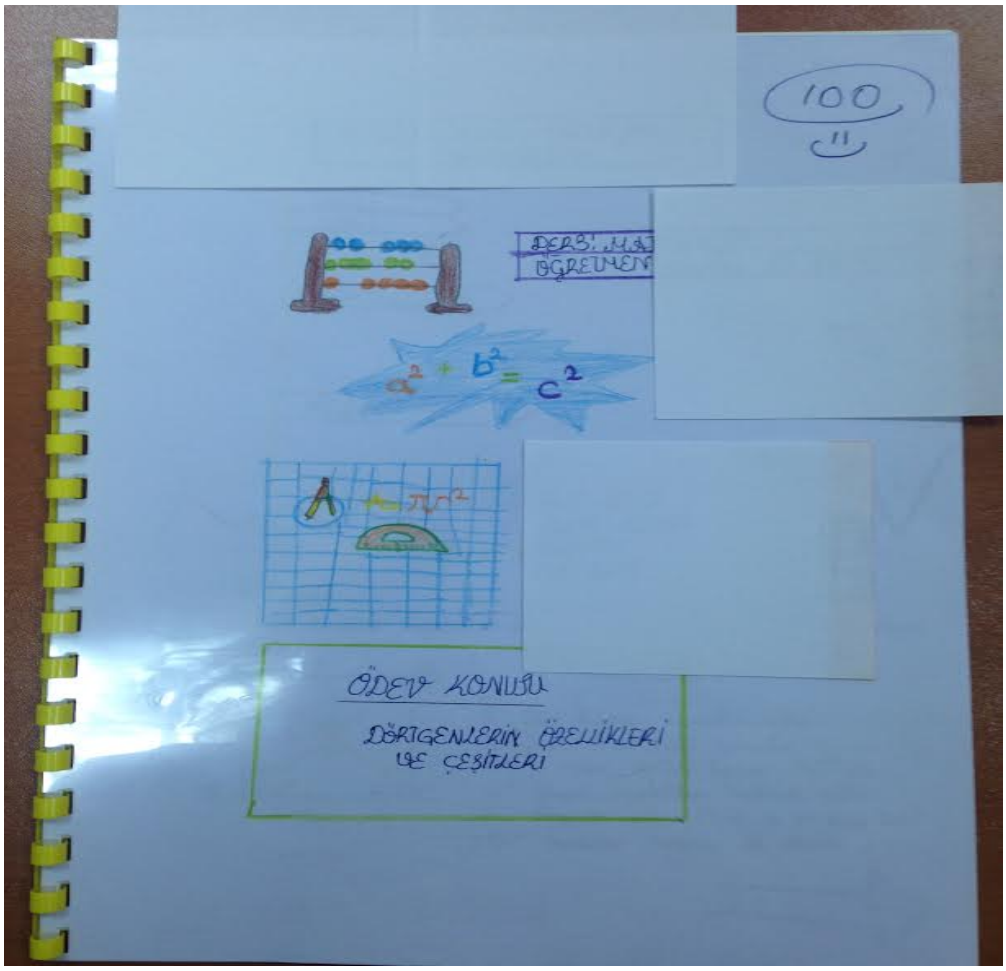


Figure 4.27: The performance-task prepared by Student Selen in Ms. Yılmaz’s class

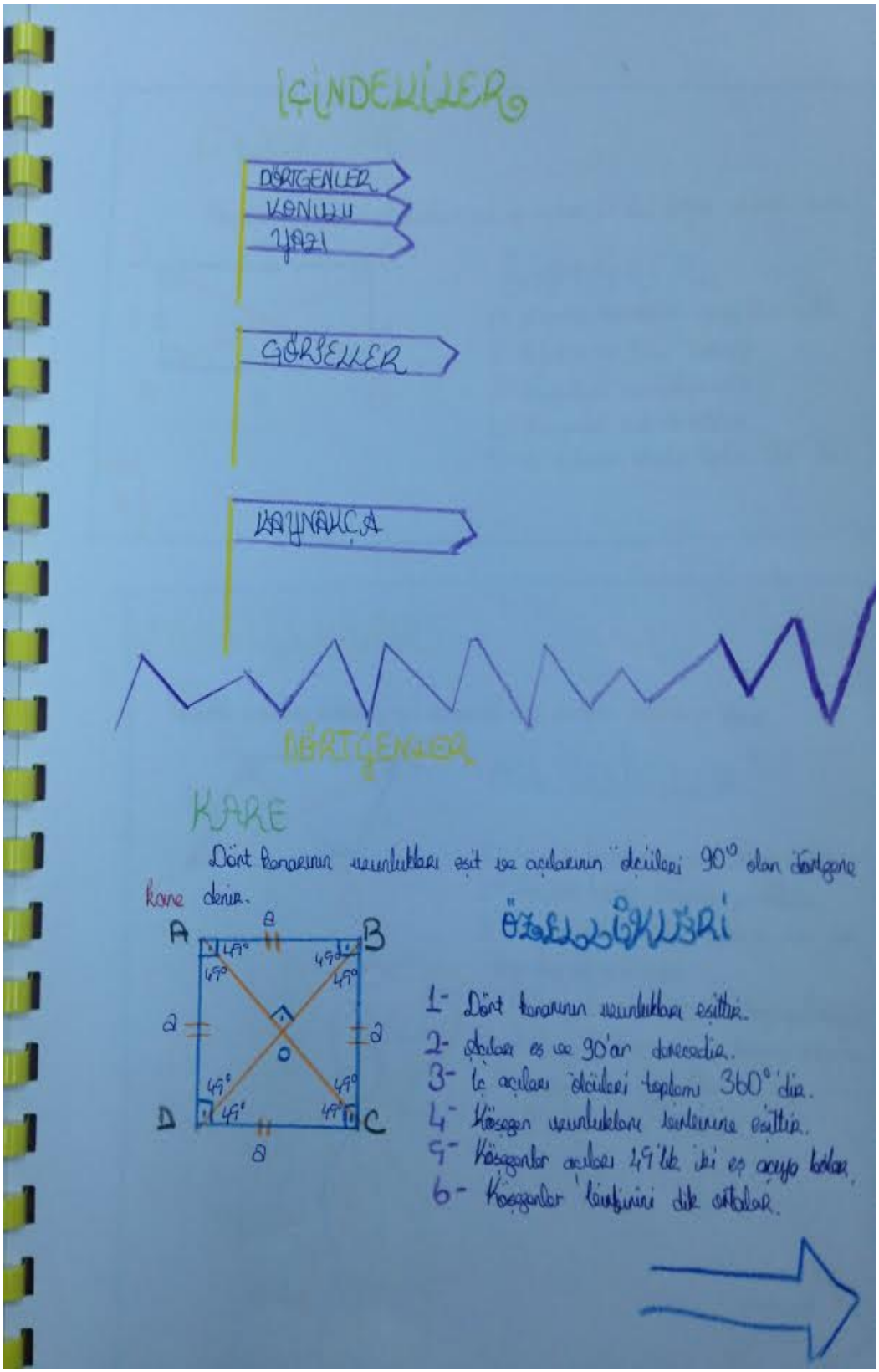


Figure 4.27 (cont'd): The performance-task prepared by Student Selen in Ms. Yılmaz's class

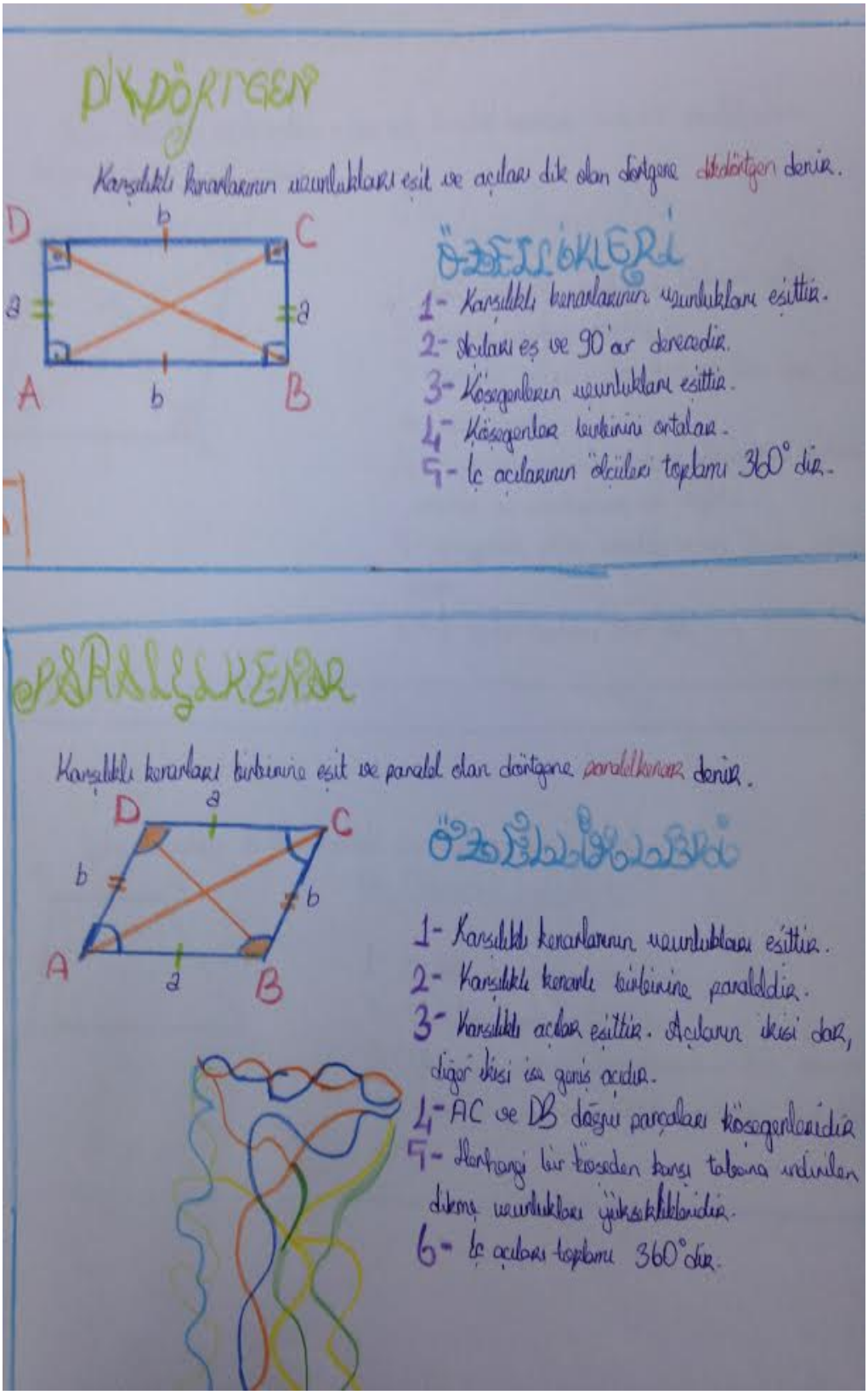


Figure 4.27 (cont'd): The performance-task prepared by Student Selen in Ms. Yılmaz's class

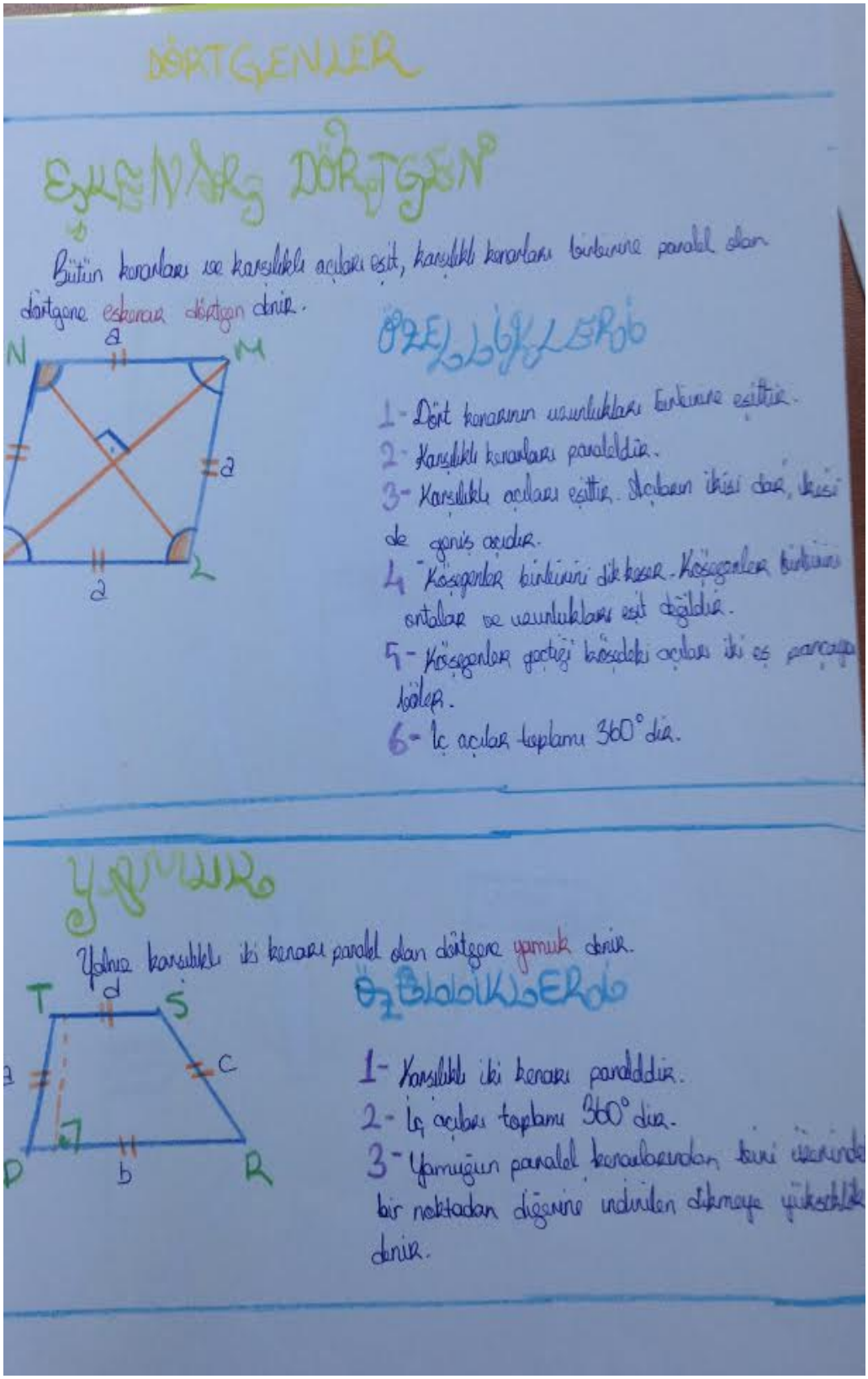


Figure 4.27 (cont'd): The performance-task prepared by Student Selen in Ms. Yılmaz's class

Figure 4.27 (cont'd): The performance-task prepared by Student Selen in Ms. Yılmaz's class

It can be seen in Figure 4.27 that Student Selen drew and explained the properties of a square, a rectangle, a parallelogram, a rhombus, and a trapezoid. It is indicated by the figures that Selen gave the information correctly and congruent with the curriculum. In that manner she gave information about the side lengths, the parallel sides, the angles, the diagonals, the heights, and the sum of the internal angles of the squares, rectangles, parallelograms, rhombuses, and trapezoids in her task. It can also be observed on the task that she drew the shapes of the quadrilaterals and determined the concepts on these drawings.

Another issue of the performance-tasks was the scoring-guide which was used to score students' performance-tasks. The interview data indicated that Ms. Yılmaz was worried whether she used scoring-guides efficiently. Her related words were as follows:

> Actually I can say that, I learned to develop and use them during my university education. However, still, I do not feel myself adequate enough to practice it. I am not sure whether I can use it correctly in every sense. (q138).

She added that she did not prepare the criteria herself. She used a prepared guide from internet with the criteria in it. It was indicated by the document analysis that there were four criteria in the guide that was used by Ms. Yılmaz: creativity, overall appearance, submitting until deadline, and using materials (supporting the issue with various materials). Then, as soon as she assigned the tasks, she explained the criteria of the scoring-guide to students and hanged it on the classroom billboard. She used the same scale with the participant Ms. Solmaz and stated that she used the scale for two aims: to score the performance-tasks and to let the students check their assessment results.

Fifth of all; the document analysis and the interview data showed that, in order to decide on the scoring-guide, Ms. Yılmaz did not take the decisions of students or school administration. On the other hand, she was depended on the decisions of the mathematics department. According to the current data, in the first meeting of the mathematics department, which took place at the beginning of the academic year, the mathematics teachers determined five main criteria for scoring the performance-tasks: making use of sufficient references, pictures, photographs or

drawings if needed; using Turkish language and the punctuation marks correctly and giving the information in order; using more than one reference; submitting the task on time; and cooperation between the group members. Ms. Yılmaz, on the other hand, used three of them in her own scoring-scale: making use of sufficient references, pictures, photographs or drawings if needed (using materials); using Turkish language and punctuation marks correctly and giving the information in order (the overall appearance); and submitting the task on time. Therefore it can be said that, Ms. Yılmaz was depended on mathematics department's criteria decisions and used three of them in her own scoring-guide.

It was also observed by the document anlaysis that the scale did not include any criteria for scoring mathematical issues. Ms. Yılmaz explained her preference with the following words: ''I think that, the creativity and using materails criteria assess students' mathematical skills therefore I did not need to add another criterion to the scale'' (q139). For each criterion she scored students' tasks over 5 points. In order to calculate the final grade, on the other hand, she multiplied the total scores by 5.

Lastly; it was seen in the documents that, the scoring interval of Ms. Yılmaz was not so similar with the mathematics department's rubric. The scale of the school mathematics department rubric was rated from 1 to 4 for each criterion whereas Ms. Yılmaz's scale was 1 to 5. According to the document analysis, in order to determine how she would score the tasks, she wrote the meaning of each point at the bottom of the scoring-guide. It was written that 5 points meant ''very well'', 4 points meant ''good'', 3 points meant ''tolerable'', 2 points meant ''acceptable'', and 1 point meant ''needs improvement''. Therefore it can be said that by the help of the related data that, in order to grade 5^{th} grades' performance-tasks, Ms. Yılmaz did not only score the completed works, she also scored partially complete, incomplete or completely wrong tasks, too. It means she did not only score totally correct studies. She also scored the partially correct, tolerable, acceptable, and inadequate tasks.

The task which was presented in Figure 4.27, on the other hand, got the score of 100. Ms. Yılmaz stated that the task was completely adequate to the criteria of the scoring-guide, so the student did not loose any point. According to the

document analysis, also, all the performance tasks got 75 and over in Ms. Yılmaz's 5th grade classes. Ms. Yılmaz thought that such a result was not a surprise because the task was easy enough to get 75 and over.

Another major assessment procedure that Ms. Yılmaz used in her 5th grade class was the project-study. In each year, by the requirements of The Ministry of National Education, students are assigned a project-study from a course that they select. Moreover according to the field notes the assignment deadlines and the topics of the projects were determined by the mathematics department of the school in the beginning of the academic year**.** According to the decisions of the department, the projects were assigned in December 2013 and gathered in the last week of April by the mathematics teachers. The department also offered project topics such as constructing a Gregorian calendar, constructing a kite, planning a trip, suggesting solutions to prevent water-waste, get to know the polygons, and representing the parents' jobs with a table.

Firstly; it was revealed with the interview data and document analysis that, like she did during the performance-tasks, Ms. Yılmaz did not choose the project topics along with the mathematics department suggestions. She preferred to offer project about the ''prisms'' topic although she did not teach it before. She asked students to construct mathematics materials for the prism topic. In that manner students were responsible to model the opened and closed versions of the rectangular prisms, square prisms, and cubes. Moreover they were asked to construct the closed version of the current prisms and explain the properties of them with a report. In other words students had not learned prism unit before they made their projects. She explained the projects and how she decided on the projects with the following words:

> I gave types of prisms as projects. They showed the closed and opened versions of the prisms through models and explained the properties of each prism in a written report. I also asked them to construct closed versions of the prisms. I gave the assignments before I taught the prism topic. Therefore I gave students, the ones who had project assignments, a little information about the topic. I could not give efficient projects because I forgot the deadline about assigning the projects. As a result of that, I had to decide on the topic and the instructions quickly. Since I was in panic to be late in giving and collecting the projects, I did not ask them to present their studies. On the other hand, spending time for presentation would affect my teaching plans, too. (q140).

Second; according to the field notes there were 30 students who wanted to prepare a project from mathematics course in Ms. Yılmaz's 5th grade classrooms and she gave the same project to each student. Moreover the students made their projects individually at their homes.

Third of all; the interview data showed that Ms. Yılmaz determined the guidelines of the projects herself. Then she photocopied and delivered them to students. During that practice she explained the instructions of the projects orally, too. The related instructions were as follows: research the properties of the rectangular prism, square prism, triangular prism, and cube; explain their properties in a written report; and show the closed and opened appearances of each through models; show your all work on your reports; construct opened appearance of the prisms from cartons; construct closed appearance of them from these opened ones. On the other hand, although they were needed, the guidelines did not include any instruction about using a ruler or a miter.

A part of a project-study completed by Student Nur in Ms. Yılmaz's class is shown in Figure 4.28:

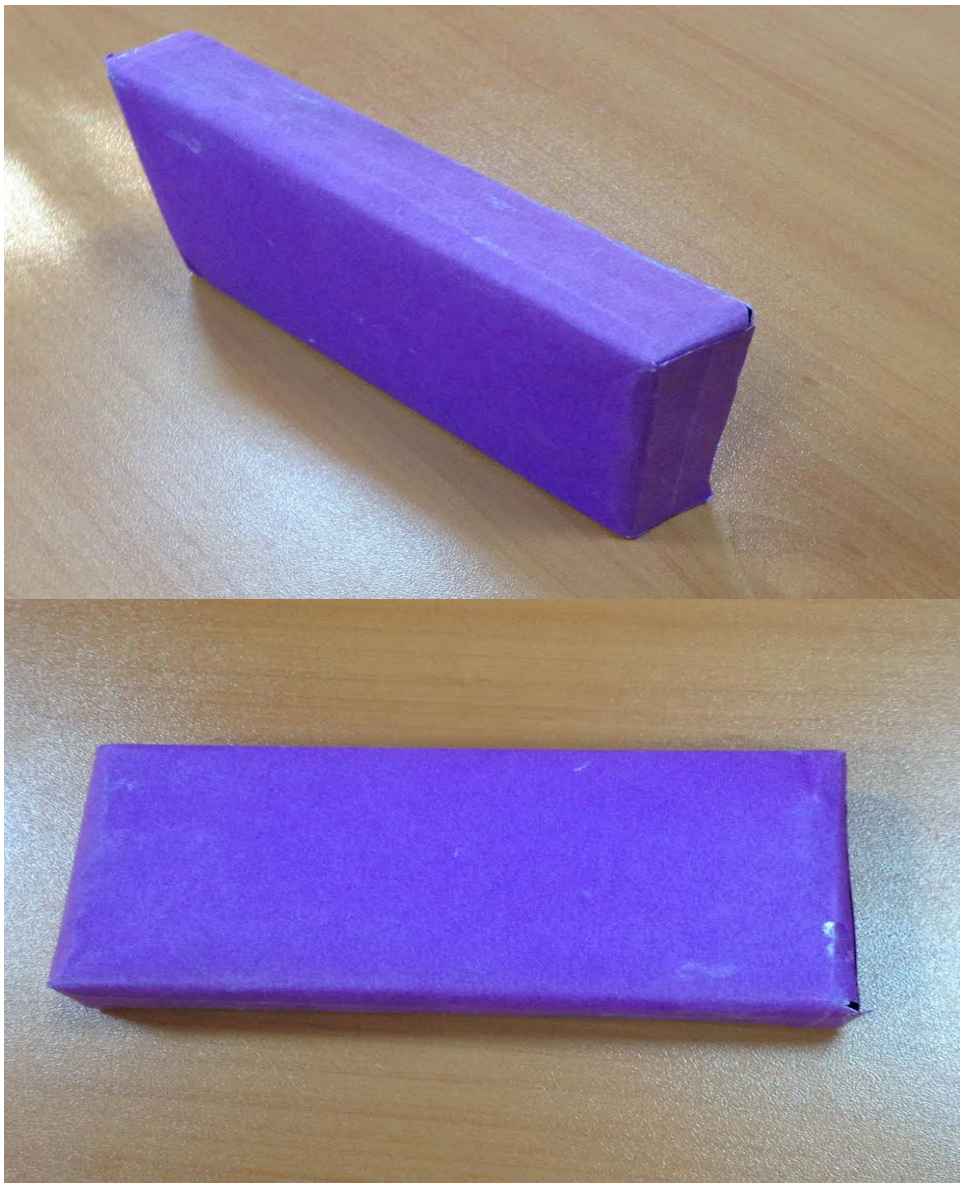


Figure 4.28: A part of a project-study completed by Student Nur in Ms. Yılmaz's class

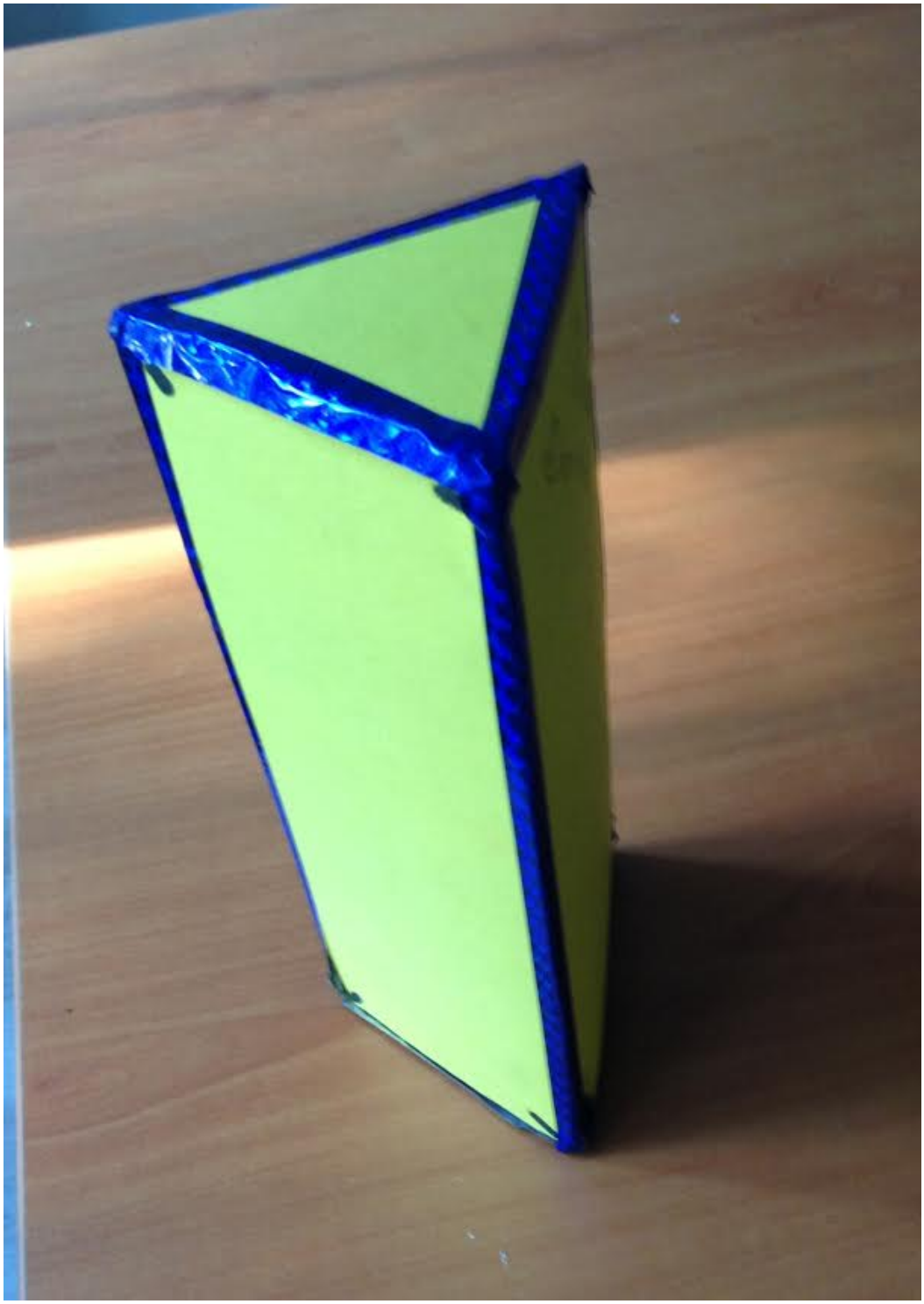


Figure 4.28 (cont'd): A part of a project-study completed by Student Nur in Ms. Yılmaz's class

Figure 4.28 (cont'd): A part of a project-study completed by Student Nur in Ms. Yılmaz's class

In Figure 4.28 a part of project study that was completed by Student Nur are shown**.** By the figures two evaluations can be done. First, it can be said that the student constructed the rectangular prism and the triangular prism correctly. Second, although the triangular prism was out of the 5^{th} grade curriculum, the study included also information also about that geometric solid. The student constructed it because there was an instruction which was asking to construct and explain a triangular prism. Therefore it can be said that Ms. Yılmaz preferred to give project studies that included external topics. On the other hand, the Figure 4.28 showed that Student Nur constructed the triangular prism correctly although she did not get any lecture about it.

Fourth; Ms. Yılmaz scored the students' projects by using the criteria which were offered by the mathematics department. In figure 4.29 the scoring-guide that was used by Ms. Yılmaz is shown:

Sınıf: .....

Projenin teslim tarihi:.....

I. PROJEYİ HAZIRLAMA SÜRECİ	1	2	3	4	5
1.Projenin amacını belirleme					10
2.Projeye uygun plan yapma					10
3.İhtiyaçları belirleme					10
4.Grup içinde görev dağılımı yapma					
5.Farklı kaynaklardan bilgi toplama					10
6.Projeyi plana göre gerçekleştirme					10
7. Ekip çalışmasını gerçekleştirme					
TOPLAM	50				

II. PROJENİN İÇERİĞİ	1	2	3	4	5
1. Türkçe'yi doğru ve düzgün yazma					10
2. Bilgilerin doğruluğu					10
3. Toplanan bilgilerin analiz edilmesi					
4. Elde edilen bilgilerden çıkarımda bulunma					
5. Toplanan bilgilerin düzenlenmesi					10
6. Kritik düşünme becerisini gösterme					10
7. Yaratıcılık yeteneğini kullanma					5
TOPLAM	95				

Figure 4.29: The scoring-guide that was used by Ms. Yılmaz

In Figure 4.29, it can be seen that there were two main criteria in Ms. Yılmaz's scoring-guide: the preparation process of the project and the content of the project. The preparation process included the criteria of: identifying the purpose of the project, planning the project, determining the needs of the project, using different references, and carrying out the project according to its plan. The criteria about the content of the project were as follows: using Turkish language rules correctly, the accuracy of the information, organizing the information, and using creativity.

It can also be seen in the figure 4.29 that, there are lines drawn on four criteria. The names of these criteria were: work-sharing in the group, producing a group work, analyzing the information, making inferences from the information. Ms. Yılmaz stated that she did not need them in scoring the current project study. However after she gave that document for the current dissertation, she made a fair copy of the scoring-guide. In that guide the four irrelevant criteria were not included. She gave the copy to the students as a report of their project grades.

According to the document analysis, on the other hand, the project which was partly shown in Figure 4.28 got a score of 95. In that manner, it was observed by the documents that the student lost 5 points only from 'using creativity' criterion. Ms. Yılmaz stated that the student completed most of her project in congruent with the guidelines and submitted it on time. Then she explained why Student Nur lost 5 points from the related criterion: ''I asked them to construct closed appearance of them from these opened appearances of the prisms. However instead of constructing the closed shape of the rectangular prism, she had covered a syrup box''. (q141).

Fifth of all; it was understood with the field notes that Ms. Yılmaz obeyed the rules of The Ministry of National Education and announced the formal assessment grades to students in 10 workdays. Moreover she gave the written report about the results of the common paper-and-pencil exams to the mathematics department at the end of the semester. In that manner she wrote the number of the students that got grades over 44 and under 44 in her report. The mathematics department, on the other hand, gave these reports to school administration. The school administration, on the other hand, used these reports for calculating the overall annual mathematics achievement of the current school.

Last of all; it was figured out that Ms. Yılmaz let students check their performance-tasks and projects with the scoring-guides. She explained the checking process:

> Students want to learn their mistakes. Then I show them the scale. For instance in the first semester they were responsible to construct graphs in their performance-tasks. I showed them the scale and explained why they lost points. In other words the students had the opportunity for checking the scoring-scales and their incorrect answers. On the other hand, I do not insist on the checking process if the students do not want it. (q142).

Ms. Yılmaz also told her 5th grades' common questions in the checking process. It can be said that students wanted to get information mostly on the reason of the grade differences between their works and their friends'. Ms. Yılmaz told that situation with an example:

> Sometimes students think that they did the same tasks with their friends but they got different grades. For instance all of them showed their tasks on the cartoons last semester, so some of the students could not make of the difference in their task grades. S/he thought that if all the works were showed on the graphs and submitted on time, then all of them should get 90 or 100. However I hang the scoring criteria on the classroom billboards. They should realize that the criteria included the content, Turkish language skills, the accuracy of the information, etc. Although they have a chance to examine these criteria, they do not accept their mistakes. (q143).

In summary; it can be understood with the data that Ms. Yılmaz obeyed the obligations of the Ministry of National Education. In that manner, she implemented three paper-and-pencil exams and one performance-task to each 5th grade student whereas she gave project to the willing ones. According to the field notes and interview data, she announced the time of the paper-and-pencil exams one week before the implementations and prepared the answer keys before exams. On the other hand, she did not prepare a scoring-guide or a rubric for the performance-tasks and projects studies on her own. It was also indicated by the documents that there were no criterion available to assess the students' mathematical skills in performance-tasks and project studies. Instead, she used the prepared ones from internet or from mathematics department suggestions. She announced the results in 10-days and let the students check their papers, tasks, and projects. She also gave common written exam report to mathematics department.

4.3.2 Ms. Yılmaz's Use of Assessment Results

The interview data, the observational data, the document analysis, and the field notes indicated that, for summative purpose, Ms. Yılmaz practiced formal assessment such as paper-and-pencil exams, performance-tasks, and project-studies. For formative purpose, on the other hand, Ms. Yılmaz practiced both the formal and the informal assessments. The informal assessments included observations, whole-class worked examples, quizzes, and students' homework.

According to the classroom assessment framework of McMillan (2007a), Ms. Yılmaz's use of informal and formal assessment results was the last step for her assessment processes. Therefore it is required to explain her use of classroom assessment results.

As a result of the related literature and the data collected, Ms. Yılmaz's ways for using assessment results will be explained in the following subsections. By the current results, the answers to the following research questions were investigated:
1. In what way are the participating mathematics teachers' formal and informal assessments related with their use of assessment results in 5th grade classrooms?
2. How do the participating mathematics teachers use the results of their assessment practices formatively in 5th grade classrooms?

4.3.2.1 Ms. Yılmaz's Use of Assessment Results for Making Decisions on Her Instructional Practices

In some of her instructional decisions, Ms. Yılmaz demonstrated that she made use of assessment results for making decisions on her instructional practices. According to the interview data Ms. Yılmaz used assessment results in order to make decisions about repeating a topic or about the effectiveness of her teaching. Besides she used project results for teaching the related topic, too.

To begin with; it was indicated by the interview data and the classroom observations that, in order to repeat an issue or a topic, Ms. Yılmaz mostly used informal assessment data. She stated that by the help of quizzes or whole-class

worked examples, she understood whether a topic repetition was a need.

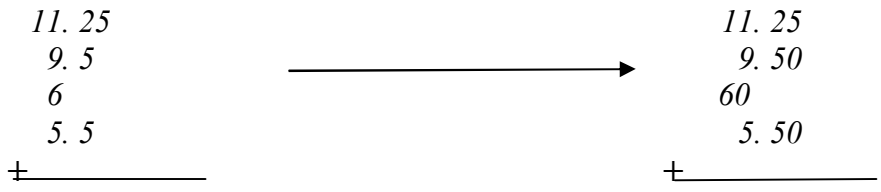
For instance after the ‘‘quiz activity’’, which was represented in Appendix E, she realized that students had problems on finding equivalent fraction to $\frac{3}{5}$. An example response including a common mistake was as follows:

$\frac{3}{5} = \frac{3}{10}$

(2)

It can be seen in the answer that, in order to find an equivalent fraction to $\frac{3}{5}$, the student multiplied the denominator by 2 but she did not multiply the numerator by 2. According to Ms. Yılmaz, having lack of knowledge about the equivalence issue should cause problems in teaching the operations with fractions. Therefore she stated that, she repeated the equivalence topic again. She went on to say that, in her repeating process, she reminded students to multiply both the denominator and the numerator by the same number.

According to the interview data, when she realized the common mistakes, Ms. Yılmaz solved the related items for repeating the topic. Her practice was observed during the “problem solving activity”, too. In the activity the students were asked to add a group of decimal numbers. At the end of the activity, the following mistake was observed in some of the students’ activity papers:



It can be seen in the operation that, in order to simplify the addition operation, the student tried to equalize the digits. Therefore she put “0” in the empty spaces of the fractional parts (11. 25; 9. 50; 5. 50). However she also put “0” in one of the integer part and turned 6 to 60.

In relation with the same item above, another common mistake can also be observed in the following operation:

11.25
9.5
6
5.5
+_____
1281

It can be seen in the operation above that the students were not careful on writing the digit part or the fractional part one under the other. Moreover the point sign that separated the integer and fractional parts was absent in the answer. As a result of that the answer was incorrect.

The interview data indicated that, after she realized the incorrect answers, Ms. Yılmaz solved the item on the board. During that process she reminded students that they needed to write the integer part and the decimal part one under another in order to do the addition operation correctly.

Second of all, Ms. Yılmaz remarked that she also understood her teaching efficiency by using the assessment results. In that manner she gave examples from her observational data in the fractions unit. Her related words were as follows:

> I tried to teach them the logic of the fractions by different methods. For instance I showed the fractions through models. In order to model them, I drew birthday cakes on the board. Students came to the board and divided the cakes in equal pieces. I also tried to practice similar methods by using rectangular or square shapes. However I observed that none of these methods were efficient enough, the logic of the fraction concept could not be taught. (q144).

Her inference was observed in the ‘‘addition of fractions activity”, too. In one of the items, for instance, students were asked to add 1/3 and 2/3 by using fraction bars. Moreover they were asked to show the operation through model. The video data showed that students had problems in defining the unit fraction. For instance, in the 34th minute, Ms. Yılmaz asked students the type of 1/3 fraction orally. A student said that it was a mixed fraction whereas the other named it as a proper fraction. According to Ms. Yılmaz such answers were clues for evaluating her teaching efficiency. She thought that the students were confused because she did not use fraction bars for teaching fraction unit. She explained how she evaluated her teaching efficiency with the following words:

> Some of the students complained about the fraction bars. They reminded me that I had not taught them the fraction unit by using the bars. That is

right. I did not use fraction bars but I showed the fractions through models. Moreover I introduced them the fraction bars in my lectures. However the fraction bars mixed their minds. They could not realize the unit fraction. They could show 1/3 by the material but they could not construct 2/3 by using two of the 1/3 bars. I had to help them in that stage. I think they were surprised because I did not use fraction bars when I was teaching the fraction unit. I was only drawing models of the fractions or the operations of the fractions on the board. If I had used the bars in my lessons, they would have answered the item correctly. (q145).

On the other hand, after the 1st and 2nd paper-and-pencil exams, Ms. Yılmaz thought negatively about her teaching efficiency because of the students' common mistakes. For instance, the document analysis showed that some of the students had problems in equalizing the fractions. Such situation was observed in the solution of the following items:

(Item from the 1st paper-and-pencil exam): Rewrite the given fractions in decreasing order.

$\frac{7}{18}, \frac{1}{3}, \frac{5}{6}, \frac{2}{9}$

The document analysis showed that, in order to put the fractions in order, some students tried to equalize the denominators. Then they rewrote the fractions as follows:

$\frac{7}{18}, \frac{1}{18}, \frac{5}{18}, \frac{2}{18}$

It can be seen in the operations above that, in order to find the common denominator, the students multiplied only the denominators. They did not multiply the numerators by the multipliers.

(Item from the 2nd paper-and-pencil exam): Do the following operations

a) $\frac{7}{6} - \frac{2}{3} =$

b) $\frac{8}{5} + \frac{2}{15} =$

It was observed in the documents that some of the students did the operations above like the following:

$\frac{7}{6} - \frac{2}{6} = \frac{5}{6}$

$\frac{8}{15} + \frac{2}{15} = \frac{10}{15}$

It can be seen in the answer above that, in order to do the subtraction operations, the students wanted to find the common denominator in each operation. In that manner they multiplied the denominator of $\frac{2}{3}$ by 2 and the denominator of $\frac{8}{5}$ by 3. On the other hand, they did not multiply the numerators of the current fractions by the same multipliers, so they responded the items incorrectly.

Both of the results showed that some of the 5th grades in Ms. Yılmaz's classes had lack of knowledge about equalizing the fractions. They multiplied the denominators by the multiplier, but they did not do the same operation for the numerators. According to Ms. Yılmaz, both of the answers showed that although she tried to fix their misunderstandings, she could not be effective on the students' permanent learning of the fraction concept. She went on to say that, after the 1st paper-and-pencil exam she reminded students the operations for equalizing the fractions but she could not prevent them to make the same mistakes in the 2nd exam. After the 2nd paper-and-pencil exam, lastly, she stated that she was so sad for that result and did not know what to do for it.

In order to find effective teaching methods, on the other hand, she searched internet sources. According to the final interview data, she wanted to use a method from internet. The method was for teaching the meaning of the concepts of the division operation. Ms. Yılmaz stated that, in the method the aim was taking students' attention to the differences of the dividend number, division number, quotient, and the remainder. The method was about illustrating the concepts by the help of watermelon, knife, and the skin of water-melon. Ms. Yılmaz stated that, in order to visualize a division operation, she drew a watermelon in the place of the dividend number, a knife in the place of the division number, a slice of watermelon in the place of the quotient, and the skin of the watermelon in the place of the remainder. However she observed that, although the method took students' attentions to the differences of the concepts in a division operation, it was not as effective as she expected.

Last of all, it was shown by the interview data and the field notes that Ms. Yılmaz used students' project results in her teaching of prism topic. For instance, it was observed during the data collection process that she gave projects on the prism topic before she taught the topic. According to the interview data, she observed in the projects that some of the students could not differentiate between the prisms and 2-dimensional geometric shapes. During the final interviews, also, she talked about her inference and continued by saying that ''I made use of my evaluation and emphasized on the difference between the 2-dimensional geometric shapes and the solid shapes. For instance I mentioned the height dimension and the volume concept in the prisms'' (q146).

In summary; it was shown in the interview data and field notes that Ms. Yılmaz used assessment results for repeating a topic, deciding on her teaching effectiveness, or teaching a topic. If there were common mistakes in her assessment practices, she evaluated her teaching efficiency or repeated the related topics. In order to teach a topic, on the other hand, she made use of the students' project results.

4.3.2.2 Ms. Yılmaz's Use of Assessment Results for Making Decisions on Her Assessment Practices

The overall data indicated that Ms. Yılmaz used assessment results to decide on the adjustments for her further assessment practices.

First of all; the interview data showed that Ms. Yılmaz decided on the adjustments for her further assessment practices mostly by the help of her observational data. She stated that she decided to practice informal assessments when she observed that the students were uninterested with the lesson. She explained her words with the followings:

> During my teaching process, I sometimes observe that the students are sleepy. Sometimes, on the other hand, they do not show any reaction to my questions. In order to activate the lesson, I decide on a quiz, a work-sheet, or something like that. Then I implement them. (q147).

In order to make adjustments for her further assessment practice, Ms. Yılmaz also observed whether a student volunteered for responding the classroom

exercises. She stated that such an observation prevented her data about what to ask to the students during the classroom exercises. In the following her related words are given:

> I observe that some of the students always volunteer to answer the classroom exercises. A few of them, on the other hand, are not interested in these exercises, so I ask them to respond to my questions. For instance, Student Nurten is one of them. She does not raise her finger for solving the exercises. Moreover I observed that she had difficulties on the multiplication table. So in some of my lectures, I ask her to answer my questions which included multiplication operations. I have been asking such questions to her since the first semester. I even use traditional methods such as oral exams to teach her the multiplication table, because she had to learn the table in the 2nd grade, but she still had problems about it. (q148).

According to the interview data, Ms. Yılmaz's classroom observation results affected her decisions about the type of the items she would use in the further paper-and-pencil exams, too. She stated that she prepared the items of the exams according to her evaluations about the students' classroom performances. Her related words were as follows:

> I am thinking the students' achievement levels in general. For instance I ask myself whether the item could be solved by lots of the students. During that activity, I rely on my classroom observations and I choose the items which are in similar with my classroom exercises. I avoid asking different than the items that I use in my classroom practices. (q149).

In other words, whole-class worked examples and her classroom observations affected her decisions about the type of the items that she used in paper-and-pencil exams. In order to explain her practice, she gave her 3rd paper-and-pencil exam as an example. The exam is shown in figure 4.30:

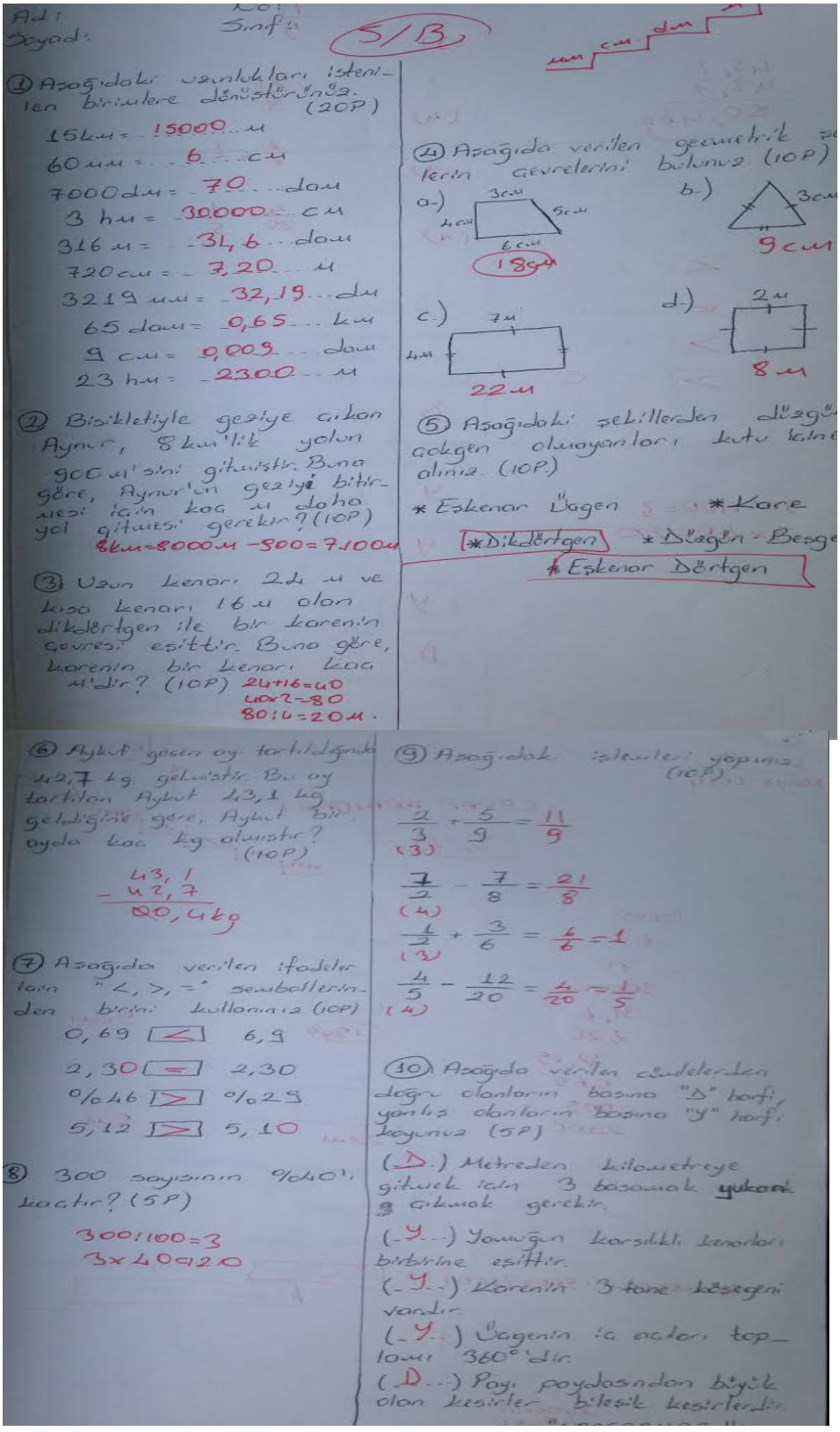


Figure 4.30: A scene from the 3rd paper-and-pencil exam that Ms. Yılmaz implemented

It can be seen in figure 4.30 that, the types of the items are constructed response, fill-in-the-blanks, and true-false. Ms. Yılmaz stated that, she observed students during her informal assessments for the length measure topic and came to the point that they were good at fill-in-the blank type, constructed-response type, and true-false type items. Therefore, according to the interview data, she asked the exam items which were related with the length measure topic (1^{st}, 2^{nd}, 3^{rd}, 4^{th}, and 10^{th}) in such forms.

In conclusion; the interview data and field notes indicated that Ms. Yılmaz used her informal assessment results for making adjustments on her further informal assessment practices or on the items of her paper-and-pencil-exams.

4.3.2.3 Ms. Yılmaz's Use of Assessment Results for Improving Students' Learning of Mathematics

Ms. Yılmaz used assessment results in order to improve students' learning of mathematics, too. In that manner she used the results for monitoring the students' progress; assigning their overall grades for the whole year; giving formative feedback to the students; preventing students from feeling anxious; and diagnosing areas of strengths and weaknesses.

To begin with; the interview data indicated that in order to monitor students' progress, Ms. Yılmaz followed the results of both the informal assessments and formal assessments. She stated that she realized each student's achievement level during her classroom observations and monitored their progresses by the help of the formal assessments. For instance after the 2^{nd} paper-and-pencil exam she made the following sentences:

> Their grades were similar with their 1^{st} exam grades. Moreover they showed similar performances with their in-class performances. According to my classroom observations, I estimated the ones who would get 100 from the exam. However the results proved my predictions. (q150).

Ms. Yılmaz also monitored whether the students showed progress on a topic. For instance, during the post-interview of the 2^{nd} paper-and-pencil exam she gave example from the students' mistakes and stated that the students' progresses on equalizing the fractions were not positive. In the exam the following items were

including operations for equalizing the fractions:

Do the following operations

a) $\frac{7}{6} - \frac{2}{3} =$

b) $\frac{8}{5} + \frac{2}{15} =$

It was observed in the documents that some of the students did the operations like the following:

$\frac{7}{6} - \frac{2}{6} = \frac{5}{6}$

$\frac{8}{15} + \frac{2}{15} = \frac{10}{15}$

It can be seen in the answer above that, the students could not find the correct answer because of their mistakes on equivalence operation. They multiplied the denominators by common multipliers but they did not multiply the numerators with the common multipliers. Ms. Yılmaz stated that the same students made such mistakes during the whole-class worked examples, too. ‘‘Therefore”, she continued, “their progress on equalizing the denominators is not positive; besides there is no change on their progress”.

After the 3rd paper-and-pencil exam, also, Ms. Yılmaz told that some of the students did not give correct answers to the item asking to transfer a length measure to the other length units. A part of the item was in the following:

I: Fill in the blanks with the suitable length measures

15 km = ...m
60 mm = ...cm
7000 dm = ...dam
3 hm = ...cm
316 m = ...dam

In the item above, Ms. Yılmaz expected students to put 0 to the right side of the measurements when they were asked to transfer a length measure to the smaller length units. During such transfers, 0 was put to the right side for each smaller unit. However Ms. Yılmaz told that, like they did during the informal assessments, some of the students put one more 0 to the right side of the length measure. She noticed that the students put that 0 for the unit that the measurement was given in the item.

For instance the following respond was from a student's exam paper:

15 km = 150 000 m

It can be seen in the answer above that, student wrote 150 000 instead of 15 000. According to Ms. Yılmaz the student put one more 0 for the 'km' unit, so he could not find the answer. She finished her explanation with the following sentences: He put one more 0 for the unit that the measurement was placed at first. Based on my previous observations, I knew he would make such a mistake. (q151).

In the manner of monitoring students' progress, she compared her observational data with the classroom activities results which were offered by the researcher, too. For instance after the ''quiz activity'' she made the following sentences: "The students who were good at comparing the fractions answered the related activity items correctly, too". She explained her interpretation through the following activity item:

> *Which one is bigger:* $\frac{3}{4}$ *or* $\frac{4}{3}$*. Explain your answer. You can show your operations through model, too.*

Ms. Yılmaz showed a student's paper. On the paper the following answer was written:

> $\frac{4}{3}$ *is bigger than a whole.* $\frac{3}{4}$*, on the other hand, is smaller than a whole. In fractions, the expressions which are equal to a whole or bigger than a whole are bigger than the ones which are smaller than a whole. Therefore* $\frac{4}{3}$ *is bigger.*

It can be seen in the answer above that the student solved the item correctly. Moreover she supported her answer with giving suitable information. Ms. Yılmaz stated that such an answer was not a surprise for her. Her related words were as follows:

> The students showed similar performances with their classroom performances. According to my observations, I knew each student and predicted her/his probable answers. These students also made correct interpretations. I also guessed the ones who would not solve the item/items because their performances about the topic were similar in the classroom exercises. I was not surprised. (q152).

In order to monitor 5th grades' progress in mathematics, Ms. Yılmaz used the results of performance-tasks and project studies, too. For instance, in order to

complete their project studies, students were asked to model the opened and closed versions of the rectangular prisms, square prisms, and cubes. After she scored the project studies, on the other hand, she stated that some of the students increased their achievement levels. She continued with the following words:

> Some of the students, who were low-achievers during my previous assessments, submitted very good projects. They prepared everything correctly: using the language efficiently, constructing understandable prism models, etc. (q153).

The classroom observations and field notes showed that Ms. Yılmaz did not keep written records for monitoring students' progress, but she trusted her memory. She explained her method with the following sentences:

> For instance my student Nurten does not know multiplication table. During the lessons I often ask her multiplication operations but she does not interested in mathematics a lot. On the other hand she promised me, she will study. I monitor her progress about the multiplication operation. I can say that such students are recorded on my memory. (q154).

It can be seen by the interview data and document analysis that Ms. Yılmaz used both the formal and informal assessment results for monitoring the students' progress in mathematics however it was also observed that she did not keep any written records for her monitoring.

Second, Ms. Yılmaz stated that she used both summatively purposed and formatively purposed assessment results during the overall grading process. According to the interview data, her grading process started with getting the observational data of the students' progresses but she did not keep a written record for her classroom observations. According to the document analysis, at the same time, she kept records of all the formal assessment results.

Ms. Yılmaz added that none of the informal assessment practice had a pre-determined proportion on the overall grades for the whole year. On the other hand she said that she used the observational data, quizzes, and homework as contributions to the overall grade at the end of the semester. She explained her system with the following words:

> I am not sure whether I could balance the contribution of the grades objectively because I do not assign a score for each assessment practice. On the other hand, students' efforts affect their in-class-performance grades positively. In order to give their overall grades, I take their efforts

> into consideration. For instance I observe that my student Nurten highered her performance on multiplication table, she tried to learn and studied. She had no knowledge on multiplication operations at the beginning of the year but her efforts showed me that she studied. Therefore I will give a high grade for her in-class-performance (q155).

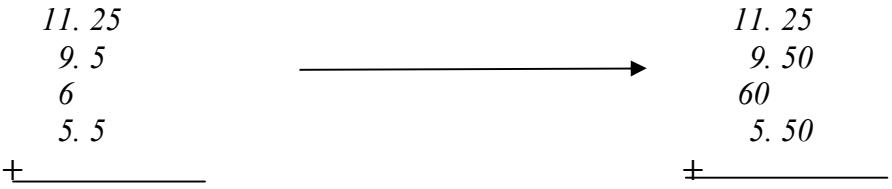
Thirdly, Ms Yılmaz used the assessment results for giving formative feedback to the students. According to the interview data she gave formative feedbacks during her informal assessment procedures. An example for her practice was observed after the ‘‘constructing a rectangle activity’’ on 09/05/2014. The activity is represented in Appendix E. In the activity the students were asked to determine whether rectangular shapes could be constructed with the given measures. In order to do the activity, the geometry sticks were given to them. On the other hand, it was observed that some of them made a common mistake in one of the items. The item asked the students ‘‘whether they can construct a rectangle with the line segments of 2 units, 2 units, and 3 units”. Some of the students acted as if there was another unit of 3 units. Therefore they thought that the units were 2 units, 2 units, 3 units, and 3 units. Then they wrote in the activity paper that the current units constructed a rectangle. At the end of the activity, Ms. Yılmaz gave formative feedback to the students about their common mistake orally. She read the current item and continued with the following words:

> *There are three length measures given. Some of you added another length measure and then constructed a rectangle by the sticks. That is wrong. In the item there are only three length measures.*

During the ‘‘constructing a rectangle activity’’ on 09/05/2014, Ms. Yılmaz also gave formative feedback about the usage of the geometry sticks. It can be seen in the representation in Appendix E that, in order to construct rectangular shapes, the students were asked to use the geometry sticks. However, it was observed on the video recordings that students were confused about the usage of the geometry sticks. Some of them counted the holes whereas others counted the segments between the holes. However they had difficulty in answering the items. Therefore Ms. Yılmaz gave formative feedback to the students about the wrong usage of the materials with the following words:

.....The length of the line segments are 2 units, 2 unit, and 3 units. (She took a stick and held it with her fingers). Some of you counted the holes. We are counting the segments between the holes, not the holes themselves. (Then she counted 3 units with the geometry stick).

Another example of her formative feedback was also realized on 11.04.2014 during the interview data of the "problem solving activity". In the problem there were two price lists for the equipment of two different puppet trademarks. By using the lists, students were asked to find the minimum cost of the equipment for constructing the cheapest puppet. The cost of the equipment was in decimal number form and integer form. In order to solve the problem, on the other hand, students had to add the decimal numbers and integers. During the activity, Ms. Yılmaz observed that some of the students made the following operation for the answer:



It can be seen in the operation that, in order to simplify the addition operation, the students tried to equalize the digits. Therefore they put "0" in the empty spaces of the fractional parts (11. 25; 9. 50; 5. 50). However they also put "0" in one of the integer part and turned 6 to 60. According to the interview data, when she realized the current mistake, Ms. Yılmaz made the following sentences as a formative feedback to the students:

...You need to check your solution. Can you put number 0 in the integer part? Are 6 and 60 the same?

Fourth of all, the interview data indicated that Ms. Yılmaz used informal assessment results, mostly the observational data, to prevent students from feeling anxious. She stated that there were two students in her classroom: Doruk and Derya. According to her informal assessment results, Doruk and Derya had weak background about fraction concept. For instance they could not differentiate the half and quarter in fractions. Moreover, she added that, when they were on the board they became anxious and refused to communicate with her. Ms. Yılmaz continued "They

became nervous when they could not solve the questions, so I was careful. For instance, I did not force them to come to the board for solving fraction problems". (q156).

Fifth; Ms. Yılmaz stated in the interviews that she used her classroom observation results to encourage students to study. In that manner she said that she gave homework to students according to their lack of knowledge. For instance she observed that, a student who had difficulty on multiplication operation studied harder by her additional homework. Moreover, she continued, the same student showed better performance on the 3rd paper-and-pencil exam. In detail, according to the interview data, the current student decided correctly whether the following items were true or false:

a) The opposite side lengths of a trapezoid are equal (F)
b) A square has three diagonals (F)
c) The sum of interior angles of a triangle is 360° (F)

Ms. Yılmaz explained the situation with the following words: "She improved her mathematics performance. I think that some of the students study harder if they get special encouragement". (q157).

Last of all; the interview data and document analysis pointed out that Ms. Yılmaz used assessment results to know students better. In that manner she tried to detect the fields of mathematics that the 5th grades were weak and tried to know students' personal distinctions. In other words she used the assessment results for making diagnostic decisions, too. According to the interview data, in order to identify students' weaknesses, she observed the students' mistakes in the assessment instruments. She thought that the students' mistakes were the main resources that showed their weaknesses. On the other hand, she stated that, project-studies and performance tasks were focused on unique topics, so they provided limited information about the students' strengths and weaknesses. "As a result of that", she continued, "I mostly used the results of my classroom observations and paper-and-pencil exams".

In the manner of knowing students better, Ms. Yılmaz stated that some of the students had weaknesses on fraction topic. She claimed that some of the students could not comprehend the logic of fractions. She continued with giving an example

from her classroom observations: “I asked them to compare $\frac{3}{4}$ and $\frac{7}{12}$. They would decide which one was bigger. Some of them said that $\frac{7}{12}$ is bigger than $\frac{3}{4}$ because 7 and 12 are bigger than 3 and 4.” (q158). “Therefore”, she added, “they made mistakes in comparing, equalizing, adding, or subtracting the fractions”.

The interview data indicated that Ms. Yılmaz observed students’ weakness on enlarging the fractions. After the “quiz activity”, also, she showed students’ activity papers as concrete examples of her inference. In one of the activity items, for example, it was asked the students to show an equivalent fraction to $\frac{3}{5}$. Figure 4.31 was an example of a student’s answer for showing equivalent fraction to $\frac{3}{5}$ in Ms. Yılmaz’s class:

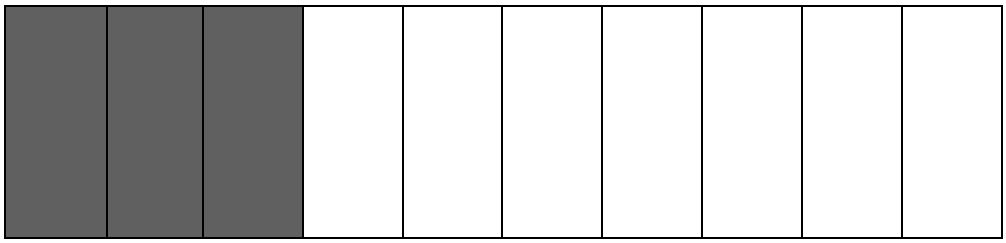


Figure 4.31: A student’s answer for showing equivalent fraction to $\frac{3}{5}$ in Ms. Yılmaz’s Class

It can be seen in the Figure 4.31 that, in order to find an equivalent fraction to $\frac{3}{5}$, the student wanted to enlarge the fraction. For instance, she multiplied the denominator by number 2. On the other hand, she did not multiply the numerator of the fraction by number 2. As a result of that, she found $\frac{3}{10}$ instead of $\frac{6}{10}$ and answered the item incorrectly. Thus, according to the Ms. Yılmaz’s previous classroom observations and the document analysis, it can be said that the owner of the answer in Figure 4.49 was weak on enlarging the fractions.

Another example that showed students’ weakness on enlarging the fractions was observed in the 1st paper-and-pencil exam, too. In the exam, Ms. Yılmaz asked students to rewrite following fractions in decreasing order:

$\frac{7}{18}, \frac{1}{3}, \frac{5}{6}, \frac{2}{9}$

According to the document analysis, most of the students tried to equalize the denominators firstly. However, in order to enlarge the fractions, some of the students did not multiply both the denominator and the numerator of a fraction with the same multiplier. An example solution that was made by a student was as follows:

$$\frac{7}{18}, \frac{1}{3}, \frac{5}{6}, \frac{2}{9} = \frac{7}{18}, \frac{1}{18}, \frac{5}{18}, \frac{2}{18}$$

$$(1)(6)(3)(2)$$

$$\frac{7}{18} > \frac{5}{18} > \frac{2}{18} > \frac{1}{18}$$

It can be seen in the answer above that the student had thought to equalize the denominators of the fractions before rewriting them in decreasing order. In that manner he determined number 18 as the common multiplier of the denominators. Then, in order to make the denominators 18, he multiplied each denominator by a different multiplier. On the other hand, he had not realized that the fractions changed when he multiplied only the denominators. Thus, according to Ms. Yılmaz and the document analysis, that 5th grade was weak on enlarging the fractions.

According to Ms. Yılmaz, in her classroom activities, some of the 5th grades were weak on making addition operations with decimal numbers, too. Her inference was also observed on the students' activity papers after the ''problem solving activity". The activity was practiced by Ms. Yılmaz on 11.04.2014 and was represented in Appendix E.

In the problem there were two price lists for the equipment of two different puppet trademarks. By using the lists, students were asked to find the minimum cost of the equipment for constructing the puppet. The lists of the two trademarks are listed in Table 4.4:

Table 4.4: The lists of the two trademarks listed in the ‘‘problem solving activity’’ (In Ms. Yılmaz’s Class)

Product	Price of Trademark A (Turkish Liras)	Price of Trademark B (Turkish Liras)
The puppet	20	26
Linden made puppet stem	7, 75	11,25
The dress kit for the puppet	4	9, 5
The dye kit for the puppet	3, 5	6
Equipment for pulling the wires of the puppet	3	5, 5

The following operation was a part of a wrong answer on that activity:

$$\begin{array}{r} 11.25 \\ 9.5 \\ 6 \\ 5.5 \\ \hline 1281 \end{array}$$

Such an operation was also observed in the 2nd paper-and-pencil exam, too. In one of the items the following operation was asked to students:

47.8+6.28+412.09=?

The following operation was a part of a wrong answer on the exam:

$$\begin{array}{r} 47.8 \\ 6.28 \\ 412.09 \\ \hline 42305 \end{array}$$

It can be seen in both of the operations above that the students were not careful on writing the integer part one under another or the fractional part one under another. As a result of that they could not determine the place of the point sign and could not find the correct answer. Ms. Yılmaz stated that she observed the same mistake in her previous informal assessment practices. She went on to say that, the students who made such mistakes in the classroom practices were the ones who made the addition operation above. Then, as the interview data and document analysis showed, the 5th grades who gave such wrong answers in Ms. Yılmaz's classes were weak on doing addition operations with decimal numbers.

The interview data and document analysis also revealed that Ms. Yılmaz determined students' weakness on problem solving ability. She came to this conclusion with the results of the 2nd paper-and-pencil exam. In the exam the following problem was asked to the students:

> *Anıl has 800 TL (Turkish Liras) salary. He paid his bills with 10 % of that salary. How much money is left?*

According to the document analysis, most of the 5th grades who responded the problem in Ms. Yılmaz's classes did the following operations:

$$800 \div 100 = 8$$
$$8 \times 10 = 80$$

It can be seen in the answer above that students were in the correct way but they did not find the money left ($800 - 80 = 720$ TL). In other words, although they used a correct solution method, they could not solve the problem. In that manner Ms. Yılmaz claimed that a student who did the operations above should found the answer because their solution method was correct. She went on to say that, the students had weakness on problem solving because they were not careful about reading a problem efficiently.

According to the interview data, Ms. Yılmaz determined that most of the students were weak on transferring a length measure to the higher length units, too. She came to this conclusion with the results of the 3rd paper-and-pencil exam and her classroom observations. For instance it was seen in the students' exam papers that, some of them passed the following sub-items whereas some of them gave incorrect answers to them.

316 m = ...dam
720 cm = ...m
3219 mm = ...dm
65 dam = ...km
9 cm =.....dam

For instance they wrote that 720 cm = 72 m or 65 dam = 6500 km. According to Ms. Yılmaz and the document data, the students who made such mistakes were weak on transferring a length measure to the higher length units.

To sum up; Ms. Yılmaz used assessment results in order to improve students' learning of mathematics by monitoring the their progress; assigning their overall grades for the whole year; giving formative feedback to them; preventing them from feeling anxious; encouraging them to study; and identifying areas of strengths and weaknesses.

4.3.3 Ms. Yılmaz's Views

In this section Ms. Yılmaz's views about the students' learning of mathematics, factors affecting teaching mathematics, and assessing students' learning of mathematics will be described. The results will be used to answer the following research questions:

1. To what extent are the participating mathematics teachers' classroom assessment procedures related to their views about the students' learning of mathematics, about the factors affecting teaching mathematics, and about assessing students' learning of mathematics?
2. What are the discrepancies between the participating mathematics teachers' views about assessing the 5th grades' learning of mathematics and their perceived classroom assessment practices?

4.3.3.1 Ms. Yılmaz's Views about Students' Learning of Mathematics

Ms. Yılmaz claimed that 5th grade students learned mathematics mostly by questioning. She explained her observations with the following words:

> When I teach a topic, the some of the students question the event. For instance, nowadays, I have been teaching simplification topic in fractions. In that manner, they question any fraction I write on the board. For instance, they ask whether they can simplify the fraction. Then, in order to make the simplification, they seek for the common divisor by asking questions. I am glad for that behavior because the students who ask questions show better performances in mathematics. They are the high-achievers. The students who do not ask questions, on the other hand, learn only the things I teach. (q159).

Ms. Yılmaz argued on the factors that affected the 5th grades' learning of mathematics, too. For instance, she stated that students' natural ability about mathematics was important in learning mathematics. In that manner, according to the interview data, she observed that some of the students could understand mathematics quicker than their classmates. She did not think that the students who had ability about learning mathematics were more clever than the other students but she thought that the students who had such an ability made more logical comments in the mathematics lessons.

In addition to natural ability, Ms. Yılmaz thought that background knowledge was needed for achieving mathematics. During the interviews she also emphasized the importance of basic mathematics knowledge for becoming good at mathematics. Her words were as follows:

> For instance there are 5th grades who do not know multiplication table although they had to learn it in primary school. Therefore, they cannot do simplification or enlarging operations in fraction topic. Moreover they cannot do multiplication operations with 7-digit or 8-digit numbers. As a result of these, they get low marks from the exams. (q160).

Ms. Yılmaz thought that having strong background knowledge also made students more creative. She said that such students tried different ways in solving mathematical problems and were not contended with the teachers' lectures. She also thought that, they improved themselves academically easily since they had strong background in mathematics.

According to Ms. Yılmaz, having background knowledge on classroom materials also affected students' learning of mathematics. She asserted that using materials in mathematics classrooms would be sufficient if the students had background knowledge about them. In that manner she stated that if the students had

background knowledge about the software, or mathematics materials such as algebra tiles, geometry sticks, fraction bars...etc., they could use them more efficiently in upper grades. On the other hand, she continued, if the students were not familiar with such materials, some problems occurred. In order to clarify her views, she gave an example from her previous experiences:

> I mostly use direct instruction in my classes. Therefore the 7th grades got confused when I used algebra tiles. They were not familiar with them, so they thought that material was another concept to learn. They could not relate the materials with the operations they had to do and could not find the unknowns in the equations. As a result of that I had to reteach the current topic. (q161).

Moreover Ms. Yılmaz argued that students' enthusiasm affected their study habits. According to her, students liked to study mathematics if they liked their mathematics teachers. She advocated the reverse situation, too. In other words, she also thought that a student who liked her/his mathematics teacher, also liked to study mathematics. She explained her thoughts with her observations about the 5th grades:

> In the past they were afraid of mathematics and they did not like to study mathematics. However my 5th grades are not like that. I taught mathematics to 5th grades last year, too. They were not afraid of mathematics, either. I think that is because of the age factor. We are young and I think that students like to learn mathematics from younger teachers. Maybe they are afraid of the elder teachers since they are strict. (q162*)*.

Ms. Yılmaz also thought that the enthusiasm and students' success were interrelated. In that manner she stated that, the students did not like mathematics if they could not achieve it. "As a result of that", she continued, "they got low grades and got reactions from their teachers". She stated the followings:

> The teacher tries to learn the reasons of the low grades and asks related questions to the individual student. For instance s/he asks her/him the reason of the low grade, whether there is a problem else, etc. Then the student gives up liking the course. (q163).

In order to clarify her thoughts about the enthusiasm and achievement relation, she gave the results of the 1st paper-and-pencil exam as an example. In the current exam most of the items were related with ordering the fractions. One of them, for instance, as follows:

Rewrite the following fractions in decreasing order

$\frac{7}{18}, \frac{1}{3}, \frac{5}{6}, \frac{2}{9}$

The document analysis showed that some of the students gave the following respond to the item above:

$$\frac{7}{18} > \frac{5}{18} > \frac{2}{18} > \frac{1}{18}$$

It can be seen in the respond above that, the students could not answer the item correctly because they did not enlarge the fractions correctly. On one hand, they found a suitable common denominator. On the other hand, they did not multiply both the numerators and the denominators by the same multiplier that she determined for each fraction separately. Ms. Yılmaz stated that she was expecting such a result because the students did not like the fraction unit in general. "All of my 5th grades disliked the fractions", she said and continued, "during the lectures they always wondered the time of the last lecture of the unit and they complained about the difficulties in learning it".

Ms. Yılmaz also acknowledged the importance of the parents' education on the students' mathematics learning. She supported her thoughts within the context of the current school. She said that, in the current school, uneducated and illiterate families were among some of these problems. She thought that such family characteristics affected students' learning habits negatively. Thus, she claimed that parents' education was very important for students' learning, too.

Last of all; Ms. Yılmaz emphasized the importance of regular practice in mathematics learning. She asserted that some students could not achieve in mathematics because they did not make regular repetition. Even if they could understand mathematics and had a mathematical background; they did not practice constantly. Thus, they were not successful in mathematics. She explained her thoughts during the post-activity interview of the 3rd paper-and-pencil exam. A part of the transcript of her thoughts was as follows: ''the results of the exam showed that they do not make regular repetitions. For instance, I observed that they had forgotten the previous topics and had problems on length measures" (q164).

To sum up; According to Ms. Yılmaz, although the 5th grades learned by questioning, their natural ability about mathematics, background knowledge, enthusiasm, the parents' education and regular practice in mathematics affected their learning of mathematics.

4.3.3.2 Ms. Yılmaz's Views about the Factors Affecting Teaching Mathematics

First of all; Ms. Yılmaz said that she could not use some teaching methods because of the time limitation. She thought that classroom materials and group works would be efficient on her teaching processes if she had enough time for them. She clarified her thoughts with the followings:

> Because of time limitations, it would be hard to follow the annual plan. Therefore I cannot implement all activities and cannot be student-centered in my lectures. I use direct instruction. In order to observe the students, on the other hand, I implement quizzes or I write questions on the board and ask students to come to the board for solving them. (q165).

She also thought that, the time limitation was also an obstacle for teaching the logic of the mathematical concepts. For instance, she said that she could not concern with each student's inadequacy because of the limited time. "Therefore", she continued, "mathematics becomes difficult for them. They do not understand the source of the knowledge since I could not use student-centered methods in my teachings".

Second of all; Ms. Yılmaz thought that her teaching was more efficient in geometry topics because of her own enthusiasms towards geometry. In that manner she thought that, because of her enthusiasm towards geometry, she might be more effective in teaching the geometry topics. "For instance I do not like fractions", she continued, "that would be the reason of the students' low-achievements in fraction unit. I had taught the topic unwillingly, so I blame myself for their failure of fractions". (q166).

Third of all; Ms. Yılmaz stated that her education background affected her teaching methods. She explained her views with the following sentences: "We are educated with direct instruction, so we are using direct instruction in the lessons. For

instance I did not construct problems in my previous education, so I cannot teach the way of constructing a problem efficiently". (q167).

Fourth; Ms. Yılmaz stated her views about the effect of classroom environment on teaching mathematics. According to her, students' seating arrangement and their behaviors affected the teaching process. She said that if the seating arrangement was formed carefully, the sessions were more productive. Moreover, she observed that, if the classroom management was efficient, the teaching process was also successful.

Fifth of all; Ms. Yılmaz stressed that students' Turkish language skills affected her teaching of mathematical concepts. According to her, adequacy in Turkish language skills positively affected the communication between her and the 5th grades. She gave an example from one of her classroom and said that she had problem on teaching what ''equal'' meant because of students' inadequate skills in Turkish language. She stated that she had to teach "equality concept" but that was hard for her since the students could not comprehend the meaning in Turkish.

Last of all; Ms. Yılmaz had concerns about the process of 4+4+4 education system, too. On one hand, she thought that the 5th grades' mathematics textbook was efficient. On the other hand, she claimed that the 5th grades were too young to be in middle school. According to her, students were expecting to continue with their primary school, but they had to start with the middle school, unpreparedly. As a result of this, she said, both the teachers and the students could not become familiar with the new system. She advocated her thoughts with the following sentences:

> They behave as if they are still in primary school. For instance they had only one teacher in primary school but in the middle school they have to get used to working with more than one teacher. Moreover, they had 4 hours mathematics in a week but they have 5 hours now. In the past, when the middle school started by being a 6th grade, students were ready for such changes. Their primary school teachers had time to prepare them for becoming 6th grades. For the new system, on the other hand, they had to start with the middle school unpreparedly, so I think that the students could not handle this unexpected change. They keep on asking primary school students' questions. For instance they ask whether they could throw their trash into the trash box, whether they would use subtitles, etc. (q168).

To sum up; Ms. Yılmaz claimed that the time limitation, the students' weaknesses on Turkish language skills, and the adaptation problems of the 5th grades

influenced her teaching efficiency in negative way. She also stated that, the classroom environment, her own enthusiasm towards the topic she taught and her education background were effective on her teaching of mathematics.

4.3.3.3 Ms. Yılmaz's Views about Assessing Students' Learning of Mathematics

First of all; it can be said that Ms. Yılmaz is a teacher who thinks there is an order of importance between assessment methods. In that manner she mostly relies on classroom observations and paper-and-pencil exam results in assessing students' learning of mathematics.

Second of all; she told her views about the assessment methods that she used. According to her, in order to assess students' learning of mathematics formally, paper-and-pencil exams are more important than the performance-tasks and project studies. **"**Because the projects and the performance-tasks give limited data", she said and continued "However I can monitor my teaching efficiency by the paper-and-pencil exams" (q169). She explained her thoughts with the following words:

> During the paper-and-pencil exams, students cannot get a clue for the correct answer, so they have to think many directions for finding the solutions. Therefore, I can monitor how s/he interpreted my teachings by checking her/his operations on the exam paper. (q170).

Ms. Yılmaz also thought that, the common aim of the projects and performance tasks was encouraging self-study and supporting creativity. On the other hand, she claimed that, project studies were more special, so they should be sophisticated. However her thoughts about the projects or performance-tasks, which were prepared in her teaching career, were not as positive as her thoughts about the classroom observations and paper-and-pencil exams. Although she thought that performance-tasks were concrete materials to grade students' performances, she thought that they did not have too much effect on students' achievement actually. Besides it was indicated with the interview data that, Ms. Yılmaz implemented performance-tasks and projects as if they were obligations.

Ms. Yılmaz affirmed her views about the performance assessment, too. She thought that, assessing a student's performance should be done by all the activities

that a student performed in mathematics lessons. She explained her thoughts with the following sentences:

> All the things that a student does for mathematics lessons are referred to mathematics performance. For instance, I think that performance assessment can be done by the checking the graded studies or by observing the students' behaviors in the classroom. It also depends on whether the students volunteer for answering the questions, whether they follow the lessons carefully or not, whether they make comments during the lectures, or whether they keep regular records in their notebooks. In other words, assessing their attitudes towards mathematics is performance assessment, so in order to assess 5th grades' performances I pay attention to all these practices. (q171).

Although she did not practice all of them, Ms. Yılmaz made comments on the assessment methods that were offered in the mathematics curriculum. For instance, according to her, student portfolios were useful resources for the students. According to her, students could review the topics with the materials in their portfolios and such an activity encouraged them to study. She also thought that, if she had used portfolios in her assessment practices, they would have been the most concrete evidences of the students' performances.

In addition to portfolios she stated her views about the concept-maps, constructed-grids, journals, drama studies, posters, and presentations. She thought that concept-maps and posters gave students the opportunity to summarize their learning. In that sense, she remarked that the concept maps could be useful in teaching triangles and polygons since the students could group the concepts and distinguish them clearly by using them. She also thought that drama studies should help students for acting a situation to a group of people. For constructed-grid, on the other hand, Ms. Yılmaz did not have any idea. Besides, according to her, asking students to keep journals was a useless method for assessing students' learning of mathematics. Last of all, she stated that, presentations motivated students for real life situations since they could express themselves by their own words during these activities.

Third of all; Ms. Yılmaz affirmed comments about the contribution of the assessment results to the students' learning of mathematics. In that sense she argued that paper-and-pencil exams gave feedback to both the teachers and their students. Moreover, she advocated that the teachers could understand their teaching

effectiveness and could repeat or teach a topic by the help of assessment results. She also claimed that the teachers could understand students' strengths and weaknesses by the help of assessment results and they could make adjustments for their further assessment practices. Students, also, could study regularly to make up for their lack of knowledge in mathematics.

Fourth of all; Ms. Yılmaz discussed the factors that affected her assessment of the students' learning of mathematics. She mostly complained about the time-limitation and crowded classrooms. She thought that, for an assessment process, time limitation and the workload of 5th grades' curriculum were effective. In that sense she stated that, because of time-limitation she could not implement assessment methods such as portfolios, presentations, and posters. According to the field notes, for instance, the 5th grades presented their performance-tasks in the first semester but they did not do any presentation for their second semester tasks. Ms. Yılmaz explained this difference with the following sentences:

> They will not make any presentation for their performance-tasks or projects in this semester because we spent too much time for the fraction and length measurement topics. If they make presentations, I cannot teach all the topics in the curriculum (q172).

Time limitation affected Ms. Solmaz in using assessment results, too. For instance after the first paper-and-pencil exam, she realized that some of the students did not understand ordering the fractions. They could not order the fractions with different denominators correctly. According to Ms. Yılmaz, this was a big misunderstanding, so she repeated the topic. However she remarked that she should teach the topic again because the problem would affect the students' learnings of decimal numbers, too. On the other hand, she continued, if she would have retaught the topic, she would stay behind the annual plan. She continued with admitting that "Therefore I could not teach the topic again".

The interview data also indicated that Ms. Yılmaz could not assign various projects or performance-tasks to the students because of the time-limitation and crowded classrooms. She stated that she wanted to assign the tasks and the projects according to the students' individual differences but time-limitation and the class sizes prevented her from doing that. She said that, in such a practice she would need much time to grade the different studies and to give feedback to each student.

She also claimed that classroom environment affected the assessment process. For instance she analyzed in some of the classrooms that, organizing goup works or using materials were not possible because of the students' incompatible behaviors and such classes could not be managed during their works. She continued with saying that, her observations affected her preferences for the classroom activities and she did not prefer to ask the students to study in groups or use materials. After the "addition of fractions" and "constructing a rectangle" activities, also, she explained her class preference with the following sentences: "There should be commotion in one of my 5th grade classes if I implemented them these two activities. They could not be organized, so I did not implement the current activities in that class" (q173).

In addition to time-limitation, crowded classrooms, and classroom environment, Ms. Yılmaz mentioned the effects of her education in mathematics on her assessment activities. In that manner she thought that her previous education in mathematics affected her approaches towards mathematics. "My teachers put big emphasis on the multiplication operation during my primary school, middle school, and high school education" she said and continued with saying that such a background was effective on her assessment process. For instance, she stated that, she expected students to be good at multiplication operation and as a result of that, during her classroom activities, she frequently asked the low-achievers to do multiplication operations.

In the manner of practicing performance tasks, on the other hand, Ms. Yılmaz claimed that there were lots of factors that prevented the tasks from being effective. According to her, these factors were her unnecessary interference in the assessment process and the education system in Turkey. In order to explain her thoughts about the negative effects of her interference, for instance, she used the following sentences:

> I interfere in the students' tasks. For instance, I insist them on using the colorful and decorative materials because I do not like undecorated tasks. Therefore I explain them everything one by one in detail and I direct them. As a result of that, being creative becomes impossible for them. (q174).

Ms. Yılmaz also stated her views about the effect of the education system on the assessment process. According to her the aims of the project-studies and the

performance tasks were not compatible with the actual education in Turkish classrooms. She continued with the following words:

> We need to teach all the topics of the curriculum, so we are fast in teaching mathematics. In that manner we mostly use direct instruction and prepare all grades for multiple-choice items because sooner or later they will have a summative-test. However, such a system prevents students from comprehending the logic of the concepts and they do not want to deal with the performance-tasks and the project studies. Therefore, project studies and performance-tasks seem like redundancy for both the teachers and the students. (q175).

The interview data showed that Ms. Yılmaz's views about the suitability of an assessment method affected her assessment practices, too. She thought that some methods were not suitable for mathematics or more suitable for other fields. For instance she put drama-study in this category and continued with the following words: ''I think that drama-study is not suitable for mathematics. It is more suitable for history, geography, or language lessons because the students act a situation during the drama-studies" (q176).

At the same time Ms. Yılmaz asserted that 5th grades' maturity level was an obstacle on assessing their learning of mathematics. For instance, she claimed that if she would have wanted them to prepare a project-study which related mathematics to other fields, only a few students would complete their works. Therefore, she continued, she did not ask them to prepare complicated projects.

Providing honesty was also a problem on Ms. Kaya's assessment practices. She stated that she had problems in assessing project studies because she was not sure whether all the steps of the studies were completed by the students. She admitted that, she did not rely on the results of the project studies since she had suspicions about the parents' interferences in them.

In conclusion; Ms. Yılmaz's views showed that, in order to assess students' learning of mathematics, she placed the much emphasis on the results of the paper-and-pencil exams and her observations in the lessons. According to her, projects and performance-tasks could encourage self-study and support creativity, if they were used efficiently. She also taught that performance assessment should be done by all the activities that a student performed for mathematics lessons. Although she had positive ideas about writing journals, presentations, posters, concept-maps, drama

studies and student portfolios, she did not prefer to use them. Besides, she had no idea about the constructed-grids. She explained her reasons by the limitation of time and the crowded classrooms. Moreover, as they were affecting the assessment process, she disputed the negative contributions of the classroom environment, her own education in mathematics, her inference in the students' studies, the education system, the suitability of the assessment methods, the maturity level of the students, and the difficulties to provide honesty.

4.3.4 Summary of Ms. Yılmaz's Views and Assessment Implementations

Ms. Yılmaz implemented both formal and informal assessments in her classes. For informal assessment she used observational data, whole-class worked examples, quizzes, and homework. For formal assessments, on the other hand, she used paper-and-pencil exams, project-studies, and performance-tasks. In the scoring part of the assessment procedure, on the other hand, she prepared answer keys and scoring-guides. In developing the scoring-guides, she was depended on the decisions of mathematics department.

She used assessment results for several purposes: to make decisions on repeating a topic, to teach a topic, to understand her teaching effectiveness, to make adjustments for her further assessments, to monitor students' progress, assigning students' overall grades at the end of the year, to give formative feedback to students, to prevent students from feeling anxious, encouraging students to study, and for making diagnostic decisions about the areas of the students' strengths and weaknesses.

Ms. Yılmaz stated her views about the 5^{th} grades' learning of mathematics. According to her observations, 5^{th} grades learned by questioning and there were some factors which were effective on their learning of mathematics. She stated that the students' natural ability and enthusiasm about mathematics; their background knowledge; their parents' education; and regular practice in mathematics affected their learning of mathematics.

Ms. Yılmaz did not place much emphasis on performance-tasks or project-studies because she thought that they provided limited data and caused cheating

probability. According to her, in order to assess students' learning of mathematics, paper-and-pencil exams, participating in the class, and students' behaviors were more important than the results of the performance-tasks and project studies.

Last of all; Ms. Yılmaz stated that 4+4+4 curriculum had negative effects on teaching and learning mathematics in 5th grades because of the students' ages. Although she agreed that activities such as performance-tasks and projects might encourage self-study and creativity among students, her complaints were mostly about these two assessment methods. It was understood that she implemented them because of the legal obligation. She thought that she could not implement these methods effectively because of her redundant inference in the students' studies, the students' maturity levels, and difficulty in preventing cheating, the education system, and time limitation.

4.4 Cross-Case Analysis Results

This section gives an overall picture of the findings of the dissertation by bringing together the major findings from the individual teachers. With the help of the cross-case analysis, the research questions of the study are answered. Cross-case analysis can generate the explanations systematically (Miles & Huberman, 1994). Therefore tables and figures will be used for a clear representation of the key themes that represented the cross-case analysis of the three individual cases.

4.4.1 Findings of the Research Question 1

In this section, the findings provided by the cross-case analysis will be explained under two sub-sections: informal assessment procedures and formal assessment procedures of the participating teachers. With the help of the results, the answer to the first research question is examined:

"What assessment procedures do the participating mathematics teachers use in the 5th grade classrooms?"

4.4.1.1 Informal Classroom Assessment Procedures of the Participating Teachers

All three teachers used informal and formal assessment procedures in their 5th grade classrooms. The informal assessment practices were not the same for all participants. It was indicated by the overall data that, although they had common practices, they had individual preferences for the informal assessment procedures. In Table 4.5, the similarities and differences of the participating teachers' informal assessment practices are represented:

Table 4.5 The participants' informal assessment practices

	Ms. Kaya	Ms. Solmaz	Ms. Yılmaz
Classroom Observations	X	X	X
Whole-class worked examples	X	X	X
Quiz			X
Homework		X	X
Students' discussions with each other	X		
Mathematics journals		X	

It can be seen in Table 4.5 that, during their informal assessment practices, all three participants used classroom observations, whole-class worked examples, and the informal assessment activities offered by the researcher. The table also showed that Ms. Yılmaz and Ms. Solmaz used students' homework for informal assessment, too. Ms. Yılmaz also used quizzes as an informal assessment whereas Ms. Solmaz provided students to keep mathematics journals. Student discussions with each other were only used by Ms. Kaya.

In practicing the informal assessments, there were differences on the three participants' procedures. In Table 4.6, the cross-case analysis results which show their informal assessment procedures are summarized:

Table 4.6 The participants' procedures during their informal assessments

Ms. Kaya	Ms. Solmaz	Ms. Yılmaz
Walked around the classroom	Walked around the classroom	Walked around the classroom
Used constructed-response items	Used constructed-response items	Used constructed-response items and multiple-choice type items
Interfered in the students' studies	Interfered in the students' studies	Interfered in the students' studies
Prepared the items herself or got from the internet before the classroom sessions	Did not prepare the items before the classroom sessions	Prepared the items herself or got from the internet before the classroom sessions
Did not keep written record for the classroom observations	Did not keep written record for the classroom observations	Did not keep written records for the classroom observations
Formed groups		Formed groups
Payed attention to the students' practices at the board		Payed attention to the students' practices at the board
Solved the unanswered items at the end of the activity		
Followed students' group discussions		

Table 4.6 (cont'd) The participants' procedures during their informal assessments

Ms. Kaya	Ms. Solmaz	Ms. Yılmaz
Did not determine a proportion about the contribution of the informal assessment results on the overall grades	Did not determine a proportion about the contribution of the informal assessment results on the overall grades	Did not determine a proportion about the contribution of the informal assessment results on the overall grades
	Gave homework from other textbooks	Prepared worksheets
In touch with the parents	In touch with the parents	
	Charged 3 students for checking the homework regularly	She checked homework regularly
	Kept written records for the journals	
	Students summarized the mathematics lectures daily on their journals	

According to the cross-case analysis results in Table 4.6, all three participants made classroom observations by walking around the classroom during the activities. Moreover, all of them asked constructed-response items during their whole-class worked examples. On the other hand, all of them interfered in the students' answers during the informal classroom assessments and did not determine a proportion about the contribution of the informal assessment results on the overall grades.

It can also be seen in the table above that, two of the participants, Ms. Yılmaz and Ms. Kaya emphasized on the students' practices at the board during their informal assessment processes. Moreover they prepared the items for the classroom sessions themselves or got them from the internet before the classroom sessions. They also used group works in their informal assessment practices. One of the participants, Ms. Solmaz, on the other hand, did not prepare the items before her classes and did not form groups during her informal assessment practices.

According to the Table 4.6, one of the participants, Ms. Yılmaz, used multiple-choice type items during her informal assessments. Moreover, two of the participants, Ms. Kaya and Ms. Solmaz, did not keep written records for their classroom observations but they were in touch with the parents about their informal assessment practices.

In Table 4.6, it can also be seen that two of the participants, Ms. Yılmaz and Ms. Solmaz gave homework different from the textbook exercises. In order to check the homework, on the other hand, they showed different approaches. Ms. Yılmaz preferred to check homework individually whereas Ms. Solmaz charged three students for that work.

Last of all, according to the Table 4.6, one of the teachers, Ms. Kaya, followed the students' group discussions and solved the unanswered activity items on the board. Ms. Solmaz, on the other hand, practiced mathematics journals by providing students to summarize the mathematics lectures daily. She also kept written records after she checked the mathematics journals.

4.4.1.2 Formal Classroom Assessment Procedures of the Participating Teachers

In order to carry on formal assessment, all of the participants used paper-and-pencil exams, project-studies, and performance tasks. Moreover, they all used scoring-guides or answer keys for scoring the students' formal assessments. Firstly, in Table 4.7, the key findings of the cross-case analysis about the participating teachers' paper-and-pencil exam procedures will be represented:

Table 4.7 The participants' paper-and-pencil exam procedures

Ms. Kaya	**Ms. Solmaz**	**Ms. Yılmaz**
Implemented three and announced one week before	Implemented three and announced one week before	Implemented three and announced one week before
Prepared the items herself (except the common one)	Prepared the items herself (except the common one)	Prepared the items herself (except the common one)
Used internet and textbook for the items	Used textbook and source books for the items	Used internet, textbook, and source books for the items
Did not write time-interval on the papers	Did not write time-interval on the papers	Did not write time-interval on the papers
Used multiple-choice, fill-in-the-blanks, and constructed-response type items	Used multiple-choice, fill-in-the-blanks, and constructed-response type items	Used multiple-choice, fill-in-the-blanks, constructed-response, and true-false type items
Prepared answer-keys before the exams	Prepared answer-keys before the exams	Prepared answer-keys before the exams
Announced the results in 10 workdays	Announced the results in 10 workdays	Announced the results in 10 workdays

Table 4.7 (cont'd) The participants' paper-and-pencil exam procedures

Ms. Kaya	**Ms. Solmaz**	**Ms. Yılmaz**
Gave a report to the mathematics department for the common paper-and-pencil exams	Gave a report to the mathematics department for the common paper-and-pencil exams	Gave a report to the mathematics department for the common paper-and-pencil exams
Let students to check their papers with the keys	Did not let students to check their papers In touch with parents	Let students to check their papers with the keys

The cross-case analysis results that were represented in the Table 4.7 showed that, for most of the steps, the participant teachers used common procedures for implementing the paper-and-pencil exams. It can be best seen in Table 4.7 that, although they prepared the paper-and-pencil exams separately, the participating teachers used internet and 5th grades' textbooks for preparing the items. Moreover, all of them used multiple-choice, fill-in-the-blanks, and constructed-response type items in their exams. All of the participants announced the date of the exams one week before, prepared answer-keys before the implementations, and announced the results to the students in 10 workdays. On the other hand, two of the participants Ms. Kaya and Ms. Yılmaz let students to check their papers with the answer keys, too.

Second of all, the cross-case analysis of the participants' performance-task procedures showed that, the teachers followed different ways in some of the steps. In Table 4.8, the cross-case analysis results of the participants' performance-task procedures are represented:

Table 4.8 The participants' performance-task procedures

Ms. Kaya	Ms. Solmaz	Ms. Yılmaz
Implemented one	Implemented one	Implemented one
Announced one week before	Announced three weeks before	Announced ten days before
Adapted a scoring-guide from the internet	Adapted a scoring-guide from the internet	Adapted a scoring-guide from the internet
Took mathematics department decisions into consideration for the criteria and task context	Took mathematics department decisions into consideration for the criteria	Took mathematics department decisions into consideration for the criteria
Announced the scoring-guide and explained orally	Announced the scoring-guide and explained orally	Announced the scoring-guide and explained orally
Did not deliver written guidelines, wrote the instructions on the board	Did not deliver written guidelines, wrote the instructions on the board	Did not deliver written guidelines, wrote the instructions on the board
Did not determine any criteria for scoring mathematical issues	Did not determine any criteria for scoring mathematical issues	Did not determine any criteria for scoring mathematical issues
Group work (She determined the members)	Group or individual works	Individual works

Table 4.8 (cont'd) The participants' performance-task procedures

Ms. Kaya	Ms Solmaz	Ms Yılmaz
Scores for the incomplete or completely wrong answers were not determined (was not a rubric)	Scores for the incomplete or completely wrong answers were determined	Scores for the incomplete or completely wrong answers were determined
Used criteria for scoring Turkish language skills	Used criteria for scoring Turkish language skills	Used criteria for scoring Turkish language skills
Students used pencil, construction paper, scissors, and a carton paper	Students used pencil, scissors, and a carton paper	Students used pencil and paper
All steps were carried out in the classroom	All steps were carried out at home	All steps were carried out at home
The task was about the addition and subtraction operation in fractions	The task was about modeling fractions and representing them in their decimal and percentage forms	The task was about explaining the properties of the quadrilaterals
Interfered in students' studies	Did not interfere in students' studies	Interfered in students' studies
Announced the results in 10 workdays	Announced the results in 10 workdays	Announced the results in 10 workdays
Let students for checking Walked around the classroom and kept written records	Did not let students for checking	Let students for checking

It can be seen in Table 4.8 that all of the participants implemented one performance task and adapted the scoring-guides for the tasks from the internet sources. In order to prepare the criteria for the scoring-guides they took the mathematics department's decisions into consideration and all of them shared the scoring-guides with the students during the assignment step. In the scoring guides, no

criteria were used for assessing the students' mathematics skills directly. Besides, all of the participants' scoring-guides involved criteria for assessing students' Turkish language skills. Moreover, none of the participants gave written copies of the guidelines. The needs for completing the tasks, on the other hand, were easy to reach or buy. The materials were pencils, scissors, carton papers, etc. Last of all, all the participants announced the students' performance-task grades in 10 workdays.

It can also be seen in Table 4.8 that the participants' performance-task implementation procedures showed some differences. For instance, only one of the teachers, Ms. Kaya, implemented all the steps of the task in the classroom. Group works were also observed in only the Ms. Kaya's and Ms. Solmaz's 5^{th} grade classes. The tasks and the time-interval of the tasks were all different in each of the participants' classrooms.

The cross-case analysis showed that two of the participants, Ms. Solmaz and Ms. Yılmaz determined the points of the incomplete or partially complete criteria on the scoring-guides. Ms. Kaya also interfered in the students' tasks during their works. After the announcement of the results, on the other hand, Ms. Kaya and Ms. Yılmaz let the students check their tasks.

Third of all, the cross-case analysis of the participants' procedures for implementing the project-studies was done. The results are represented in Table 4.9:

Table 4.9 The participants' project-study procedures

Ms. Kaya	Ms. Solmaz	Ms. Yılmaz
Gave to the willing individual students	Gave to the willing individual students or groups	Gave to the willing individual students
Assigned in December, collected in April	Assigned in December, collected in April	Assigned in December, collected in April
Gave topic along with the mathematics department's offers	Did not give topic along with the mathematics department's offers	Did not give topic along with the mathematics department' offers
The study was about the polygons	The study was about the prisms	The study was about the prisms
Taught the topic before the study	Did not teach the topic before the study	Did not teach the topic before the study
Delivered written guidelines	Delivered written guidelines	Delivered written guidelines
Lack of instruction about the equipment needed (in the guidelines)	Lack of instruction about the equipment needed (in the guidelines)	Lack of instruction about the equipment needed (in the guidelines)
Took mathematics department decisions into consideration for the criteria	Took mathematics department decisions into consideration for the criteria	Took mathematics department decisions into consideration for the criteria

Table 4.9 (cont'd) The participants' project-study procedures

Ms. Kaya	Ms. Solmaz	Ms. Yılmaz
Scores for the incomplete or completely wrong answers were not determined (was not a rubric)	Scores for the incomplete answers were determined but did not specialized (was not properly a rubric)	Scores for the incomplete answers were determined but did not specialized (was not properly a rubric)
Put emphasis on scoring Turkish language skills but did not determine any criteria for scoring mathematical skills	Put emphasis on scoring Turkish language skills but did not determine any criteria for scoring mathematical skills	Put emphasis on scoring Turkish language skills but did not determine any criteria for scoring mathematical skills
Announced the results in 10 workdays	Announced the results in 10 workdays	Announced the results in 10 workdays
Let students for checking	Did not let students for checking	Let students for checking

It can be seen in Table 4.9 that, all the participants gave projects to willing students in December and collected the projects in April. Then they all announced the project grades in 10 workdays. All the studies were about geometry and the copies of the guidelines were given to the students by the participants. On the other hand, the participants did not determine the equipment needed for completing the projects. All the participants used mathematics department's offers when they decided on the criteria of the scoring-guides. In all of the participants' project-scoring-guides, there were criteria on scoring Turkish language skills but there was not a criterion for scoring mathematical skills. Moreover, the scoring-guides of the participants did not include proper information about the partially correct or incomplete answers of the students.

Table 4.9 represented the differences in the participants' project-study procedures, too. For instance, the mathematics department's offers about the project topics were not used by Ms. Solmaz and Ms. Yılmaz. They gave the projects about the prism topic. It was their preference. Moreover, they taught the related topic after

the students' submissions. Ms. Kaya, on the other hand, gave a topic along with the mathematics department's offers.

4.4.2 Findings of the Research Question 2

According to the overall data, all of the participating teachers practiced formal assessments for their summative purposes. For formative purpose, on the other hand, all of them practiced both the formal and informal assessments. In this section, by the help of the cross-case analysis, how the participating mathematics teachers' informal and formal assessment practices were related with their use of assessment results will be clarified. The results are used to answer the second research question:

"In what way are the participating mathematics teachers' formal and informal assessments related with their use of assessment results in 5^{th} grade classrooms?"

The cross-case analysis revealed that all of the participants used informal assessment results for repeating a topic. For instance Ms. Solmaz used the results of her classroom observations (informal) for repeating the addition operation with decimal numbers. Another participant, Ms. Yılmaz, also used the results of the whole-class worked examples (informal) for repeating to equalize the denominators. Ms. Kaya used both the informal and the formal assessment results in order to repeat a topic. For instance, with the help of her whole-class worked examples (informal) and the paper-and-pencil exams (formal), she repeated the fraction comparisons and length measure transfers.

All the participants used the informal assessment results for understanding their teaching efficiencies. For instance, Ms. Kaya used the whole-class worked examples (informal) results for deciding her efficient teaching in addition operation with fractions. Ms. Solmaz also used whole-class worked example (informal) results for deciding on her efficient teaching of equalizing the denominators. Ms. Yılmaz used both the informal and the formal assessment results for deciding on her teaching efficiency. For instance, she understood during her classroom observations (informal) that, her teaching was not efficient enough for the fractions. After her "1^{st}

and 2nd paper-and-pencil exam evaluations (formal), on the other hand, she understood that she was not efficient enough for teaching to equalize the denominators.

Two of the participants, Ms. Yılmaz and Ms. Solmaz, used the project-study (formal) results for teaching the prism topic. According to the overall data, they did not teach the prism topic before the study. After they evaluated the studies, on the other hand, they realized the common mistakes of the students and used them in teaching prism unit. In that manner, they put much emphasis on the current mistakes during their teachings.

In order to decide on the adjustments for their further assessment practices, all of the participants used their informal assessment results. For instance, Ms. Solmaz realized with the whole-class worked examples (informal) that, the students were not ready to show the decimal and percentage forms of the fractions through models. Therefore she did not ask such an item for the performance-tasks. Ms. Yılmaz, also, used the classroom observation (informal) results for practicing additional informal assessments. Ms. Kaya, on the other hand, used both the informal and formal assessment results to adjust her further assessment practices. For instance, she used the results of the whole-class worked examples (informal) for deciding on the types of the items that she would use in the paper-and-pencil exams. Moreover she used the results of the performance tasks (formal) for improving further group works.

One of the participants, Ms. Kaya, used the formal assessment results for deciding on the suitability of an assessment method. For instance, she used the paper-and-pencil exam results (formal) for understanding the suitability of the exam items. According to the interview data, after the 1st paper-and-pencil exam (formal), she decided whether the exam was suitable for the 5th grades' achievement level, the objectives, or the way she taught the related topic.

In order to monitor students' progresses, Ms. Kaya and Ms. Yılmaz used both the informal and formal assessment results. For instance, Ms. Kaya used the results of her classroom observations (informal), paper-and-pencil exams (formal), and performance-tasks (formal) for monitoring students' progress in mathematics. Ms. Yılmaz, on the other hand, used all of her formal assessment results and her

classroom observations (informal) for monitoring the students' progress. One of the participants, Ms. Solmaz used only her informal assessment results such as classroom observations (informal) and students' mathematics journals (informal) for monitoring students' mathematical progress.

It was also indicated by the cross-case analysis that all the participating mathematics teachers assigned the students' overall grades with using formal and informal assessment results. In that sense, all of them used the results of the formal assessments: paper-and-pencil exams, project-studies and the performance-tasks. With the help of the answer keys which were prepared by them, they scored the students' papers and recorded the grades. Moreover they all used their observational data (informal) and whole-class worked studies (informal) for grading. One of the participants, Ms. Yılmaz, used her quiz results (informal) for making contribution on the students' overall grades. Ms. Solmaz, on the other hand, used mathematics journals and homework checklists for assigning the overall grades. In using their informal assessment results for grading, it was understood that none of the teachers kept written records for the classroom observations or whole-class worked examples. For instance "all of them are on my mind" said Ms. Kaya and added that she recorded her observations on her mind in order to use them for the students' overall grades.

All the participants gave formative feedbacks to the students by using informal assessment results. They gave feedback orally during the whole-class worked examples (informal). Ms. Kaya and Ms. Solmaz also used the formal assessment results for giving formative feedbacks. Moreover, Ms. Kaya wrote notes on the project-studies of the students in order to give formative feedbacks to them.

All of the participants used the observational data (informal) for preventing students from feeling anxious and to encourage the students to self-study. Ms. Kaya also used the results of her whole-class worked examples (informal) to prevent students from feeling anxious and to encourage them to study. One of the participants, Ms. Solmaz, on the other hand, used the students' mathematics journals (informal) for encouraging them to study.

According to the cross-case analysis, only Ms. Solmaz used the assessment results for preventing students from cheating. She stated that she became aware of

the students with observational data (informal) and homework checklists (informal). Then she used her awareness for preventing the students from cheating. On the other hand, Ms. Solmaz was the only participant, who used both the paper-and-pencil exam results (formal) and whole-class worked example results (informal) for rewarding the students. For instance, if the students showed higher performances than their classmates, she mostly preferred to support their overall grades at the end of the academic year.

All of the participants used the formal and informal assessment results to know students better. In other words they all used the assessment results for making diagnostic decisions. In order to explain the participants' practices, the individual cases represented many examples. For instance, Ms. Yılmaz followed the students' mistakes during her classroom observations (informal) and in the paper-and-pencil exams (formal). During her practices, she realized the students who were weak at ordering the fractions, addition operation with decimal numbers, problem solving, or on transferring a length unit to higher units. Ms. Kaya, on the other hand, realized the students who were weak at performing handcrafts and showing fraction operations through models with the help of the performance-tasks (formal). She also identified the students who had strengths on doing operations with fractions by the performance-task results. Moreover, during her classroom observations (informal), she realized the students who were good at drawing geometric expressions but weak at writing the definitions of these expressions. Another participant, Ms. Solmaz, understood with her paper-and-pencil exam results (formal) that, most of the students were good at geometry topics but weak at ordering the fractions, solving fractional problems, making addition operation with decimal numbers, or transferring a length measure to higher length units. Moreover, with the help of the performance-tasks, she indicated the students who were good at writing the fractions in decimal and percentage forms. Besides, Ms. Solmaz and Ms. Yılmaz used the observation (informal) and paper-and-pencil exam (informal) results to identify the students who were good at paper-and-pencil exams although they were inactive in the classrooms.

To sum up; the cross-case analysis of the three participating teachers' assessment practices showed that, all of them used formal assessments for their summative assessment purposes and they used both informal and formal assessments

for their formative purposes. In that manner, their informal and formal assessments were related to their use of assessment results in several points. Figure 4.32 is constructed to summarize and represent the answer of the related research question:

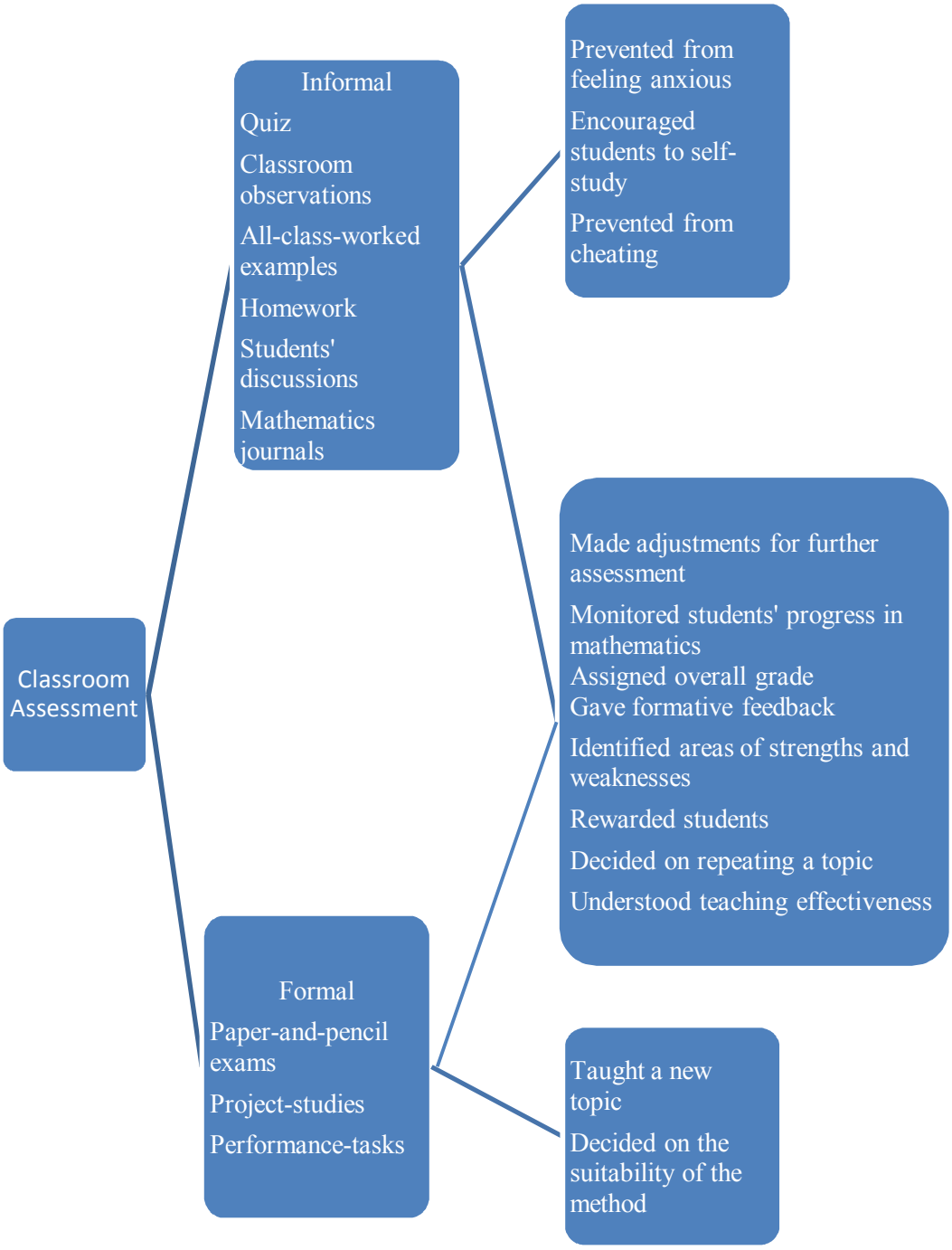


Figure 4.32: The relation between formal and informal assessments and their uses

4.4.3 Findings of the Research Question 3

In this section, the cross-case analysis results will be explained in order to figure out how the participants used the assessment results in making decisions on their instructional practices, assessment practices, and in improving students' learning of mathematics. The results are used to answer the third research question:

"How do the participating mathematics teachers use the results of their assessment practices formatively in 5^{th} grade classrooms?"

In order to represent the similarities and the differences of the participants' use of assessment results, Table 4.10 is constructed:

Table 4.10 The participants' use of assessment results

	Ms. Kaya	Ms. Solmaz	Ms. Yılmaz
Use for Instruction	Decided on repeating the topic	Decided on repeating the topic	Decided on repeating the topic
	Understood teaching effectiveness	Understood teaching effectiveness	Understood teaching effectiveness
		Taught a new topic (used project results)	Taught a new topic (used project results)
Use for Assessment	Made adjustments for further assessment	Made adjustments for further assessment	Made adjustments for further assessment
	Decided on the suitability of the method		
Use for improving students' learning of mathematics	Monitored the students' progress in mathematics	Monitored the students' progress in mathematics	Monitored the students' progress in mathematics
	Assigned overall grades	Assigned overall grades	Assigned overall grades
	Gave formative feedback	Gave formative feedback	Gave formative feedback
	Prevented students from feeling anxious	Prevented students from feeling anxious	Prevented students from feeling anxious
	Identified (Diagnosed) areas of strengths and weaknesses	Identified (Diagnosed) areas of strengths and weaknesses	Identified (Diagnosed) areas of strengths and weaknesses
	Encouraged the students to study	Encouraged the students to study	
		Prevented them from cheating	
		Rewarded students	

It can be seen in Table 4.10 that, in order to make decisions on their instructional practices, the participating mathematics teachers decided on repeating a

topic. They also understood their teaching effectiveness by the results of their assessment practices. Two of the participants, Ms. Solmaz and Ms. Yılmaz also used the project-study results for teaching a new topic.

Table 4.10 also represented how the participating teachers used assessment results for their assessment practices. It can be seen in the table that, all of them made adjustments for their further assessment practices by the help of the assessment results. Ms. Kaya also decided whether her assessment method was suitable for her mathematics classes, lectures, etc.

According to the Table 4.10, in order to improve students' learning of mathematics, all of the participants monitored the students' progress in mathematics, assigned overall grades at the end of the academic year, gave formative feedback to students, prevented students from feeling anxious, and diagnosed the areas of the students' strengths and weaknesses. Two of the participants, Ms. Kaya and Ms. Solmaz also encouraged the students to study. Ms. Solmaz, last of all, tried to prevent students from cheating and rewarded them in order to help their improvements on mathematics.

4.4.4 Findings of the Research Question 4

In this section, the findings provided by the cross-case analysis will be explained under two sub-sections: participating mathematics teachers' views and the relation between the participating mathematics teachers' views and their assessment procedures. With the help of the analysis, the fourth research question will be answered:

"To what extent are the participating mathematics teachers' classroom assessment procedures related to their views about the 5^{th} grades' learning of mathematics, about the factors affecting teaching mathematics, and about assessing 5^{th} grades' learning of mathematics?"

4.4.4.1 Participating Mathematics Teachers' Views

The study indicated that, the views of the participating teachers through the assessment concept could be represented under three main themes: teachers' views about the 5th grades' learning of mathematics, about the factors affecting teaching mathematics to the 5th grades, and about assessing the 5th grades' learning of mathematics.

To begin with; the study showed that all three participants had similar views about the 5th grades' learning of mathematics. The results of the teachers' views about the students' learning of mathematics are represented in Table 4.11:

Table 4.11 The participants' views about the students' learning of mathematics

Ms. Kaya	Ms. Solmaz	Ms. Yılmaz
5th grades learn by questioning	5th grades learn by questioning	5th grades learn by questioning
Students' natural ability, background knowledge, enthusiasm, regular practice, classroom environment (the average achievement level of a class), parents' socioeconomic level and education affected 5th grades' learning of mathematics	Students' natural ability, background knowledge, enthusiasm, regular practice, parents' socioeconomic level and education affected 5th grades' learning of mathematics	Students' natural ability, background knowledge, enthusiasm, regular practice, parents' socioeconomic level and education affected 5th grades' learning of mathematics

It can be seen in Table 4.11 that all the participants thought that the 5th grades learned mathematics by questioning. They also thought that the students' learning was affected by their natural ability, background knowledge on

mathematics, enthusiasm towards mathematics, regular practice, and their parents' socioeconomic and education. One of the participants, Ms. Kaya, also thought that the achievement level of a class affected the students' learning of mathematics.

Second of all, the cross-case analysis showed the similarities and differences between the participants' views about the factors affecting their teaching of mathematics. The results of their related views are represented in Table 4.12:

Table 4.12 The participants' views about the factors affecting teaching mathematics

Ms. Kaya	Ms. Solmaz	Ms. Yılmaz
Curriculum (negative and positive)	Changes in the curriculum and textbook (positive)	Curriculum (negative) Textbook (positive)
Time limitation (negative)		Time limitation (negative)
Being too young for middle school (negative)		Being too young for middle school (negative)
	Students' weaknesses on Turkish language skills (negative)	Students' weaknesses on Turkish language skills (negative)
Learning mathematics from mathematics teacher (positive)		
	Students' enthusiasm towards mathematics (positive)	
	Students' learning capacity (positive)	
	Classroom management (positive)	
		Classroom environment (seating arrangement, students' behaviors, etc.)
		Her teaching enthusiasm (positive)
		The way s/he learned mathematics (negative)

It can be seen in Table 4.12 that, according to Ms. Kaya and Ms. Yılmaz, time limitation and the age of the 5th grades were effective on teaching mathematics in negative way. Ms. Kaya also thought that learning mathematics from a mathematics teacher positively affected teaching mathematics. In addition, Ms. Solmaz thought that the classroom management, students' enthusiasms towards mathematics, and students' learning capacity had positive effects on teaching mathematics. Ms. Solmaz and Ms. Yılmaz also thought that the students' weaknesses on the Turkish language skills affected teaching negatively. One of the participants, Ms. Yılmaz thought that classroom environment was effective on teaching mathematics. According to her, her enthusiasm towards a topic and the way she learned a topic were effective on her teaching of mathematics. Last of all, the teachers thought that the changes in the curriculum affected teaching mathematics.

Third of all; the cross-case analysis showed the participants' views about assessing students' learning of mathematics. The findings for their related views are represented in Table 4.13:

Table 4.13 The participants' views about assessing students' learning of mathematics

Ms. Kaya	Ms. Solmaz	Ms. Yılmaz
The results of the paper-and-pencil exams and classroom observations were the most important ones	The results of the paper-and-pencil exams and classroom observations were the most important ones	The results of the paper-and-pencil exams and classroom observations were the most important ones
Performance assessment could be done by performance-tasks	Performance assessment could be done by performance-tasks	Performance assessment could be done by all the activities that a student performed
Positive at writing journals, constructing posters, presentations, constructed-grid, concept map, drama study, portfolio but did not use because of time limitation and curriculum workload	Positive at constructing posters, presentations, constructed-grid, concept map, drama study, portfolio but did not use because of time limitation, curriculum workload, and students' maturity level	Positive at writing journals, constructing posters, presentations, concept map, drama study, and portfolio but did not use because of time limitation and crowded classrooms
Classroom environment (the average achievement level of a class), family problems, maturity level of the students, the suitability of the assessment method, difficulties to provide honesty, weakness on reading comprehension, common exams had negative contributions	Personal characters of the students, socio-economic status, classroom environment (achievement level), her own conscience, and common exams had negative contributions	Classroom environment(seating arrangement, students behaviors, etc.), the way s/he learned mathematics, her inference in students' works, maturity level of the students, the suitability of the assessment method, and difficulties to provide honesty had negative contributions

Table 4.13 (cont'd) The participants' views about assessing students' learning of mathematics

Ms. Kaya	**Ms. Solmaz**	**Ms. Yılmaz**
Parents interfere in students tasks and projects at home	Parents interfere in students tasks and projects at home	Parents interfere in students tasks and projects at home
		Project studies and performance tasks could encourage self-study and creativity if they were used efficiently. However they are not compatible with Turkish classrooms Students learned geometry topics easier than learning the other ones

It can be seen in Table 4.13 that, paper-and-pencil exams and classroom observations were the most important assessment methods for participating mathematics teachers. The table also indicated that, although they were positive towards the assessment methods such as presentations, posters, portfolio, etc., they could not practice them because of time limitation, crowded classrooms, or curriculum workload. All of them thought that the parents' help on the projects affected the assessment process negatively. All of the participants thought that classroom environment was effective on assessment. Ms. Kaya and Ms. Solmaz also thought that family problems and common exams affected the assessment process. According to Ms. Kaya and Ms. Yılmaz, the maturity level of the 5^{th} grades, difficulties in providing honesty, and the suitability of an assessment method affected the assessment process.

It can also be seen in Table 4.13 that, one of the participants, Ms. Kaya, emphasized on the effects of the students' weaknesses on reading. Ms. Solmaz, on the other hand, added that personal characters of the students and her conscience were effective on her mathematics assessment practices. Lastly, the participating

teacher Ms. Yılmaz, stated that the way s/he learned mathematics and her inference in students' works were effective on her classroom assessment practices in 5th grades.

4.4.4.2 The Relation between Participating Mathematics Teachers' Views and Their Assessment Procedures

The cross-case analysis of the individual cases indicated many relations between the participating mathematics teachers' assessment procedures and their views. In the current section, the relations will be described in order to answer the fourth research question:

"To what extent are the participating mathematics teachers' classroom assessment procedures related to their views about the 5th grades' learning of mathematics, about the factors affecting teaching mathematics, and about assessing 5th grades' learning of mathematics?"

First of all; during the interviews all of the participants stated that regular practice had positive effect on students' learning of mathematics. In relation with their thoughts it was observed that, Ms. Solmaz gave additional homework from different textbooks whereas Ms. Yılmaz gave worksheets to the students. They checked the students' homework regularly, too. Although she did not use the results for grading the students, Ms. Yılmaz said that she checked the students' notebooks and textbooks in order to observe whether they did their homework regularly. In addition to homework, Ms. Solmaz asked students to keep mathematics journals for providing the regular practice, too.

Secondly, all the participants complained about the negative effect of the time limitation on their assessment procedures. It was observed during the study that, their view affected their assessment preferences. For instance, although they were positive about them, none of the participants practiced the assessment methods such as constructing posters, presentations, concept map, drama study, and portfolio in their 5th grade classes. They said that time limitation prevented them from practicing different kinds of assessment methods.

Thirdly; In addition to time limitation, Ms. Solmaz and Ms. Yılmaz thought that students' weakness on Turkish language skills affected teaching mathematics

negatively, too. In that sense, it was observed in their scoring-guides of the project-studies that, there was a criterion for scoring the students' Turkish language skills. In other words, it can be said that their views about the effect of the students' Turkish language skills influenced Ms. Solmaz and Ms. Yılmaz during their assessment procedures.

Ms. Yılmaz and Ms. Solmaz, also thought that the 5th grades' textbook was useful. In relation with their thoughts it was indicated that they used the textbooks for preparing the items of their paper-and-pencil exams. In that sense, it can be said that their positive thoughts about the efficiency of the textbook affected them on their assessment practices.

Fourth of all; enthusiasm was a factor that was discussed by some of the participants during the interviews. For instance, Ms. Yılmaz stated that she had enthusiasm towards teaching geometry. In relation with her views, it was observed during the study that she gave project-studies about prism topic, and performance-tasks about the quadrilaterals. Ms. Solmaz, also thought that students' enthusiasm towards dealing with the geometry topics was high. Her thoughts were also related with her project-study procedures. It was indicated with the document analysis that, her 5th grades studies prism topic during their projects. The topic was the preference of Ms. Solmaz.

Fifth of all; the analyses showed that all of the participants put much emphasis on the paper-and-pencil exams results and their classroom observations. In that manner, during their classroom activities, they practiced classroom observations by walking around the classrooms. Two of the participants, Ms. Kaya and Ms. Solmaz, also followed the students' studies at the board. One of the participating mathematics teachers, Ms. Kaya also formed groups to follow students' works and discussions in the group studies. The paper-and-pencil exam procedures of the participants also showed that, each of the participating mathematics teachers prepared the items and the answer keys of the exams individually. Therefore, the data about the participants' procedures showed that the teacher's positive views about the paper-and-pencil exams and the classroom observation affected their related procedures positively, too.

Last of all; it was revealed with the study that all of the participants stated that, they implemented performance-tasks and project-studies because they had to. In other words, they were not willing to practice projects and performance-tasks. The effects of their views were observed on their procedures. For instance, they did not prepare the scoring-guides of the project-studies and performance-tasks themselves. Instead they adapted them from internet. Moreover, they did not deliver written guidelines for the performance tasks, or did not write the necessary materials on them during the project-studies.

It was also observed that, the participants' views affected their scoring-guide procedures. For instance, none of the participants determined a criterion for scoring mathematical issues in the tasks or projects. In that manner Ms. Solmaz stated the following sentences: ''since I used the scale for an obligation, I did not need to add a new criterion to the prepared one''. Furthermore, Ms. Kaya did not determine the score of incomplete or partially correct answers in projects or performance-tasks. Two of the participants, Ms. Yılmaz and Ms. Solmaz, also did not determine the score of incomplete or partially correct answers in projects.

During the implementation procedures, on the other hand, Ms. Solmaz and Ms. Yılmaz asked students to complete all the steps of the performance-tasks at home. Moreover they assigned the projects about prism topic but they did not teach the prisms before.

In Table 4.14 the relations between the participating mathematics teachers' assessment procedures and their views about the students' learning of mathematics, about the factors affecting teaching mathematics, and about assessing students' learning of mathematics are represented:

Table 4.14 The relations between the participating mathematics teachers' assessment procedures and their views

Participating Teachers' Views	The Related Assessment Procedures Practiced by Them
Regular practice affected 5th grades' learning of mathematics	Mathematics journals Gave homework from other textbooks, prepared worksheets
Time limitation has negative effect on assessment process	Did not use constructing posters, presentations, concept map, drama study, and portfolio
Students' weaknesses on Turkish language skills negatively affect teaching mathematics	Used criteria for scoring Turkish language skills (performance tasks and project studies)
The textbook is useful	Used textbooks for preparing the items of the paper-and-pencil exams
Enthusiasm towards geometry topics	The projects were about the prism topic
Paper-and-pencil exams and classroom observations were the most important assessment methods	Practiced classroom observations Walked around the classroom Payed attention to the students' practices at the board Formed groups, followed students' group discussions Prepared the items, and the answer keys of the exams themselves
Implemented performance-tasks and projects since they were obligations	Did not prepare the scoring-guide herself Did not deliver guidelines Did not write the equipment on guidelines Did not determine any criteria for scoring mathematical issues Scores for the incomplete answers were not determined (Ms. Kaya) All steps were carried out at home Gave the projects before they taught the related topic (Ms. Yılmaz and Ms. Solmaz)

4.4.5 Findings of the Research Question 5

The cross-case analysis of the individual cases indicated that there were discrepancies between the participating mathematics teachers' perceived assessment practices and their views. In this section the current discrepancies will be explained and the answer to the fifth research question will be elaborated:

"What are the discrepancies between the teachers' views about assessing the 5th grades' learning of mathematics and their perceived classroom assessment practices?"

The cross-case analysis showed that, all of the participating mathematics teachers' grading procedures contradicted with their views about the classroom observations. For instance, all of them stated that classroom observation was the most important assessment method. On the other hand, none of them determined the proportion of the classroom observation results on the overall grades. They did not keep a written record for their classroom observations either. As a result of that, it can be said that the participating teachers' views and their assessment practices had a discrepancy in the manner of the grading procedure.

Another discrepancy between the teachers' views and their procedures in assessment was about the performance assessment concept. All of the participating teachers stated that performance assessment could be done by performance-tasks. During their scoring-guide procedures, on the other hand, none of them determine a criterion about assessing students' mathematical skills in performance-task. Moreover, Ms. Solmaz and Ms. Yılmaz could not observe the students' performances individually because the students completed all the steps of the tasks at their homes.

Last of all; it was indicated with the study that, the views of the teachers and their performance-task procedures had another discrepancy, too. All of the teachers stated that, the interventions of the parents on the students' projects or performance tasks affected assessment negatively. However, Ms. Yılmaz and Ms. Solmaz assigned the tasks to the students and asked them to do their tasks at their

homes. Therefore, it can be said that, there was a discrepancy between the assessment procedures of Ms. Yılmaz and Ms. Solmaz and their related views.

In summary; the cross-case analysis of the study showed that there was discrepancy between the participants' views and their grading procedures. Although they stated that they put much emphasis on it, they did not determine the exact effect of the classroom observations on the overall grades. Moreover, the views of Ms. Solmaz and Ms. Yılmaz showed that, there were discrepancies between their views about the performance-tasks and their procedures for the tasks. In table 4.15, the discrepancy between the participants' statements and their perceived practices is summarized:

Table 4.15 The discrepancy between the participants' views and their perceived practices

Teachers' views	**Teachers' perceived practices**
According to the participants, classroom observations were the most important assessment methods. They also said that they used the results for assigning the overall grades	Did not determine the proportion of the classroom observation results on the overall grades
Performance assessment could be done by performance-tasks	Did not observe the students' performances. Moreover they did not use a criterion for assessing students' mathematical skills
Parents' interventions in the performance-tasks and project-studies affected the assessment process negatively	Asked students to complete the steps of the performance-tasks at home

CHAPTER 5

DISCUSSION AND CONCLUSION

The purpose of the study was to investigate the mathematics teachers' assessment practices in the 5th grades. In that manner, the three participating teachers' assessment procedures and their use of assessment results were investigated. Moreover their views about the 5th grades' learning of mathematics, about the factors affecting teaching mathematics, and about assessing 5th grades' learning mathematics were examined in order to understand the relation and discrepancy between the teachers' views and their assessment practices in mathematics classes.

The study indicated that, the participating mathematics teachers' assessment stages and the framework developed from McMillan (2007a) had common points. The participants implemented both formal and informal assessments in order to carry out their purposes. Then they evaluated their assessments with the help of the answer keys or scoring-guides. Last of all, they used the results for diagnostic, grading, or instructional decisions. However, the study put forward additional results. For instance, on some of the assessment steps, the participants' assessment procedures were affected from their views. Moreover, discrepancies were observed between their views and perceived assessment practices in some way. Therefore, in this chapter, the key themes will be discussed to make the overall picture of the study understandable.

The chapter has two subsections. In the first one, the key findings mentioned in Chapter IV and their connections to the research literature will be discussed relevant to the research questions. In the second subsection, implications of the study's findings for teacher education and curriculum developers, and recommendations for future research studies will be given.

5.1 Discussion on Participating Mathematics Teachers' Classroom Assessment Practices

The first key finding of the study was about the participating mathematics teachers' assessment procedures. The purpose of classroom assessment can be summative, formative, or diagnostic (Airasian & Russell, 2008; Deneen & Deneen, 2008; Hackling, 2004; Popham, 2011). It was observed in the study that, the participants carried out both formal and informal assessments for their summative, formative, or diagnostic assessment purposes.

For their informal assessment practices, the participants mostly used classroom observations. The result was similar with the study of Trotman (1997). Moreover, during their classroom observations, the participants mostly walked around the classroom. The overall data indicated that, with the help of the walking around activity, the teachers observed the students' studies or interacted with them about their workings. The results were congruent with the study of Torrance and Pryor (2001). In their study, Torrance and Pryor (2001) also figured out that, teachers got feedbacks about the students' working processes by observing their works in the classrooms.

According to the formative assessment cycle of McMillan (2007b, p. 3), giving feedback to students is a key element of classroom observations. However, the participants did not always give specific or immediate feedbacks to the students during their classroom observation procedures. Therefore, classroom observation procedures were not in congruent with the formative assessment cycle of McMillan (2007b, p. 3) in the manner of the feedback issue.

It was indicated with the study that, for their formal assessment practices, the participants followed the method and calendar obligations of The Ministry of National Education (MoNE, 2013a). In parallel with the current obligations, the teachers practiced formal assesments such as paper-and-pencil exams, project-studies, and performance tasks. In that manner, they announced the date of the paper-

and-pencil exams and performance-tasks one week before the implementation and announced the results in 10 workdays. They assigned the project-studies in December and collected them in April like it was offered in the curriculum.

Smith (2000) indicated with his study that curriculum links teaching goals with learning. He continued with saying that, teaching goals and curriculum were linked to each other by assessment process. The participants' procedures in formal assessment practices showed concurrency with the 5th grades' curriculum offers. For instance, the participating mathematics teachers used multiple-choice, fill-in-the-blanks, and constructed-response items in their paper-and-pencil exams. In addition, Ms. Solmaz used true-false type items, too. In the curriculum, the types for the paper-and-pencil exam items were offered as open-ended, fill-in-the-blanks, or true-false (MoNE, 2013a), too. All of the participants prepared the answer keys before the examinations and they gave reports for the common paper-and-pencil exams at the end of the implementation. Moreover, all of the participants announced the results in 10 workdays like it was offered in the curriculum. Therefore, the results were compatible with the 5th grade mathematics curriculum in the preparation, implementation, and steps of the examinations.

According to the interview data, all of the participants made use of the 5th grade textbooks for preparing the exam items. In other words, participants interacted with the textbooks during their assessment procedures. In that manner, the study had similar results with the study of Remillard (1999). For instance, in his study, Remillard (1999) indicated that textbooks were the exact representations of the curriculums. According to his framework in the study, the teachers interacted with the textbooks in order to select and design their mathematical tasks like it was indicated by the current dissertation.

For the performance-tasks and the project-studies, also, the participants' procedures were congruent with the offers of the Ministry of National Education in general. For instance, all of the participants followed the calenders offered by the Ministry, or used and announced the scoring guides before the implementations. However it was observed that none of the participants prepared the criteria of the scoring-guides individually. They used the prepared ones from the internet resources. Moreover, they -except Ms. Kaya- did not practice the performance-tasks in the

classrooms. There was not any criterion for scoring the students' mathematical issues. The results were in paralel with the literature. In the literature, it was observed that teachers had problems about the aim, content, application and evaluation of the performance-tasks (Meydan & Öztürk 2008; Tüfekçioğlu & Turgut, 2008). Therefore, the results of the study were similar with the literature in the manner of the performance-task and project procedures.

During the interviews, it was also observed that, the participants mostly complained about the time limitation and parental help in the students' performance-tasks and projects. The results are similar with the studies of Acar and Anıl (2009), Baki and Bütüner (2009), and Arı (2011).

Grading the performance-tasks or projects was also a problem for the participating teachers. For instance, Ms. Solmaz stated her thoughts with the following words:

> I know scoring-guides are formed to make objective assessment. However I do not think that they are valid or reliable. For instance a student is active in the lessons. I decide on a grade for her/him according to his class performance. Then when I am scoring her/his task, I think about that grade and try to reach that grade on my mind. Therefore sometimes I use the criteria of the scoring-scale as a formality. (q73).

It can be understood with the quotation above that, Ms. Solmaz did not grade the students' tasks independent from her previous assessments. In the study of Baki and Bütüner (2011), also, it was indicated that the teachers assessed students' projects mostly based on their paper-and-pencil exam scores. During the current study, it was understood that the approaches of Ms. Kaya, Ms. Solmaz, and Ms. Yılmaz towards the performance-tasks and the projects were similar. Therefore, although Baki and Bütüner (2011) conducted their study for investigating the project assessment, their study results can be compared with the participating teachers' performance-task practices.

The second key finding of the study was about how the participants' informal (formatively purposed) and formal assessment (both formatively and summatively purposed) results were related with their use of assessment results. According to the assessment framework of McMillan (2007a), teachers use assessment results for making diagnostic decisions, instructional decisions, or for

grading. Ussher and Earl (2010), on the other hand, reminded that information gathered by the assessment tools could be used both formatively and summatively. In that manner, the current study showed that, the participating mathematics teachers used some of their summatively purposed assessment results for formative purposes. For instance, Ms. Kaya used the performance-task evaluations for determining the students who had weaknesses on showing fractional operations through models. Ms. Yılmaz also used the paper-and-pencil exam results for realizing the students who were weak at ordering the fractions, addition operation with decimal numbers, problem solving, and transferring a length unit to higher units. Ms. Solmaz, last of all, used paper-and-pencil exam results for identifying the students who were good at geometry topics, or weak at solving fractional problems and making addition operation with decimal numbers. It can be said that the participants used summatively purposed assessment results for knowing their students better. "Knowing students better" is a diagnostic concept (Airasian & Russell, 2008; Butler & McMunn, 2006). However, in literature, diagnostic purpose is also defined as a form of formative assessment in which assessment is used to obtain detailed information about the individual students' prior knowledge, ways of reasoning, use of strategies, and misconceptions (Crisp, 2012; Keeley & Tobey, 2011; Sach, 2012). Therefore, the study showed that, the participating teachers used their summatively purposed assessment for formative decisions like it was offered by Ussher and Earl (2010).

It was also indicated with the study that, the participating teachers-except Ms. Solmaz-used both the formal and informal assessment results for monitoring students. Moreover, Ms. Kaya used her paper-and-pencil exam results for understanding her teaching efficiency on equalizing the denominators of the fractions. She also used her performance-assessment results for making adjustments of her further assessments. The participants-except Ms. Kaya-also used the project assessment results during their further teachings. It was also observed that, the participants -except Ms. Kaya- gave formative feedbacks to students with the help of their formal assessments. All of the results showed that the participating mathematics teachers used their summative assessment purposes for formative decisions. This is also congruent with the related discussions (Segers & Tillema, 2011; Ussher & Earl,

2010) and similar with the results of Al Duwari (2013), Greenstein (2004), and Uçar (2007).

According to the third key finding of the study, the participating mathematics teachers used the assessment results for making decisions about their instructions, assessment practices, or for improving students' learning of mathematics. For instance, as a decision about their instructions, all of the participating teachers used their assessment results for understanding their teaching effectiveness like it was indicated by Trotman (1997), Uçar (2007), and Abdul Rahim (2012). Moreover, similar with the results of the study of Trotman (1997), the study showed that all the participants used assessment results for intending their further teaching activities. For instance, Ms. Solmaz used the results for repeating the addition operation with decimal numbers. Ms. Yılmaz, also used the results for repeating to equalize the denominators. Ms. Kaya, on the other hand, used the results for repeating the fraction comparisons and length measure transferrings. Ms. Solmaz and Ms. Yılmaz, on the other hand, used the assessment results during their teaching of a new topic: the prisms.

Assessment can be accepted as a part of the instruction process. Therefore, it can be said that, the participants' use of assessment results such as making adjustments for further assessment practices were similar with the results of Trotman (1997). Abdul Rahim (2012) also indicated with her study that the teachers used the assessment results for deciding on the suitability of a method. This was also similar with Ms. Kaya's use of assessment results. In that manner, she used the results of the 1st paper-and-pencil exam for deciding whether the exam was suitable for the 5th grades' achievement level, the objectives of the 5th grade mathematics curriculum, or the way she taught the related topics.

Ms. Kaya used the results of the performance-tasks for making decisions about her further group works, too. She stated that, she would prefer one of the following adjustments in her further performance-tasks: supporting more group works, or implementing individual tasks through fewer items. She advocated that encouraging such practices would prepare students for listening and making efficient discussions in a group work. According to her, individual performance-tasks would be more productive in the crowded classrooms. It can be seen that, Ms. Kaya used

the assessment results for intending more organized group-works in the future.

It was also observed with the results that, the participants used the assessment results for improving students' learning of mathematics. Like Trotman (1997) and Abdul Rahim (2012) indicated with their studies, all of the participating teachers in the current study used the assessment results for monitoring the students' progress in mathematics, grading, and giving feedback to the students. Ms. Kaya and Ms. Solmaz also used the assessment results for encouraging students to study. This was also a congruent result with the study of Abdul Rahim (2012).

In the study, like it was indicated with Trotman (1997) and Abdul Rahim (2012), it was observed that the participants used the assessment results for knowing students better (understanding on what topics the students had strengths or weaknesses). In that sense, Ms. Kaya determined that, the students gave correct answers to the mathematical operations. On the other hand, she added that, the same students could not do the same operations if they were asked through a problem. For instance she said that, the students were able to make the addition and subtraction operations with decimal numbers but they had difficulties in solving the related problems. A suggestion for solving that problem was determined during the case of Ms. Solmaz. She stated that, students showed better performance when they were working with materials such as manipulatives. Therefore, problem solving abilities may be improved with the help of the materials. In that manner, teachers may let the students deal with materials during their problem solving activities. Ms. Solmaz, also determined many students who were weak on transferring length units to the higher units. In order to solve that problem, the curriculum developers may take this result into consideration and may think to take the related topic to the 6^{th} grades' curriculum.

In the manner of the third key finding, there were also results which were not supported with the literature. For instance, Ms. Solmaz used assessment results for rewarding students. Most of the time, she rewarded the students by giving gifts or higher in-class-performance grades. The result cannot be discussed or compared with the literature. However, the explanation of Ms. Solmaz was a good clarification for the reason of her practice:

> In the beginning of the first semester, I gave them my word about rewarding if they could get 85 and over in all the paper-and-pencil exams. Some of the students got 85 and over. Moreover there was a student who got 100, 100, and 98 from his first semester exams. I gave them some small gifts and I observed that my rewarding practice had been effective.

It can be seen that, she observed the efficiency of rewarding. As a result of that, she continued with the same practice. During the data collection process, she sometimes used the assessment results for rewarding students with higher in-class performance grades or small gifts if they deserved them.

The fourth key finding of the study was the relation between the participating mathematics teachers' views and their assessment procedures. In that manner, there are several studies indicating that the teachers' beliefs and views about teaching, learning, or curriculum strongly affect teachers' teaching and classroom assessment activities (Brown, 2004; Calderhead, 1996; Clark & Peterson, 1986; Erdal, 2007; Heaton 1992; Pajares, 1992; Peker & Gülle, 2011; Pepin, 1999; Prawat, 1992; Putnam, 1992; Remillard, 1992, 1999; Teo, 1997; Thompson, 1992; Yılmaz, 2006). Similar with the related research, the current study also showed that the teachers' views and their assessment procedures were related at some points.

For instance, Ms. Yılmaz and Ms. Solmaz thought that regular practice had positive effect on students' learning of mathematics. In relation with their thoughts it was observed that, Ms. Solmaz gave additional homework from different textbooks. She also made students keep journals for supporting regular practice. Ms. Yılmaz, on the other hand, gave worksheets to the students. They checked the students' homework regularly, too. In addition to homework, Ms. Solmaz made her students keep mathematics journals for regular practice, too. Ms. Yılmaz and Ms. Solmaz also stated that the 5^{th} grades' textbook was useful. In relation with their thoughts it was observed that they used the textbooks for preparing the items of their paper-and-pencil exams. The participating teachers' (Ms. Solmaz and Ms. Yılmaz) views about geometry enthusiasm, positive views about the paper-and-pencil exams and the classroom observations affected their assessment procedures. Therefore it can be said that, there are situations in which the views of the teachers affected their assessment procedures positively.

Ms. Solmaz also thought that the number of items that a 5th grade student solved about a topic was important to learn mathematics. Therefore, she asked students to solve 50 or 100 multiple-choice items in the weekends. However, the study of Rosário, Núñez, Vallejo, Cunha, Nunes, Mourão, and Pinto (2015) showed that the positive effect of homework on the students' mathematics achievement was not related to the amount of homework. Therefore, it can be said that the amount of homework does not always affect students' learning of mathematics.

According to the related literature, some methods like paper-pencil tests may seem more powerful to the teachers (Bıçak & Çakan, 2004; Doğan, 2005; Duban & Küçükyılmaz, 2008; Gelbal & Kelecioğlu, 2007). The same result was observed in the current study, too. In that sense, all of the participants thought that paper-and-pencil exams or classroom observations were the most reliable assessment methods. For instance they all practiced classroom observations by walking around the classrooms. Ms. Kaya and Ms. Solmaz, followed the students' studies at the board. Ms. Kaya, on the other hand, formed groups to follow students' works and discussions in the group studies. The paper-and-pencil exam procedures of the participants also showed that, each of the participating mathematics teachers prepared the items and the answer keys of the exams individually. The relation between their views and their classroom observations and exams was explained by the literature. According to the related research, the teachers had the much experience on paper-and-pencil exams (Bıçak & Çakan, 2004; Doğan, 2005), so they mostly relied on that assessment method. However, the current study showed that classroom observations were also important for the participating teachers. This may be also because of their daily experiences on making observations, too.

All the participants complained about the negative effect of the time limitation on their assessment procedures like it was examined by the study of Uçar (2007). It was indicated with the study that, their views affected their practices. For instance, none of the participants practiced the assessment methods such as constructing posters, presentations, concept map, drama study, and portfolio in their 5th grade classes, although they were positive about theses assessment methods. Their statements were also clues for the effect of time limitation and their assessment

practices. In that manner, all of them stated that time limitation prevented them from practicing different kinds of assessment methods. In addition to time limitation, Ms. Solmaz and Ms. Yılmaz stated that students' weaknesses on Turkish language skills affected teaching mathematics negatively, too. In that sense, it was observed in their scoring-guides of the project-studies that, there was a criterion for scoring the students' Turkish language skills.

The common paper-and-pencil exam was also a problem for the participants. There is not any result similar with the current result. All of the participants complained about such paper-and-pencil exams. They stated that they could not be sure about the validity of the results. It was also observed that, they had anxiety about these exams. However, if the Ministry of National Education regulates the obligations about the common exams, the participants would be relaxed.

The literature also showed that, teachers did not practice performance-based assessment methods often since they did not feel confident about the fairness of such assessment methods (Cooney et. al., 1996; Ohlsen, 2007). Similar with the finding in the literature, the participating mathematics teachers of the current study stated that, they implemented performance-tasks and project-studies because they had to. In other words, maybe they would not practice them if they were not obligations. Moreover, the literature showed that the teachers were not sure whether they were assessing students' performance truly and appropriate (Bıçak & Çakan, 2004; Doğan, 2005; Duban & Küçükyılmaz, 2008; Gelbal & Kelecioğlu, 2007). Besides, they were worried about the application and evaluation procedures of the performance-tasks or projects (Meydan & Öztürk, 2008; Tüfekçioğlu & Turgut, 2008). Such a result was also observed during the current study. For instance, Ms. Yılmaz stated the following words about the scoring-guides:

> Actually I can say that, I learned how to develop and use them during my university education. However, still, I do not feel myself adequate enough to practice it. I am not sure whether I can use it correctly in every sense. (q138).

The participants also complained about the parental help in the project-studies and the performance-tasks like it was observed in the literature (Acar & Anıl, 2009; Arı, 2011; Belet & Girmen, 2007; Coşkun et. al., 2009; Yılmaz & Benli, 2011). Moreover they thought that the students usually used printouts taken from the

internet, wrote them down on their papers and submitted them to their teachers. For instance, Ms. Kaya stated the following sentences:

> When s/he did her/his performance-tasks and project studies at home, I cannot be sure whether s/he did the studies herself/himself. Maybe s/he got help from other people, maybe s/he wrote a prepared one from internet. For instance I give a task-I guess the golden ratio. I observe that s/he searches from internet, write it down and take it to school. I do not think that is a big assessment. In my opinion participating in classes, raising hand to volunteer the exercises, and exam grades are ahead of the others. I put much emphasis on them. Of course I do not mean that performance-tasks and projects are insignificant but...I think they do not provide certain results. (q54).

It can be seen with the quotation that Ms. Kaya complained about the parental help in the performance-tasks or project-studies. Moreover, she complained about the printout tasks or projects. Such a result was also observed in the study of Baki and Bütüner (2009). Like she stated above, Ms. Kaya thought that students were sometimes inadequate to complete all parts of the projects by themselves. Therefore, according to the interview data, she did not think that students' project-study achievements had the same meaning with students' mathematics achievements. Then, it can be said that Ms. Kaya did not have a confidence on project studies because of the cheating suspect.

During the assessment procedures, all of their views those were discussed above showed effects on the participants' practices. For instance, they did not prepare the scoring-guides of the project-studies and performance-tasks by themselves. Instead they adapted them from internet. They did not determine any criterion for scoring mathematical issues in the tasks or projects, either. Moreover, Ms. Kaya did not determine a score for the incomplete or partially correct answers in the scoring-guides. Ms. Yılmaz and Ms. Solmaz, also, did not determine the score of incomplete or partially correct answers for the projects. Ms. Yılmaz and Ms. Solmaz gave all the steps of the performance-tasks like they were homework. Moreover they assigned the projects about prism topic before they taught that topic. None of the participants delivered written guidelines for the performance tasks. Their project-study guidelines had also lack of knowledge. In other words, the participants thought that the performance-tasks and project-studies were obligations and they practiced them because of this obligation. Ms. Kaya, on the other hand, did not explain the

equipments needed for the project-study on the related guideline. Moreover she asked students to explain and compare pentagons and hexagons although they did not exist in the curriculum. Although she taught that project studies had the aim of assessing higher order skills, she used the same scoring-guide for scoring performance-tasks and project-studies. Therefore, it can be said that, the participants' views affected their practices during their application and evaluation processes.

After the 2013-2014 academic year, Ministry of National Education removed the performance-task obligation from the middle school curriculum (MoNE, 2014). Therefore, maybe the participants' practices about the performance-tasks and project-studies, and the related literature by which it was figured out that the teachers still had problems about the aim, content, application and evaluation of the performance-tasks (Meydan & Öztürk 2008; Tüfekçioğlu & Turgut, 2008) were all foresights of the teachers. In the manner of the improvement about the assessment implementations, on the other hand, having seminars about the preparation and implementation processes of the assessment methods would be helpful for the teachers.

The fifth and also the last key finding of the study was about the discrepancy between the participants' views and their perceived classroom assessment practices. For instance, all of the participating mathematics teachers' grading procedures contradicted with their views about the classroom observations. They all stated that classroom observation was the most important assessment method but they did not determine the proportion of the classroom observation results on the overall grades. Another discrepancy was observed between the participants' views about the performance-assessment and their performance-task procedures. In that manner they all thought that performance assessment could be done by performance-tasks. However, during their scoring-guide procedures, they did not determine a criterion for assessing students' mathematical skills in performance-task. Ms. Solmaz and Ms. Yılmaz also could not observe the students' performances because their students completed all the steps of the tasks at their homes. Moreover, Ms. Yılmaz and Ms. Solmaz thought that parental help was a negative effect on the performance-tasks or projects.

In the literature, there are also studies which show the discrepancy between the teacher's thoughts and their classroom practices (Mulhall & Taylor, 1998; Susuwele-Banda, 2005). Kersaint and Thompson (2001) explained this situation with the failure of translating theoretical knowledge to classroom practices. Their claim may also be valid for the current study. For instance, the participants, when they were students in the faculties of education, might be practiced teaching in an environment that did not completely congruent with a school environment. They could have learned the theoretical knowledge and practiced this knowledge in a well-designed school environment. Therefore, they could not reflect their views on the current school context. The studies explained this situation with the lack of teaching experience. It was indicated that, teachers with experience or teachers who were trained in measurement used performance or observation methods much more efficiently than the inexperienced teachers (Bol et. al., 1998; Zhang & Burry-Stock, 1997). Similar with the literature, in the current study, the discrepancies were observed between the participants' views and their classroom observation or performance-based assessment procedures. Besides, they had 5 years or less teaching experiences. In other words, the reason of the discrepancies between the participants' views and their perceived classroom assessment procedures could be their lack of experience in teaching.

To sum up; the key findings of the study were discussed under five themes: the participants' assessment procedures; the way the participants' informal and formal assessments were related with their use of the assessment results; the participating mathematics teachers' use of the assessment results; the relations between the participating mathematics teachers' views and their classroom assessment procedures; and the discrepancies between their views and their perceived classroom assessment practices. Although there were different results in the literature, the current study showed similarities with the literature in general. Moreover, there were also results such as Ms. Solmaz's use of the assessment results for rewarding. It can be said that these results were specific to the current research and can be new findings among the similar study results.

5.2 Implications of the Study for Educational Practices

The findings of the current study have some implications that could be taken into consideration by the teachers, teacher educators, curriculum developers, and Ministry of National Education.

To begin with; although the results of the study are discussed under five key findings, it includes many findings that can illuminate the mathematics teachers' classroom assessment practices. For instance, in the study there are examples for both the informal and formal assessment practices of the participants. The teachers may compare their use of assessment results with the participating teachers' preferences. The study also indicates mathematical arenas on which the participants used the assessment results. For instance, when did the participants decide to repeat a topic? What were the sudents' weaknesses or strengths in mathematics classrooms? How did a mathematics teacher monitor a student's mathematical progress or encourage the students for self-study? How did a mathematics teacher grade her students? When did a mathematics teacher give formative feedback? How a mathematics teacher could use the assessment results for preventing the students from feeling anxious?. Moreover they can examine what is existed in a teacher's mind during the assessment process. Sometimes, teachers are not aware of whether their views are affecting their assessment practices. In that sense, the relations or discrepancies between the participants' views and perceived practices may be helpful to the mathematics teachers. For instance it was observed in the study that, the participants' negative views about the time-limitation, performance-tasks, and projects affected their classroom assessment procedures. Moreover, the participants did not determine the proportion of the classroom classroom assessment results on the overall grades although they said that they used them for assigning the overall grades. Such results may be helpful to the teachers for realizing the relations or the discrepancies between their views and classroom assessments. Such an awareness makes contribution to the effectiveness of their assessment methods.

Teacher educators may also discuss the results of the study, so that they can make improvements on the education of preservice teachers. In that manner, the

results about the discrepancy between the participants' views and their assessment practices may be helpful for the educators. Additional sub-topics may be supported, in order to clarify the preparation and implementation procedures of the scoring-guides (rubrics), performance-tasks, or projects. They may also discuss the results during their courses about grading.

Curriculum developers may use the results of this study, too. They may check whether all of the curriculum objectives were being assessed by a clear procedure in 5th grades. The study was conducted for a few topics. However, the participants' problems about the time-limitation, crowded classrooms, or project-study procedures may be the starting point for discussing the 5th grade curriculum. The curriculum developers also can make an additional check about the suitability of the topics such as transferring a length unit to higher units.

Last of all; the results may be beneficial for the regulations of Ministry of National Education (MoNE). The 5th grades have become middle school students for only a few years. In that manner, the study figured out the problems that the participants had because of the maturity level of the 5th grades. For instance, the maturity levels of the students caused problems during the performance-tasks, project-studies, or common paper-and-pencil exams. However, MoNE did not offer an obligation for performance-tasks since 2014-2015 academic year (MoNE, 2014). MoNE may develop such a regulation for the project-studies or common exams in 5th grades, too. In order to help teachers, they may also conduct seminars about the preparation and implementation of the assessment methods which are suitable for the 5th grades.

5.3 Recommendations for Further Research

According to the results of the study some recommendations for further studies can be given. For instance, this study was conducted with a public school in Ankara. Similar studies may be conducted with both the private school mathematics teachers and the public school mathematics teachers from different districts of Turkey. Such additional studies may make contribution to the literature. For instance, the differences between the assessment practices of the public school teachers and the private school

teachers may be observed. Therefore, with the results, the reasons of the differences in assessment practices of the private school teachers and the public school teachers may be exposed.

The study can be conducted with the teachers who teach mathematics to different grade groups in the middle schools or high schools. Such studies may indicate additional results, so the teachers may have more sources about the assessment practices. They may question their assessment practices and discuss the steps for an efficient assessment process.

The study depended mostly on the interviews. However, for each participant, classroom observations were conducted only for a few lessons. In the future, the researchers may conduct similar studies with much classroom observation durations. Classroom observations give more clues about the teachers' practices. Moreover they may give much data about the discrepancies between the teachers' views and practices.

Similar studies may be conducted with the pre-service mathematics teachers in the purposively developed classrooms. The results can be compared with the results of this study in the manner of the relations or dicrepancies between the teachers' views and their assessment practices. Having such data may be helpful to realize whether the pre-service teachers' practices or views about assessment change positively or negatively in time. If there was a negative change, the reasons of such changes may be investigate.

Seminars or in-service trainings may be conducted in order to improve the mathematics' teachers practices of the project-study, performance-task, scoring-guide, and grading.

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APPENDIX A

THE IN-DEPTH INTERVIEW PROTOCOL (PILOT STUDY)

Tarih :
Başlangıç saati:
Bitiş Saati:
İyi günler. Benim adım Nihan UÇAR SARIMANOĞLU. Orta Doğu Teknik Üniversitesi Eğitim Fakültesi'nde doktora öğrencisiyim. Öncelikle benimle görüşme yapmayı kabul ettiğiniz için çok teşekkür ederim. 5. sınıf matematik öğretmenlerinin ölçme değerlendirme yöntemlerini nasıl uyguladıklarını öğrenmek amacıyla bir çalışma yürütmekteyim. Bu amaç doğrultusunda sizinle yapmak istediğim görüşmeyi kabul ettiğiniz için şimdiden teşekkürler. Yapacağımız görüşme öğrencilerin matematik dersi için yaptıkları çalışmaları nasıl değerlendirdiğinizi anlamam konusunda bana çok yardımcı olacaktır. Bu görüşmelerde vereceğiniz bilgiler çalışmamda farklı isim altında kullanılacaktır. Gerçek kimliğiniz gizli tutulacaktır. Bana sormak istedikleriniz olursa lütfen çekinmeden sorunuz. Ayrıca sizin için sakıncası yoksa görüşmeyi kayıt altına almak istiyorum.

1- Adınız Soyadınız?
2- Hangi üniversiteden mezunsunuz?
a. Hangi bölüm?

b. Yüksek lisans/ doktora?

3- Kaç yıllık matematik öğretmenisiniz?
a. Bugüne kadar kaçıncı sınıflara matematik öğrettiniz?
b. Mevcut okulunuzda kaçıncı yılınız?
4- Bu ders yılında kaçıncı sınıflara matematik öğretiyorsunuz?
a. Ders anlattığınız 5. sınıfların mevcutları nelerdir?

5- Bir öğrencinin veya tüm sınıfın dersinizi anlayıp anlamadığını nasıl tespit ediyorsunuz?

6- Sizce 5. sınıf öğrencileri matematiği nasıl öğreniyor ?

a. Öğrencilerin matematiği öğrenme biçimleri sınıf düzeyine göre farklılık gösteriyor mu? Nasıl?

b. Bu seviyedeki öğrencilerin matematiğe karşı tutumları nedir? Öğrenciler arasında tutumlar ne tip farklılıklar gösteriyor? Bu tutumlar hakkında nasıl fikir sahibi oluyorsunuz?

c. Farklı öğrencilerin matematikteki başarısında neler rol oynuyor? Farklı tiplerde öğrencilerden örnekler vererek açıklayabilir misiniz?

7. Bir 5. sınıf öğrencisinin yıl boyunca matematik başarısının düzeyindeki değişiklikleri nasıl tespit ediyorsunuz? Bunun için kullandığınız yöntemler var mı? Neden bu yöntemleri kullanıyorsunuz?

a. Yıl içinde puanlamadığınız ama öğrencinin matematik başarı düzeyini belirlemenize katkısı olan ölçme yöntemleriniz nelerdir?

b. Bu yöntemlerde dönüt verme işlemini nasıl yapıyorsunuz? Ne zaman veriyorsunuz? Ne tür dönütler veriyorsunuz?

c. Yazılı, sözlü değerlendirmeler, proje ödevleri, performans görevleri, ürün dosyası gibi notlandırdığınız yöntemler öğrencinin başarı düzeyini belirlerken sizin için ne kadar etkili oluyor?

d. 5. sınıflarda yıl boyunca notlandırdığınız ve notlandırmadığınız ölçme yöntemlerinden elde ettiğiniz sonuçları yıl sonunda öğrencilerin başarılarını belirlerken nasıl birleştirirsiniz? Birbirlerine katkıları olur mu? Oluyorsa bunun belli bir oran dağılımı var mıdır?

8- Sizce aşağıda belirtilen ölçme yöntemlerinin amaçları nelerdir?
a. Yazılı sınavlar

b. Proje ödevleri

c. Performans görevleri

ç. Drama çalışmaları

d. Ürün dosyası

e. Günlük tutma

f. Sözlü sunum

g. Poster hazırlama

h. Kavram haritaları

ı. Yapılandırılmış grid

8. Yukarıdaki yöntemleri 5. sınıflarda uygularken içeriklerinde neler oluyor? Örnekler verebilir misiniz? Bu içerikler neye göre değişiyor?

9. Matematik dersi kapsamında 5. sınıflarda ölçme-değerlendirmeyi hangi zamanlarda daha çok yapıyorsunuz? Neden?

a. Değerlendirme sürecine kimleri katıyorsunuz? Öğrenci, akran, veli, başka öğretmenler?

10. 5. sınıflarda ölçme yöntemlerinizi belirlerken hangi kaynaklardan/materyallerden faydalanırsınız? Hangi amaçla? Nasıl?

11. 5. sınıflarla matematik dersinde hangi ölçme yöntem/yöntemlerini daha önemli görüyorsunuz? Niçin?

11. a Uygulamadığınız yöntemleri kullanmama sebebiniz nedir?

12. Sizce performans değerlendirme nedir? Neden?

a. Performans değerlendirmeyi 5. sınıflarda nasıl yapıyorsunuz? Hangi yöntemleri kullanıyorsunuz? Önemli olduğunu düşündüğünüz ama sizin kullanmadığınız bir performans değerlendirme yöntemi var mı? Neden kullanmıyorsunuz?

b.Kullandığınız yöntemleri seçerken veya oluştururken hangi kaynaklardan/materyallerden faydalanırsınız?

,

13- Sizce dereceli puanlama cetveli nedir?

a. Sizce 5. sınıf öğrencilerin çalışmalarının değerlendirilmesinde dereceli puanlama cetveli ne gibi işlevlere sahip olabilir? Siz nasıl kullanıyorsunuz?

b. Sizce dereceli puanlama cetveli hazırlanırken ne gibi kritik faktörlere dikkat edilmelidir?

c. Dereceli puanlama cetveli hazırlarken aşağıdaki etkenler sizi nasıl etkiliyor?

- Zümre kararları
- Müfredat
- Öğrencilerin tutumu
- Veli görüşü
- Okul yönetimi

d. Hazırladığınız dereceli puanlama cetvelini öğrencilerinizle paylaşır mısınız? Paylaşıyorsanız, uygulamanızın hangi aşamasında paylaşırsınız (Önce, sonra, uygulama sırasında)? Paylaşmıyorsanız neden?

14- 5. sınıf öğrencileri değerlendirilme süreçlerinde, size daha çok hangi konularda soru sorarlar?

a. Bu soruların neden kaynaklandığını düşünüyorsunuz?

15- 5. sınıflarla matematik derslerinde öğrencilerin başarılarını ölçmekte karşılaştığınız sorunları zorluk derecesine göre sıralayabilir misiniz?

a. Bu sorunların neden kaynaklandığını düşünüyorsunuz?

16- 5. sınıf matematik öğretim programlarını düzenleyen kişi siz olsaydınız, ölçme-değerlendirme yöntemleri ve uygulamaları konusunda ne gibi değişiklikler yapmayı öngörürdünüz? Neden?

APPENDIX B

THE IN-DEPTH INTERVIEW PROTOCOL (MAIN STUDY)

Tarih :
Başlangıç saati:
Bitiş Saati:
İyi günler. Benim adım Nihan UÇAR SARIMANOĞLU. Orta Doğu Teknik Üniversitesi Eğitim Fakültesi'nde doktora öğrencisiyim. Öncelikle benimle görüşme yapmayı kabul ettiğiniz için çok teşekkür ederim. 5. sınıf matematik öğretmenlerinin ölçme değerlendirme yöntemlerini nasıl uyguladıklarını öğrenmek amacıyla bir çalışma yürütmekteyim. Bu amaç doğrultusunda sizinle yapmak istediğim görüşmeyi kabul ettiğiniz için şimdiden teşekkürler. Yapacağımız görüşme öğrencilerin matematik dersi için yaptıkları çalışmaları nasıl değerlendirdiğinizi anlamam konusunda bana çok yardımcı olacaktır. Bu görüşmelerde vereceğiniz bilgiler çalışmamda farklı isim altında kullanılacaktır. Gerçek kimliğiniz gizli tutulacaktır. Bana sormak istedikleriniz olursa lütfen çekinmeden sorunuz. Ayrıca sizin için sakıncası yoksa görüşmeyi kayıt altına almak istiyorum.

1- Adınız Soyadınız?
2- Hangi üniversiteden mezunsunuz?
a. Hangi bölüm?

b. Yüksek lisans/ doktora?

3- Kaç yıllık matematik öğretmenisiniz?
a. Bugüne kadar kaçıncı sınıflara matematik öğrettiniz?
b. Mevcut okulunuzda kaçıncı yılınız?
4- Bu ders yılında kaçıncı sınıflara matematik öğretiyorsunuz?
a. Ders anlattığınız 5. sınıfların mevcutları nelerdir?

5- Bir öğrencinin veya tüm sınıfın dersinizi anlayıp anlamadığını nasıl tespit ediyorsunuz?

6- Sizce 5. sınıf öğrencileri matematiği nasıl öğreniyor ?

a. Öğrencilerin matematiği öğrenme biçimleri sınıf düzeyine göre farklılık gösteriyor mu? Nasıl?

b. Bu seviyedeki öğrencilerin matematiğe karşı tutumları nedir? Öğrenciler arasında tutumlar ne tip farklılıklar gösteriyor? Bu tutumlar hakkında nasıl fikir sahibi oluyorsunuz?

c. Farklı öğrencilerin matematikteki başarısında neler rol oynuyor? Farklı tiplerde öğrencilerden örnekler vererek açıklayabilir misiniz?

7. Bir 5. sınıf öğrencisinin yıl boyunca matematik başarısının düzeyindeki değişiklikleri nasıl tespit ediyorsunuz? Bunun için kullandığınız yöntemler var mı? Neden bu yöntemleri kullanıyorsunuz?

a. Yıl içinde puanlamadığınız ama öğrencinin matematik başarı düzeyini belirlemenize katkısı olan ölçme yöntemleriniz nelerdir?

b. Bu yöntemlerde dönüt verme işlemini nasıl yapıyorsunuz? Ne zaman veriyorsunuz? Ne tür dönütler veriyorsunuz?

c. Yazılı, sözlü değerlendirmeler, proje ödevleri, performans görevleri, ürün dosyası gibi notlandırdığınız yöntemler öğrencinin başarı düzeyini belirlerken sizin için ne kadar etkili oluyor?

d. 5. sınıflarda yıl boyunca notlandırdığınız ve notlandırmadığınız ölçme yöntemlerinden elde ettiğiniz sonuçları yıl sonunda öğrencilerin başarılarını belirlerken nasıl birleştirirsiniz? Birbirlerine katkıları olur mu? Oluyorsa bunun belli bir oran dağılımı var mıdır?

8- Sizce aşağıda belirtilen ölçme yöntemlerinin amaçları nelerdir?

a. Yazılı sınavlar

b. Proje ödevleri

c. Performans görevleri

ç. Drama çalışmaları

d. Ürün dosyası

e. Günlük tutma

f. Sözlü sunum

g. Poster hazırlama

h. Kavram haritaları

ı. Yapılandırılmış grid

9. Siz 8. soruda belirtilen yöntemleri 5. sınıflarda uygularken içeriklerinde neler oluyor? Örnekler verebilir misiniz? Bu içerikler neye göre değişiyor?

a. Soruları, projeleri ya da görevleri belirlerken etkilendiğiniz faktörler var mıdır? Ortak sınav yapılması, 8. sınıfta uygulanacak sınav, vs.?

10. Matematik dersi kapsamında 5. sınıflarda ölçme-değerlendirmeyi hangi zamanlarda daha çok yapıyorsunuz? Neden?

a. Değerlendirme sürecine kimleri katıyorsunuz? Öğrenci, akran, veli, başka öğretmenler?

11. 5. sınıflarda ölçme yöntemlerinizi belirlerken hangi kaynaklardan/materyallerden faydalanırsınız? Hangi amaçla? Nasıl?

12. 5. sınıflarla matematik dersinde hangi ölçme yöntem/yöntemlerini daha önemli görüyorsunuz? Niçin?

a. Uygulamadığınız yöntemleri kullanmama sebebiniz nedir?

13. Sizce performans değerlendirme nedir? Neden?

14. Performans değerlendirmeyi 5. sınıflarda nasıl yapıyorsunuz? Hangi yöntemleri kullanıyorsunuz?

a. Önemli olduğunu düşündüğünüz ama sizin kullanmadığınız bir performans değerlendirme yöntemi var mı? Neden kullanmıyorsunuz?

b.Kullandığınız yöntemleri seçerken veya oluştururken hangi kaynaklardan/materyallerden faydalanırsınız?

15- Sizce dereceli puanlama cetveli nedir?

a. Sizce 5. sınıf öğrencilerin çalışmalarının değerlendirilmesinde dereceli puanlama cetveli ne gibi işlevlere sahip olabilir? Siz nasıl kullanıyorsunuz?

b. Sizce dereceli puanlama cetveli hazırlanırken ne gibi kritik faktörlere dikkat edilmelidir?

c. Dereceli puanlama cetveli hazırlarken aşağıdaki etkenler sizi nasıl etkiliyor?

- Zümre kararları
- Müfredat
- Öğrencilerin tutumu
- Veli görüşü
- Okul yönetimi

d. Her değerlendirme yöntemini uygularken ayrı bir dereceli puanlama cetveli uygular mısınız? Örnekler verebilir misiniz? (Yazılı sınavlar, proje ödevleri, performans görevleri, ürün dosyası, vs.)

e. Hazırladığınız dereceli puanlama cetvelini öğrencilerinizle paylaşır mısınız? Paylaşırsanız uygulamanızın hangi aşamasında paylaşırsınız (Önce, sonra, uygulama sırasında)? Paylaşmıyorsanız, neden?

16- 5. sınıf öğrencileri değerlendirilme süreçlerinde, size daha çok hangi konularda soru sorarlar?

a. Bu soruların neden kaynaklandığını düşünüyorsunuz?

17- 5. sınıflarla matematik derslerinde öğrencilerin başarılarını ölçmekte karşılaştığınız sorunları zorluk derecesine göre sıralayabilir misiniz?

a. Bu sorunların neden kaynaklandığını düşünüyorsunuz?

18- 4+4+4 eğitim sistemiyle birlikte ortaokula dahil edilen 5. sınıflarda uyguladığınız matematik öğretim programı hakkındaki görüşleriniz nelerdir?

i. Amacı

ii. Uygulanabilirliği

iii. Yararları

iv. Ölçme değerlendirme boyutu

a. 5. sınıf matematik öğretim programını düzenleyen kişi siz olsaydınız, ölçme-değerlendirme yöntemleri ve uygulamaları konusunda ne gibi değişiklikler yapmayı öngörürdünüz? Neden?

APPENDIX C

POST-ACTIVITY INTERVIEW PROTOCOL

1. Çalışmayı uygulamadan önce değerlendirme sonuçlarını ne amaçla kullanacağınıza karar verdiniz mi?

2. xxx çalışmasını nasıl değerlendirirsiniz? Öğrencinizin konuyla ilgili başarı düzeyine bu çalışmayla nasıl karar verirsiniz? Neden?

3. Sonuçları ne amaçla kullanacaksınız? Neden?

4. xxx çalışmasının sonuçları dersin işlenişi ya da öğrenci başarı seviyesi konularında size fikirler verdi mi? Nasıl?

5. Çalışma sonuçlarını paylaşacak mısınız? Öğrenciyle, velilerle, okul idaresi ya da diğer öğretmenlerle? Neden?

6. Bu çalışma sonucunda öğrencilerin konuyla ilgili hangi hataları yaptığını gözlemlediniz? Bu gözlemlerinizi ne amaçla kullanmayı düşünüyorsunuz? Neden?

7. Uygulamadan önce çalışmanın sonucunda öğrencilerin neler yapabileceğini bekliyordunuz, değerlendirmeniz sonucunda farklı gözlemleriniz oldu mu? Nasıl? Farklı öğrencilerin çalışmalarından örnekler vererek anlatır mısınız?

8. Bir öğrencinizin konuyla ilgili başarı düzeyine yönelik xxx çalışmanızdan önceki ve sonraki fikirleriniz arasında farklar var mı? Nasıl?

APPENDIX D

FINAL INTERVIEW PROTOCOL

1. Yazılılarda ya da etkinliklerde, proje ödevi, performans görevinde 5. sınıf öğrencileriniz için yaparlar diye öngörmenize rağmen zaman zaman beklediğiniz sonucu alamamış olmanızı neye bağlıyorsunuz?

2. Dönem boyunca uyguladığınız ölçme-değerlendirme uygulamalarınızda 5. sınıf öğrencilerinizin yaptığı hataları gözlemlediğinizde ne yaptınız?

3. Yazılı, performans görevi ya da proje ödevi gibi ölçme-değerlendirme uygulamalarının sonuçlarını açıkladıktan sonra, neden sadece istekli öğrencilere gösteriyorsunuz?

4. 5. sınıf öğrencilerinizin matematik öğrenirken yaşadıkları güçlüklerin belirlenmesinde, dönem boyunca uyguladığınız ölçme-değerlendirme çalışmalarınızı nasıl kullandınız? Neden?

5. 5. sınıf öğrencilerinizin zaman içinde ne kadar geliştiğini incelemek için dönem boyunca uyguladığınız ölçme-değerlendirme çalışmalarınızı nasıl kullandınız? Neden?

APPENDIX E

ACTIVITIES

İsim-Soyad: **Tarih:**

Etkinlik 1: Kısa Sınav

1. Aylin $\frac{2}{3}$ ve $\frac{4}{5}$ kesirlerinin bütüne yakınlıklarının aynı olduğunu ve bu yüzden aynı çokluğu ifade ettiklerini söylemektedir. Aylin'e katılıyor musunuz? Açıklayınız. Açıklamanızı netleştirmek için şekil çizebilirsiniz.

2. Aşağıdaki dikdörtgen üzerinde $\frac{3}{5}$ kesrine denk olan bir kesir tarayınız.

a. Bu kesrin $\frac{3}{5}$ kesrine denk olduğuna nasıl karar verdiğinizi açıklayınız.

3. $\frac{3}{4}$ mü yoksa $\frac{4}{3}$ mü daha büyüktür? Açıklayınız. Açıklamanızı netleştirmek için şekil çizebilirsiniz.

APPENDIX E

ACTIVITIES

Ad-Soyad: **Tarih:**

Etkinlik 2: Kesirlerde Toplama

1- Elinizdeki materyalleri kullanarak aşağıdaki kesirlere örnekler oluşturunuz.

a. Paydası aynı olan iki farklı kesir:

b. Payı aynı olan iki farklı kesir:

2- Elinizdeki materyali kullanarak $\frac{1}{3}$ ve $\frac{2}{3}$ kesirlerini toplamaya çalışınız. Nasıl yaptığınızı model çizerek anlatınız.

a- Elinizdeki materyalle yaptığınız bu işlemi matematiksel ifade olarak yazınız

3- Elinizdeki materyali kullanarak $\frac{2}{4}$ ve $\frac{1}{8}$ kesirlerini toplamaya çalışınız. Nasıl yaptığınızı model çizerek anlatınız.

a- Elinizdeki materyalle yaptığınız bu işlemi matematiksel ifade olarak yazınız.

APPENDIX E

ACTIVITIES

İsim-Soyad: **Tarih:**

Etkinlik 3: Problem Çözme

SORU: Kuklalara çok meraklı olan Barış bazı fiyatları araştırmak üzere Kukara isimli kukla mağazasına gidiyor. Barış bu mağazadan beğendiği Pinokyo kuklasını ya da kuklayı yapmak için gerekli malzemeleri alabilir. Mağazanın fiyat listesi aşağıdaki gibidir.

Ürün	A marka (TL cinsinden fiyatı)	B marka (TL cinsinden fiyatı)
Bütün olarak bir Pinokyo kuklası	20	26
Pinokyo şeklinde yontulmuş dayanıklı ve yumuşak ıhlamur ağacı parçası	7, 75	11,25
Pinokyo'nun şapkası, pantolonu ve ayakkabılarından oluşan kıyafet seti	4	9, 5
Pinokyo'nun burnunu, kaşlarını, saçlarını ve yanaklarını boyamak için hazırlanmış ahşap boyama seti	3, 5	6
Kuklayı oynatmayı kolMs Kayaştıracak tel ve levha malzemeleri seti	3	5, 5

Barış gerekli malzemeleri satın alarak kendisine bir Pinokyo kuklası yapmaya karar veriyor. Malzemeleri birleştirerek yapılacak en düşük fiyatlı Pinokyo kuklası için Barış'ın kaç TL'ye ihtiyacı vardır?

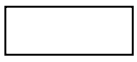
APPENDIX E

ACTIVITIES

Ad-Soyad: **Tarih:**

Etkinlik 4: Dikdörtgen Oluşturma

Soru: Elinizdeki materyalde iki nokta arası 1 birim (br)'dir. Buna göre aşağıda uzunlukları verilen doğru parçaları ile dikdörtgen elde etmeye çalışınız. Dikdörtgenleri elde edip edemediğinizi yanlarına not alınız. Sizce neden ne olabilir?

	 **Elde edebildiniz mi?**	**Elde edemediyseniz nedeni?**
2 br, 4 br, 2 br, 4 br		
2 br, 2 br, 3 br		
3 br, 1 br, 3 br, 5 br		
5 br, 3 br, 5 br, 3 br		

APPENDIX F

CODING SHEET

Themes	Codes
Theme: Teachers' views about students' learning of mathematics	Code_a2: Primary school teacher or mathematical background affect students' learning Code_a3: Mastery of mathematics develops by regular studying Code_a4: 5th grades can not study by themselves Code_a5: Students' natural ability about mathematics affects their learning Code_a6: Some external factors affect learning and teaching mathematics (e.g: classroom environment, parents, socioeconomic level, time limitation) Code_a8: 4+4+4 programme includes workload for both teachers and students Code_a9: 5th grades are too young to adapt secondary school programme Code_a10: It is a positive innovation for the education system that 5th grades are learning mathematics from mathematics teacher Code_a11: Students' enthusiasm and mathematics achievement are relevant Code_a19: 5th grades' textbook is efficient for both teachers and students (e.g teaching less topic is a positive innovation for 5th grades)
Theme: Teachers' views about assessment	Code_a7: Some assessment methods are not suitable for mathematics (or more suitable for other branches; or are not suitable for all mathematics topics) Code_a1: Assessment is important for students to have meaningful learning (e.g. understand the reason for learning a mathematical concept) Code_a12: There is an order of importance between assessment methods Code_a13: Objectivity is a need in assessment Code_a14: Assessment encourages students to study Code_a15: Assessment motivates students to perform better (e.g learning from mistakes) Code_a16: Assessment motivates students for external exams (e.g national summative exams) Code_a17: Assessment motivates students for real life situations Code_a18: Teacher is a counselor in assessment process Code_a19: Some factors affect assessment process Code: Assessment instruments should be sophisticated (eg: should encourage creativity, should connect mathematics to other fields) Code: rubric is a formality

Theme: Teachers' classroom assessment procedures	Code_b1: Formal assessment (must be carried out; there is a connection between them; constructed-response items, paper-and-pencil exams, project-study, performance-tasks) Code_b2: Informal assessment (e.g getting observational data, whole-class worked examples, giving a short question at the end of a lesson; homework; discussions and presentations are permitted) Code_c1: Using prescribed criteria (scoring criteria, scoring guidelines, rubrics) Code_c1i: Using prescribed criteria_selecting criteria (preparing the rubric or scoring criteria) Code_e1: Using assessment to understand how much students learn and to evaluate students' understandings (Before/During a topic) Code_c2: Reporting the results to students/parents/school administration Code 20: Cooperating with people such as parents, school administration, other teachers, etc. Code_20i: Cooperating with people such as parents, school administration, other teachers, etc_negative
Theme: Teachers' use of assessment results for making instructional decisions	Code_d1: Using assessment results for repeating a topic Code_d2: Understanding teaching effectiveness Code_d5: Using assessment results for teaching a topic
Theme: Teachers' use of assessment results for making decisions on their assessment practices	Code_d3: Making adjustments for further assessment Code_d4: Deciding the suitability of assessment method
Theme: Teachers' use of assessment results for improving students' learning of mathematics	Code_e2: Using assessment results to encourage self-study among students (e.g presentations that are carried in the classrooms; handworkings) Code_e3: Using assessment results for evaluating students' achievement levels Code_e7: Using assessment results to monitor students' progress Code_e8: Using assessment results to prevent students from feeling anxious Code_e9: Using assessment results to figure out students' mathematical background Code_e10: Using assessment results to prevent cheating Code_e11: Using assessment results for grading students' work Code_e12: Using assessment results for giving formative feedback Code_e12i: Using assessment results for giving formative feedback_negative Code_e6: Using assessment results to know students better_Diagnostic purpose (e.g using asessment to identify areas of strengths and weaknesses) Code_e7: Using assessment results for rewarding

APPENDIX G

TURKISH VERSIONS OF THE QUOTATIONS

q1: *Çocuğu her yönüyle gözlemleyebiliyorsun. İşlem becerisini gözlemliyorsun, soruya nasıl yaklaşmış, anlamış mı, matematiksel olarak nasıl yazıyor. Herşeyi gözlemleyebiliyorsun*
q2: *Aslında dersteki benim değerlendirmemde; ders esnasındaki ölçme ve değerlendirme sürecinde, yani gözlem sürecinde zor bir şey olduğunu düşünmüyorum. Yani tamamen öğrenciyle benim aramda hiçbirşey yok, hiçbir engel yok. Ben tamamen objektif olarak ölçebiliyorum. O yüzden zaten en çok ona önem veriyorum*
q3: *Mesela diyelimki bir defa tahtaya kalktı, fena değil galiba diyorsun. Ama bu artık birkaç defa tekrarlanınca, tamam diyorsun yani öğrenci gerçekten başarılı. İyi diyorsun, ilgili diyorsun, bilmediğini soruyor diyorsun*
q4: *Mesela bir tanesini, 2 tanesini ben örnek çözüyorsam 2 tanesine de öğrenciyi kaldırıyorum. Sonra, ünitenin bir bölümü bittikten sonra, karışık alıştırmalar çözüyorum. Karışık alıştırmalar çözmek için o konularla ilgili, ben bir ünitenin tamamının bitmesini beklemiyorum. Mesela işte bir bölümü, mesela bugün ne gösterdim ben ondalık açılım. Bunu ben gösterdikten sonra, sonrasında, karışık alıştırmalar çözdük ondalık açılımla ilgili*
q5: *Hangi öğrenci sorulursa sorulsun kesinlikle hakkında bir fikrim var. Yani böyle öğrenci hafızam da kuvvetlidir. Diyorum ya soru için tahtaya kalktığında kafamda bir puan alıyor zaten benim*
q6: *Bu noktada velileri değerlendirme sürecine dahil etmekten memnun oluyorum. Bana öğrencilerinin evde çok çalıştığını ama çekingen olduklarını, hata yapmaktan korktuklarını anlatıyorlar. Benden öğrenciyi tahtaya kaldırmamı rica ediyorlar. Tabii ben de derslerde bu hatırlatmaya dikkat ediyorum*
q7: *İnternetten. Ders kitaplarında oluyor veya o an ders anında aklıma geliyor. Bunları not alıyorum ve sınavlarda soruyorum*
q8: *Bu sorunun amacı öğrenci dikdörtgenin özelliklerini öğrenmiş mi, onu gözlemlemek. Öğrenci ilk iki işlemi doğru yapmışsa, özellikleri anlamış demektir.. O zaman son işlemi yanlış yapmış ya da yapamamış bence çok da önemli değil. İlk iki işlemde bunu gösterebilir zaten. Dikkat eksikliğinden yapamamış olabilir bence. Bu yüzden puanın çoğunu ilk iki işleme, sadece 2 puanı ise son işleme verdim*
q9: *Burada kazandırılmaya çalışılan öğrenciye sıralama yaptırabilmek. Bir öğrencinin yanlış işaret kullanarak sıralama yapması büyük hata. Yani, sonuçta virgül koymamış, yanlış işaret kullanmış. Bu yanlış bildiğini gösterir*
q10: *Kağıtlarını dağıtıyorum. Cevap anahtarımı da masamın üzerine koyuyorum veya işte ellerine veriyorum. İşte hangi soru kaç puan, nasıl puanlanmış, nerede hata yapmışlar kesinlikle gösteriyorum ki bir daha o hataları yapmasınlar*
q11: *Grupları oluştururken eee dengeli dağıtım yapmaya çalıştım. Yani mesela çok başarılıları bir arada verip, çok başarısızları bir grup yapmadım. Denge işte bir başarılı, iki orta, bir başarısız şeklinde dağıtmaya çalıştım*
q12: *Öğrencilerin seviyelerini biliyorum. Ayrıca geçen dönem, performans görevlerini yaparken, el becerilerini de gözlemledim. Bu yüzden proje ödevi olarak*

dörtgenlerin özelliklerini, farklarını, ve yapılışlarını vermenin onlar için faydalı olacağını düşündüm. Bence seviyesine göre proje hazırlayan bir öğrenci çalışmasını isteyerek tamamlar. Ayrıca matematikten soğumaz. Dahası başarısız çocukların yüksek not almasını da istedim

q13: *Yani benim sınıfımda hatanın çoğu ondalık gösterimlerde toplama çıkartmada değil de mantık kurmada, yani yapılan hatalar mantık kurmada. Çünkü toplama çıkartma yapmayı öğrenmiş ama hangi markanın daha ucuza mal olacağına karar verememiş. Yani bu da aslında dersin kazanımıyla çok bağlantılı değil diye düşünüyorum. Bu onun kendisinin soru çözmesiyle alakalı bir problem. Veya kendi düşünmesiyle, problem çözme yeteneğiyle alakalı bir problem diye düşünüyorum. Yani toplama çıkartma işlemini hatalı yapsalar ders kazanımıyla alakalıdır derim, dersi tekrar veririm ama öyle değil*

q14: *Bir tek kesir şeritlerini kullanarak modelleme yapmada sıkıntıları ve soruları oldu. Bunun da sebebi bence bu konudaki tecrübelerinin olmaması. Onun dışında konuyla ilgili soruları olmadı. Demekki ben kesirlerde toplama konusunu anlatabilmişim, bu konuda yeterince soru çözmüşüm*

q15: *5. sınıflardan 7 kişi matematikten proje ödevi almış. 1. Dönem performans görevlerini yaptırıken öğrencilerin seviyesini ve el becerilerini gözlemledim. Böylece belirlediğim çokgenlerin özelliklerini, aralarındaki farkları ve çizimlerini proje ödevi olarak yaptırmanın onlar için uygun olacağına karar verdim*

q16: *Mesela sınıfta üçgen çizip onlara bunun bir diktörgen olup olmadığını sodum. Hepsi dikdörtgen olmadığında hemfikirdi ama sebebini açıklayamadılar. Bazıları tahtaya dikdörtgen şekli çizip, işte didörtgen böyle oluyor dedi. Kimisi bu diktörtgen değil çünkü o bir üçgen dedi. Yani soru açık uçlu olunca cevaplayamıyorlar, hazır değiller bence. Ayrıca böyle soruları okumak ta zor benim için. Belki çocuk cevabı biliyor, diktörtgenin her özelliğini biliyor ama Türkçe'yi iyi kullanamıyor.Cevabı da yanlış veriyor o yüzden. Nasıl bilebilirim ki?. Açık uçlu soru sormuyorum yazılılarda o yüzden*

q17: *Soruların tamamı derste sorduklarım gibi. Yani ekstradan çok fazla değişik tip soru alıp getirmedim. Sınıf başarısı da gayet yüksek. Ayrıca, soruların kazanımları karşıladığını düşünüyorum. Yani kazanımlarla uyumlu benim fikrimce. O yüzden de bence çocukların başarılarını ölçmeye yeterli bir sınav*

q18: *Başarı yükselmesini takip ediyorum- zaten çalışınca katılımının arttığı gözlemleniyor. Veya daha düzenli çalışmaya başlıyor. Anlamadığını sormaya başlıyor. Veya işte yazılıdan düşük alıyor ama performansı çok güzel getiriyor. Yani uğraşıyor bir şekilde*

q19: *Hatalarını gözlemlerim ve kafama yazarım. Böylece, daha sonra hataların düzelip düzelmediğini diğer ölçme yöntemlerinde gözlemleyebilirim.. Gözlemlediğim ve kafama yazdığım için de hem konuyla ilgili yapılan hataların düzelip düzelmediğini, hem de öğrencinin o hatayı bir daha yapıp yapmadığını takip edebilirim*

q20: *Bence verdi yani ilk dönem şeyini de karşılıyor. Yani ilk dönem başarılı olan çocuk, gerçekten başarılı olanlar yine başarılı*

q21: *Ders esnasında derse aktif olarak katılan ve başarı gösteren öğrencilerin bu yazılıda da başarılı olmasını bekliyordum, beklediğim gibi oldu. Sadece birkaç öğrenciden 85in üzerinde notlar beklerken, 82-83 gibi 5e yakın ama yine de 5 olmayan notlar geldi. Genel olarak beklediğim öğrenciler beklediğime yakın notlar aldı*

q22: *Yazılılardan, performans görevinden ve proje ödevlerinden çıkan ortalamaya bir baktım. Öğrencim Demir'in notu 80 çıktı ama çocuk bence 90lık bir öğrenci. Gözlemle karar verdim. Yani gözlem derken hani nasıl diyeyim, böyle hiçbir şey yapmadan da tabiki çocuğa not vermedim ama baktım işte derse katıldı, parmak kaldırdı, ilgiliydi. Diyorumki ya bu 90. Yani tamam yazılılardan pek yüksek alamamış ama hani böyle kafamdan değerlendirmeyi yaptım. Gözlemlerimle zaten her öğrenci için kafamda bir not oluyor. Yani benim için yazılı ve performans görevinden aldığı notların 80 olması önemli değildi. Ben ona 80 yerine 90 verdim. Yani bir şekilde yazılıdaki eksikliği veya işte performansındaki eksikliği telafi ettim çünkü dediğim gibi öğrencinin seviyesini kesinlikle biliyorum. Eksikliği bir şekilde telafi ettim*

q23: *Buradaki üçgenle ilgili verdiğin bilgi anlaşılmıyor. Konuyu daha açık özetlemelisin. Ayrıca üçgenin çizimini de düzeltmelisin. Bir daha bu hataları yapmamak için daha dikkatli araştırma yapmalısın*

q24: *Çalışmaları yeterli değil. Geçmiş konuları tekrar etmesi gerekli. Konuyla ilgili eve test gönderiyorum. Lütfen yapması için destek olunuz*

q25: *Veliyi de bilgilendiriyorum. Böylece veli de öğrencisinin matematikteki gelişimini takip edebilme şansını yakalamış olur. Dahası evde destek olurlar tekrar konusunda. Öğrencilerin eksiklerini velinin de bilmesi iyi olur. Onlarla işbirliği sağlamak öğrencilerin gelişimine olumlu katkı yapar*).

q26: *Ama genel olarak yapılamayan soruları ya da yapılan hataları tahtaya çözdüm. Buradan kontrol edin dedim. Tahtaya düzeltilmişini çözüp, bakın buralara dikkat edin dedim. Genellikle uygulama anında yaptım bunları çünkü daha etkili oluyor o anda uygulandığı için*

q27: *Tahtaya kalkmak istemiyor. Yani kolay bir örneğe bile parmak kaldırmıyor o çocuk hiç. Zaten çocuk hiç parmak kaldırmıyorsa anlamadığını anlıyorum. Kaldırmak istiyorum bir yandan, bir yandan da, çocuk yapamadığı için, tahtaya kalkması başarısızlık gibi olacak, yapamayacak. Rencide etmek istemiyorum çünkü yapamadığı zaten belli. Yani kaldırıp ta tahtada, bir daha yapamamasını perçinlemiş gibi oluyorsun. O yüzden zorlamıyorum*

q28: *Yani aslında bir de şöyle yapıyorum mesela diyelim ki az kalkan veya başarısız bir çocuk parmak kaldırıyor. Hemen onu kaldırıyorum teşvik etmek için. Yani aslında ben herkese şans veriyorum, kendilerini rahat hissetmelerini sağlamaya çalışıyorum*

q29: *Bir de bazılarının da şöyle bir problemi oldu. Mesela modelleyecek, oraya şeklini çizip, kağıttan kesip o şekille kesilen kısmı üstüne denk getiremiyor yani el kabiliyeti olmayan gruplar da var. Aslında mantığını yapabiliyor ama yani ne yapacağını biliyor ama onu oraya monte edemiyor. Böyle gruplar da vardı*

q30: *Mehmet diye bir öğrencim var mesela çok başarılı. 3. soruda mesela bileşik kesri yazmış, düşünmüş. Onu nasıl modelleyeceğini hatırlayamıyor. Yani onun tam sayılı kesir halinde mesela işte bana gelmiş diyorki öğrenci 15/4; 15 çizgi çizmiş, şimdi ben bunu 4ünü mü şey yapacağım diyor, böyle de olmazki diyor. Aslında bunun olmadığını anlıyor ama onu tam sayıyla yazıp oralara tam model koyması gerektiğini düşünemiyor*

q31: *Daha çok doğru cevap bekliyordum açıkçası. Yani beni de yanıltan kişiler oldu. Daha çok doğru cevap bekliyordum. Beklediğim kadar doğru cevap gelmedi aslında. Bunun da toplama-çıkartma işleminden değil de problem çözme becerisi yok veya işte sadece işlem olarak verilse, problem olarak istenmese yapabilirler. Yani bir kuklayı oluşturacak malzemelerin fiyatları şudur, kuklanın fiyatını bulun deseler, çocuklar yapabilir*

q32: *Dikdörtgenin tanımını sormuşum. Çocuk tanımını yazamıyor. Şekil çizsem olur mu dedi mesela. Şekille anlatmak istiyorum dedi ve doğru çizdi. Yani dikdörtgeni, özelliklerini öğrenmiş ama onu çizerek tanımlarken daha rahat hissediyor*
q33: *Mustafa diye, Ali diye birkaç öğrencim var yani öyle dersle ilgileniyormuş gibi çok gözükmüyorlar, derste çok aktif değiller, bir de yaramazlar biraz da ama 95in üzerinde not aldılar. Yani demek ki dersi anlıyorlar veya evde çalıştığı zaman başarılı oluyor çocuk. Yani derste mesela bu öğrencileri çok uyarıyorum ben-yapmayın, susun, konuşmayın diye. Ama çocukta potansiyel var yani öğrenebiliyor. Yani yaramaz ama aynı zamanda da başarılı*
q34: *Yani çocuklar iyi. Ben iyi buluyorum. Yani orta seviyenin biraz üstündeler. Çok iyi, çok süper olan da var bir iki tane. Ama genel olarak işte orta seviyenin biraz üstü. Bir de eee istek var. Yani mesela geçen seneki 5lerim o kadar istekli değildi. Bu senekiler çok istekli*
q35: *Yaşları küçük olduğu için kendi kendilerine çalışma becerileri henüz tam gelişmemiş. Herşeyi soruyorlar. Hatta kullanacakları kalemi, defter düzenini bile soruyorlar. Yani soru-cevap şeklinde çalışmak onların öğrenmesinde daha etkili oluyor. Kendi kendilerine bırakmak, çalışmalarını beklemek o kadar etkili olmuyor*
q36: *Düşünceleri henüz gelişmemiş. Bu yüzden kendi hazırladıkları çalışmaların eksiklerini çok net göremiyorlar. Bana daha çok performans görevi ve projeden soru soruyorlar. Mesela öğrenci diyorki öğretmenim ben yarısını yaptım, doğru gidiyor muyum, size göstersem olur mu? Veya ben ödevi anlamadım, neyi tam araştıracağımı bilemiyorum diyor. Danışıyorlar. Açıklıyorum, sorularını cevaplıyorum. Yani danışma süreci oluyor*
q37: *Bazı öğrencilerde yetenek yok. Yani çocuk 10 defa da çalışsa konuyu algılayamıyor*
q38: *Mesela 5'e giden öğrencilerimde çarpma, bölme bilmeyenler var. 7'ye giden öğrencilerimde de var. Yani temel yok. Çocuk çarpmayı, bölmeyi öğrenmemişki ilkokulda. Ben ona kalkıp ta daha zor bir konuyu nasıl öğretebilirim*
q39: *İlkokul sınıf öğretmeninin matematik yönünden katkısı çok önemli. Öğrenci toplama-çıkarmayı bilmiyorken, bir problem çözme becerisi yokken ortaokul matematiğini yapamaz diye düşünüyorum. Yani bence...yüzde olarak vermek istersem en büyük yüzde sınıf öğretmeninin olabilir. Sonra çocuğun matematik yeteneği. Yani ben ortaokul matematik öğretmeninin çok az bir rol oynadığını düşünüyorum. Mesela çocuk okula gelemedi, öğretmeninden o konuyu dinleyemedi. Bu çocukta eğer matematik temeli, yeteneği ve isteği varsa evde çalışıp ta yapabiliyor bunu yani. Sadece matematik öğretmenine bağlı değil diye düşünüyorum*
q40: *Öğrencinin bu uygulamada sorularda hata yapma sebebi ben öğretmediğimden değil, kendisi tekrarlamadığından; çünkü ben aynısından çözdüm derste*
q41: *Bazı öğrenciler için sınıf değişikliği öneriyoruz ve okul idaresi de bunu onaylıyor. Bu uygulamanın sebebi, öğrencinin çalışkan öğrencileri örnek alıp, onlar gibi davranmasını sağlamak*
q42: *Sadece matematik öğrenmekle ilgisi yok, aynı zamanda müzik aleti öğrenmeye de çalışıyor; doğMs Kaya ilgili araştırmalar yapıyor. Eee hatta karıncalarla ilgili bir kitap bile yazmış. Kapağına çok harika-karıncMs Kaya ilgili bir resim yapmış. İçine-önsöz kısmına-karıncalarla ilgili bilgi vermiş. İnternetten test sorusu araştırır, matematikle ilgili araştırmalar yapar. Temeline baktığımda, anne babanın aşırı ilgisi var. Okumuş insanlar ve kendisi tek çocukları. Çocukluğundan beri onunla çok ilgilenmişler. Çok ilgilendikleri için de çocuk kendini geliştirmiş*

q43: *Hem yöntem uygulayayım, hem ders işleyeyim, hem çocukları kontrol altında tutayım dersen...hepsi birarada olmuyor, çok zor oluyor. O yüzden, illaki, birinden feragat ediyorsun*
q44: *Mesela şöyle olabilir. Kesirlerde toplama çıkarmayı falan gösteriyorsun. Bir de kesir problemleri var ya. Mesela sarmal şekilde ilerliyor ya. Mesela kesir problemleri 6. sınıfın konusu olsun. Kesirler biraz azalsın mesela. Sen toplamadan, çıkarmadan daha çok örnek çöz. Ama benim programımda bakıyorum bir sürü konu var. E ben toplama çıkartma yapsam problemlere az kalacak-az zaman kalacak. E hızlanıyorsun sen onun için. Kitap kalın mesela bence. Mesela biraz sadeleştirilebilir böyle. Bazı konular bir sonraki yıla bırakılabilir. Mesela 8lere-tabi 8lerin konuları daha ağır ama-8lerin konusu çok az, 6ların konusu da çok yoğun mesela. Ben ilk öğretmenlik yılımda, mesela, 6ların müfredatını yetiştirmekte zorlanıyordum. 5lerde de öyle yani. Bence zaman tam yetiyor*
q45: *Şu yönden iyi değil: hızlı geçiş oldu. Biraz bocalamaları oluyor öğrencilerin. Belki yaşlarından veya düşünce olarak çok gelişmemiş olmalarından, ilkokul öğrencisi soruları soruyorlar. İşte şunu renkli kalemle mi yazsam, şu alt başlık mı.*
q46: *Ölçütü ne kadar çok tutarsan sonuca o kadar çok ulaşırsın. Bir yazılı yapmak mı, 3 yazılı yapmak mı? Tabii ki 3 yazılı yapmak daha etkili. Bazı öğrenciler kendilerini üç yazılı sınavda da gösteremeyebiliyor ama derste aktif oluyorlar. Bu yüzden bir öğrenci olabildiğince çok değerlendirmek daha etkili bence*
q47: *Çocuklar proje ve performans çalışmalarıyla yazılı notlarını yükseltmek istiyorlar. Yazılıdan yüksek alamayan öğrenci projeyi matematikten hazırlamak istiyor. Böylece notunu yükselteceğini düşünüyor; 2 yapayım, 3 yapayım diye düşünüyorlar*
q48: *Projeyi senede bir tane veriyoruz çünkü proje daha üst becerileri ölçüyor. Çocuğun sadece matematikten kesirler konusunu öğrenmesi yeterli değil. Çocuğun matematik dünyasıyla ilgili başka bilgilere de ihtiyacı var. Kesip yapıştırmaya da ihtiyacı var, afiş hazırlamaya da ihtiyacı var, araştırma yapma becerisi kazanmaya da ihtiyacı var. Geleceğine yönelik yani. Yani diğer becerileri de kazanmaya ihtiyacı var. Mesela benim zamanımda öğretmen -ama tabi ilkokul muydu ortaokul muydu yoksa onu çok hatırlayamadım-sözlükten kelimelerin anlamını isterdi mesela. Orada biz neyi öğrenirdik. Sözlük nasıl kullanılır. Sözlük kullanamayan insanlar var. Mesela öğretmen altın oran konusunu ödev veriyor. Bu gerçek hayatı da ilgilendiren bir konu. Öğrenci onu performans ile öğreniyor. İşte böyle şeyler veya işte internetten nasıl araştırma yapılacağı proje ödevi sayesinde oluyor. Aslında, bence, amacına uygun uygulansa güzel; ama bence amacına ulaşmıyor*
q49: *Perfomans değerlendirme…yani bence bu eğitimi e işte yazılı sınav, 10 soru veya işte 25 soru kalıbından kurtarmak için çocuğun diğer becerilerini de ölçmek için bir yöntem; ama çocuk onu uygularken sen göreceksin, gözlemleyeceksin*
q50: *Çok fazla değerlendirme yöntemi var. Bunları yapabilmek için az sayıda sınıfının ve öğrencinin olması gerektiğini düşünüyorum. Diğer türlü öğleden sonralarımı hep bunları hazırlamak, bunlarla uğraşmakla geçirirsin. O yüzden herşeyi yapamıyorum. Yani eve çok iş götürürsün. O yüzden yapmıyorum hepsini. Daha çok temel ve önemli şeyleri yapmaya çalışıyorum*
q51: *Çocuğun dersteki performansına bakıyorsun ve derste de kendin direkt gözlemliyorsun yani hiçbir şey yok, hiç başka bir kıstas yok. Direkt çocuğun hakkındaki bütün gerçek ortaya çıkıyor. Yani performans, proje gibi değil*

q52: *Yani mesela atıyorum 10 kişi normalde 5 alabilecekken 5 kişi 5 aldı. Ama diyorum ben herhalde işte ilk sınavdı, e onlar beni tanımıyor, ben onları tanımıyorum. Kafaları karışmış olabilir. Bir de daha çok klasik tarzı sormuşum, test çok koymamışım mesela. Yapamadılar, bocaladılar, panik yaptılar. E baktım sınıfta genel böyle bir Ms Solmazm var yazılı notlarını o yüzden böyle çok aşırı kıstas almadım. Ders içi performans notlarını verirken daha esnek verdim*

q53: *Kavram haritaları mesela üçgenler konusunda gibi böyle sınırlı-üçgen çeşitleri gibi konularda sınırlı çünkü tanımlar var. Bu yüzden ben matematikten daha çok fen derslerine uygun olduğunu düşünüyorum. Yine de o çok etkili bir şekilde kullandığım bir yöntem değil*

q54: *Performans görevini ve proje çalışmasını evde yaptığı zaman kendisi mi yapıyor emin olamıyorum. Belki başkasından yardım alıyor veya işte internetten hazır bir şey alıp yazıyır. Bu çok büyük bir başarı değil bence. Mesela bir konu vermişim-atıyorum altın oran. İnternetten bakıp, kağıda yazıp getirmiş. O büyük bir değerlendirme değil bence. Bence derse katılımı, parmak kaldırması ve yazılı notları tabiki diğerlerinden daha önde. Ben bunlara daha çok önem veriyorum. Tabiki performansla projeye de önemsiz demiyorum ama yani…bence kesin bir sonuç vermiyor*

q55: *Drama çalışması gibi teknikleri kullanamıyorum çünkü yaşları daha küçük, ilgilerini çekmiyor. Öğrenciler kendi proje ödevlerini bile kendileri yapmıyorlar; veliler yapıyor*

q56: *Ben bunu grup çalışması olacak şekilde düzenledim ama beklediğim gibi olmadı. 72 dakikaları olmasına rağmen, vakit kaybetip zamanı yetiştiremediler. Sadece 3 basit soru vardı. Sınıfta böyle soruları kolayca cevaplıyorlar. Karar veremediler, görev paylaşımı yapamadılar, kimin kelimeleri yazılacak çalışmaya karar veremediler. Çok başarılı öğrenciler bile bocaladılar. Buna rağmen grup çalışmasını öğrenmeleri gerek diye düşünüyorum*

q57: *Bence proje hazırlamak 5. sınıf programından kaldırılabilir, performans ta belki; çünkü üst düzey kazanımlar için biraz zekanın da, düşüncenin de olgunlaşması lazım ama 5. sınıf çocuklarında o olgunlaşma yok. Mesela 5. sınıf çocuğunun ben afişi anlamamasını, hazırlayamamasını anlayabiliyorum. Bu konuda değişiklik yapmak isterdim*

q58: *Bazıları matematiksel olarak düşünebiliyor ve çalışmalarında işlemleri doğru yapıyor. Açıklama istendiğinde ise bunları cümlelere dökemiyor. Düzenli okuyor olsalar, işlemleri kelimelere dökmekte sorun yaşamazlar*

q59: *Benim birebir görebildiklerimi ben daha çok önemsiyorum galiba. Gözlem yani. Direkt görebildiğim için. Evet yazılılar yapıyoruz ama o yazılıya da girerken de bir önceki derste ya da daha önce işlediğim derslerde bu çocukların nasıl olduklarını az çok kestirebiliyorsun. Yani o yüzden…Evet çok istisnalar oluyor, o ilk anlattığım örnek gibi o çocuk derste aktif değil ama sınavdan yüksek bir not almıştı. Öyle sınavlar elbetteki olacaktır ama ben daha gerçekçi olduğunu düşünüyorum kendi gözlemlerimin*

q60: *Zaten öğrenen çocuk böyle gözlerinden şak diye anlıyosun yani. O çocuk derse de katılıyor. Israrla parmak kaldırıyor. Sen söz hakkı vermesen bile kendini parçalıyor. Ama bilmeyen çocuk saklanıyor. Gözlerini kaçırıyor. Hani hiçbirşey, uygulama yapmasan bile o çocuğun öğrenmedğini anlıyorsun*

q61: *Ya şöyle yapıyorum ben mesela hani anlatacağım bir şey var diyelim. Öncesinde önden bilgileri var mı diye bir yokluyorum. Hani soru-cevap şeklinde. Bazen de işte atıyorum mesela biz üslü sayıları gördük. Karesel işte küp falan. Bu konuyla ilgili problemlerin öncesinde mesela ilgili sorular sordum. Atıyorum işte beşin karesi kaçtı? İşte ikinin küpü ne demekti falan diye onların işte beyin fırtınası yapmalarını sağlıyorum mesela. Öyle olunca bir soruyorlar. Zaten bilen ya da az çok ön bilgisi olan cevap verebiliyor. Yanlış ta olsa birşeyler bir yerden yakalıyor yani çocuk. Onun üzerinden devam ettiriyorsun zaten. Ama hiç bilmedikleri bir konu da olabiliyor. Bu sefer ilk sen anlatıyorsun. Sonra onlardan cevap bekliyorsun. Hani mesela bir örnek olduğunda daha hiç kimse yapmadan birkaç öğrenci o örneği yapmak istiyor. Daha hiç anlatmadan. Hani konu sadece atıyorum sadece birkaç cümle söyleyip örnekle açıklayacaksın onu diyelim. Birkaç öğrenci ona zaten atlıyor. Biz biliyoruz, şöyle olacak diye. Ama bilmeyenler oluyor mesela. Şimdi nasıl yapıyoruz, işte onların söyledikleriyle ya da benim kattıklarımla az çok onların tabirleri anlayabilecekleri şekilde işliyorum*

q62: *Öncelikle yani şu soruyu soracağım, şöyle yapacağım falan diye hani bir ön çalışmam olmuyor plan anlamında, belge anlamında. O an zaten sınıf ortamıyla da alakalı oluyor bazı zamanlar. Mesela öyle bir sınıfa giriyorsun ki çocuklar senden çok şey bekliyor zaten. Yani aç, versen her şeyi alacak çocukların olduğu sınıflar var. Hepsi mi öyle, değil tabiki de ama hani o anki koşula da bağlı oluyor. Bir anda aklına geliyor zaten böyle yapsam daha fazlası olabilir diye düşünüyorsun ama bir sınıf var hani sen kendin ne kadar çabalarsan çabala yani çok fazla da etkili olmuyor*

q63: *mesela ders işlerken öyle bir soru geliyor ki önüne evet bunu bütün sınıf yapamaz biliyorsun ama hani üst düzeyde olanlar yapabilir diye düşünüyorsun ve o sınıfa o soruyu soruyorsun*

q64: *böyle bir yöntemle ben tekrar etsinler, benim anlattığım boşa gitmesin, birazcık da sorumluluk sahibi olsunlar diye düşünmüştüm. Kendi kendine çalışma yeteneği kazansın diye böyle bir şey yapmıştım*

q65: *Mesela atıyorum ben bugün ders işledim. İşte konuyu eve gidince özetleyip, çözdüğümüz soruları tekrar ediyorlar. Cevapları kapatıp hani şey soruların cevaplarını oraya çözüyorlar, kendileri yapmaya çalışıyorlar. Böyle bir yöntem var 1. dönemden beri uyguladığımız bizim*

q66: *Bir ara dönemde istemiştim, kontrol etmiştim. Sonra, en son artık dönem biteceğine yakın. Dönem sonu notlarına sözlü notu olarak etki ediyor. Yani 1. dönem sonunda da kontrol ettim. 2. dönem yine devam ediyor dedim. Dönem içinde karar veriyorum aslında ne zaman kontrol edeceğime. Ya da işte bakıyorum şimdi sınıf ortamına biraz böyle şey var, rahatlık var, çalışmıyorlar. İşte….çok fazla tutulmadığını düşünüyorum. Bir anda söylüyorum, bu hafta ev defterlerinizi kontrol edeceğim diye. Bir anda böyle bir irkiliyorlar. Kalmıştı falan diye. Hemen tepkileri belli oluyor. 5ler ya, çok küçükler. Nerede nasıl davranacaklarını bilmiyorlar. Hemen kendilerini ele veriyorlar. Yapmadıklarını söylüyorlar. Sonra yapmaya çalışıyorlar*

q67: *Ne yapıyorum işte ödev kontrol listeleri var. Eee işte (durakladı, düşündü). İlk başta şöyle bir şey yapmıştım. ilk haftalarda kendim kontrol etmeye kalkmıştım ama baktım-gördüm böyle başolunacak gibi değil yani. Sınıf mevcudu kalabalık. Ders gidiyor zaten. Öyle olunca 3 gruba ayırmıştım. İşte bu grubu 1 kişi kontrol edecek, bu grubu 1 kişi falan diye. Sonra o grubu kontrol edenler böyle gayet sorumluluk*

sahibi bir şekilde yaptılar. Kim ödev yapıyor, kim yapmıyor çetele tutturuyorum zaten. Onları yıl boyunca saklıyorum

q68: *Soru bankası, yani kaynak dediğim onlar zaten. Elimde birkaç yayınevinin kitapları var onlardan kullanıyorum. Hani internetten de bakıyorum ama çok fazla internetten yararlanmıyorum açıkçası. Yani seçmeli soruları ya kendim hazırlıyorum ya da dediğim gibi kaynakları kullanıyorum*

q69: *3. soruda tekrar alt alta yazmamış, üzerinde toplamaya kalkmış o zaman da virgülü gözden kaçırmış. Ancak sayıları doğru toplamış. Sonuçta virgülün yeri belli değil bir tek. O yüzden yarı puanı aldı*

q70: *Sorunun çözümümde en önemli kısım kesir sıralama. Sıralamayı yanlış yapan zaten sonuca ulaşamaz. O yüzden en çok puanı doğru sıralamaya verdim*

q71: *Veli toplantısında dağıttım. Çocuklarının hatalarını da görsünler istedim. Öğrencilere tek tek gösterince çok vakit alıyor. Mesela 98 almış 2 puanını soruyor. O yüzden hatalarını anlatıyorum ben ama kağıtlarını tamamen vermiyorum*

q72: *Verdiğim ödev: 10 tane kesri ön yüzde kesir, kesrin altında modelle gösterimi. Arka yüzü çevirdiğinizde kesrin ondalık ve yüzdelik gösterimi ama modellemesi yok şeklinde birer küçük dikdörtgen şeklinde kesilmiş mukavvalardan oluşan materyaller oluşturmak. oyun gibi bir şey akıllarında kalır diye yaptırmıştım. İçeriği tam anlamışlar. Yönerge vermedim ama ben anlattım*

q73: *Yani o puanlama ölçeklerinin çok da şey…ne bileyim ben çok geçerli ve güvenirli olduğunu düşünmüyorum ben açıkçası. Ya evet onun o amaçlı, hani öğretmen daha objektif olsun, daha gerçekten de işe yarar bir şekilde verilsin notlar diye yapılıyor ama hani çok öyle olduğunu düşünmüyorum. Mesela atıyorum…(düşünüyor) çocuk çaba gösteriyor. O…yani o puanı hak ettiğini düşünüyorsun. E puanı verirken mesela işte oraları doldurmaya çalışıyorsun (gülücük). Şuradan şu kadar gelse, buradan bu kadar gelse falan diye. Formalite icabı yani. Yani bazen öyle şeyler oluyor*

q74: *Görmedikleri konuyu verdim ki en azından bana konuyu işlerken yardımı olur, ben daha kolay öğretirim dedim. Mesela onların prizmalarla ilgili yapacakları hataları, yanlış anladıkları şeylerin farkında olurum diye düşündüm. Bu da konuyu daha etkili anlatmamı sağlar dedim. Modelini de yaptırdığım için çocukların aklında daha çok kalır dedim. Zaten genelde zayıf öğrenciler aldığı için proje ödevini, kendileri yapsın dedim. Kendilerinin emeği olsun, çalışsınlar dedim*

q75: *Grup olarak yapılanda dikdörtgenler prizması yerine dikdörtgen anlatılmış. Daha üst sınıflara ait bilgiler verilmiş her iki ödevde de: mesela alan hesaplama, simetri ekseni, cisim köşegeni. Gereksiz kısımları yazmamalılardı, organize olmalıydı çalışma. Bu tip eksiklikler vardı yani, onlardan kırdım bu puanları*

q76: *Mesela birkaç tane iyilerim var, soru sorduğunda onların senin verdiğini birebir tahtada yaptığını görünce daha mutlu olup, kendi anlattığından emin oluyorsun. Öğrettiğinden emin oluyorsun*

q77: *Derste hep iyiler cevap verirdi ama şimdi hepsini gözlemleme şansım oldu. En azından anlattıklarım boşa gitmemiş, bunu gördüm onları bu çalışmada gözlemleyince. Buna sevindim*

q78: *Bazısı alakasız yazmış sonuçları; mesela 2/5 demiş o da 0,30 demiş yüzde olarak. Zaten bu ödevi verirken amaç kesirlerde çok zorlanmıştık, onun üstüne ondalık, yüzde konuları işlendi onlar da zordu. Ben de oyun gibi bir şey akıllarında kalır diye yaptırmıştım. Ama alakasız sonuçları görünce hala mı diyorsun, kendi anlatimindan şüpheye düşüyorsun*

q79: *Ben 4 tane 5. sınıfa giriyorum. Bir konuyu ilk anlattığım 5 ile sonradan anlattığım 5 arasında farklar var. Bir konuyu ilk anlatırken 5'te şimşek çakıyor kafamda. Bir de şöyle anlatayım diyorsun, diğerlerinde öyle de anlatıyorsun. Onlar daha çabuk öğreniyor. İlk anlatırken o yöntem iyi diyorsun. Mesela anlatıyorsun ağır bir konu, diğer sınıfta daha somutlaştırayım diyorsun. Öyle yapıyorum. Ya da çocuklardan fikir geliyor, şöyle bir şeye benziyor diyor, ya da bir soru soruyor. Ben o zaman farklı da anlatabilirim diye düşünüp, öyle anlatıyorum. O sınıflar daha çabuk öğreniyorlar*

q80: *Bu sınıf aslında genel olarak iyidir ama 4-5 kişi var, yapar gibi olmuşlar etkinlikte ama yine hataları var. Onları derste de öyle gözlemliyordum zaten ama ben bu kadar algılamayacaklarını düşünmemiştim ama belki toplamada hata yaparlar demiştim, öyle de oldu. Tekrar üzerinden geçmem gerekiyor ondalık kesirlerde alt alta toplamanın çünkü orada çok hata yapan oldu*

q81: *Ben yüzdelik, ondalık gösterimleri modelleyin deseydim de hata yaparlardı*

q82: *Bazı soruları iyilerden yaparlar diye bekliyorsun, yapamayanlar yapamazlar diye bekliyorsun. Sınav sorularını hazırlarken etkileniyordum aslında çünkü kimin yapıp kimin yapamayacağını biliyordum. Soruları ona göre hazırlıyordum. Yani daha kolay sorabiliyordum bazı soruları mesela*

q83: *Zehra mesela bugün getirdi defterini gerçekten de özene bezene yazılmış. Ve bilerek yaptığına inanıyorum bu çocuğun çünkü derste de zaten kendisi yapıyor işlemleri ben yapmadan*

q84: *Çok aktif olmayan vardı normalde ama çocuk grubun sözcüsü gibiydi bu çalışmada. Başka bir tanesi vardı, normalde de dersle alakası yoktu. Yine bu çalışmada da öyle davranmaya devam etti. Onları gözlemleyerek gelişimlerini takip edebiliyorum*

q85: *4-5 kişinin bu tip hatalarını derste de öyle gözlemliyordum zaten. Tüm bunları yine gözlemledim yani bu yazılıda, başarı seviyelerinde değişim olmamış, görebildim*

q86: *Yıl boyunca uyguladığım ölçme yöntemlerinin sonuçları yıl sonunda öğrencilere not verirken devreye giriyor. Yani bütün işte ders içi katılımları, davranışları, hareketleri, matematiksel bilgisi, kendini ifade ediş biçimi…Bunların hepsi dediğim gibi sözlü notu anlamında ya da kanaat anlamında oraya yansır. Evet yazılılara bir şey yapamıyoruz. İşte projeye bir şey yapamıyoruz. Performansı var evet iyi yapmışsa iyi veriyorsun, kötü yapmışsa kötü veriyorsun ama iyi bir çocuk hani matematikte kötü olsa bile az çok onu sözlü gibi biraz yükseltmeler olabiliyor*

q87: *Ece zaten o puanı hakkediyordu, sınırda kaldı-Yani 4 gelecek ama 3 almış çocuk. Hani 2, 3 puan olsa 4 gelecek. E bu çocuğun dersteki performansı oraya yansıttım kanaat notu olarak. Her öğrenci böyle değil tabiki de. Derste hiçbir şey yapmayana da zaten 42'de, 43'te de kalsa bile vermiyorum yani*

q88: *Ben sözle zaten onları övüyorum. Mesela iyi bir şey yapıyorsa ya da onun mesela çok kötü-vasat durumda bir öğrenci var diyelim. O derste iyi bir çalışma yaptıysa, atıyorum evet aferin Ali falan diyorum, bunu böyle yapmışsın, doğru düşünmüşsün diyorum*

q89: *Sonuçları söylerken bunu öğretmedim mi diye eleştirdim onları*

q90: *İyi öğrencilerimden beklemediğim yerde hata yapan varsa onlara anlattım buralarda hata yapmışsınız diye. Sonra da o soruların doğru çözümlerini yaptım sınıfta*

q91: *Birimlerin aralıklar olduğunu bulamadılar O boşlukların sayılacağını yapamadılar yani. Ben konuyla ilgili zorlanırlar dedim. Yapamazsa 2-3 öğrenci*

yapamaz dedim. Belki 3 kenar uzunluğu verilmiş alıştırmayı sorarlar dedim ama çok başka kısımlarda sorun oldu. Materyalde birim kavramına takılanlar oldu mesela bunu beklemiyordum. Bu yüzden birim hesaplamak için şerit üzerinde nereyi sayacaklarını gösterdim

q92: *Çok sessiz sakin bir öğrencim. Yani benim derslerimde sessiz, diğer derslerde de sessiz. Derse katılmıyormuş gibi gözüken ama bir şeyler yapabilen bir çocuk aslında. Evet ödevlerini düzenli bir şekilde yapıyor ama çocuk derste sessiz yani.. Yani parmak kaldırmasa da sen bunu yap diyorum mesela ya da sen ne düşünüyorsun dediğimde orada bile çocuk dilini döndüremiyor, bir şey söylemiyor. Kalkıp ben bu çocuğu bütün sınıfın önünde kaldırıp ta-heleki bazı öğrenciler var direkt bir şey söylüyorlar olan her şeye, yorum yapma yetenekleri var maalesef. Hani o çocuğu orada ezip büzmektense diyorum kaldırmayayım…. Çünkü o bilemeyen çocuğu ya da kendini ifade edemeyen bir çocuğu o sınıfın önüne çıkarıp ta herkes…kızarıp bozarıyor zaten çocuk yani yerin dibine düşmüş oluyor. Nereden kalktım diyor ya da o derse karşı soğuyor zaten kendini ifade edemediği için, bir şey anlatamadığı için. Hani o çocuğu orada ezip büzmektense diyorum ben de, zorlamıyorum*

q93: *Mesela bir kaynaştırma öğrencimiz var E… diye. Pi sayısı yarışması olacaktı bir ara bizim okulda. Kendisinin sayılarla arasının çok iyi olduğunu gözlemledim. Hani kaynaştırma öğrencisi ama plakaları ezberliyor, sınıftaki öğrencilerin birçoğunun numarasını biliyor. Yoklamayı alırken, mesela atıyorum R…. yok dediğimde işte 1301 mi falan, direk numarasını söylüyor. Öğretmenim o yok diyor mesela. Ben de bunu bildiğim için pi sayısını ona yazmıştım. Virgülden sonrasını bak ezberlersen, böyle bir yarışma var diye ve gerçekten de 50 basamağı ezberleyerek gelmişti. Abartmıyorum, ciddi bir şekilde ve elime aldım yazılı halini-kontrol etmek için- yani ben bilmiyorum o kadar. Ciddi söylüyorum*

q94: *Zaten genelde zayıf öğrenciler aldığı için proje ödevini, kendileri yapsın dedim. Kendilerinin emeği olsun, çalışsınlar dedim*

q95: *Bu çocuğun 3 alması çok çok zor. Bak 5 demiyorum, 3 alması çok zor. Ama bu çocuk 3 aldı ve kağıdını incelediğimde bakıyorum bu çocuk bunu yapamaz. Biliyorum da. Çünkü görüyorum derste o çocuğun kapasitesinin ne olduğunu ya da ben ne sorduğumda ne cevaplayacağını biliyorum. Sonra çağırdım ben bu çocuğu, bu soruyu nasıl yapmıştın dedim. Sonra bir kaldı. Yapmıştım oradaki gibi dedi. Sonra işte şey böyle yapmıştım falan diyor ama açıklayacak bir şeyi yok. Diyorum, tekrar yapar mısın falan dedim. Yapamam dedi. Neden yapamazsın? Ben o zaman yapmıştım, şimdi yapamam dedi. Direkt kızardı, bozardı. Niye yapamıyorsun dedim. Burada yaptıysan şu anda da yapman gerekiyor dedim. Sonra hayır, inanmıyorsanız kalsın vermeyin not dedi direkt. Ve o çocuk o soruyu yapamadı. Tekrar sınav yapmak zorunda kaldım ben. Ortak sınavı evet bir kez daha ona uyguladım. Aynı sınavı uyguladım. Aynı sınavı uygulamama rağmen aldığı not 1*

q96: *Öğrencinin başarı seviyesindeki değişiklikleri görebilmek amacıyla kullandım. Yazılı sonuçları düşündüğüm gibi çıktı. Önceden derste iyi olanlar yine iyi ama vasatlar kesirlerde parçadan bütüne, bütünden parçaya geçişleri karıştırmışlar*

q97: *Kesir işlemlerini yapabilmişler ama kesir işlemini problem içinde sorunca doğru cevabı bulmakta sorun yaşamışlar. Mesela 12/42= A/7 sorusunu yaparlar diyordum sınavdan önce çünkü derste benzer örneklerini çok yapmıştık. Karıştırmışlar. Yani 42:6 yapmışlar ama 12×6 yapmış pay kısmını. Onu da bölmemiş yani. Denk kesri bulmak konusunda hala problemleri olduğunu anladım, özellikle problem içinde geçiyorsa*

q98: *Ben belki toplamada hata yaparlar demiştim, öyle de oldu. Mesela sınıf düzeyinin ortalamasında ya da hafif aşağısında olan bir kız, kağıdını en son o verdi. Beklediğim gibi hatalı da yapmış zaten*
q99: *sınavları çok iyi geldi, zaten karnesine de 5 geldi yani. 90 küsürlerde aldı hep. Hatta 100 bile aldığı oldu sanırım. 93ün altına düşmedi o çocuk. Demin dediğim gibi yazılılarda kimin yapıp yapmayacağını görüyorsun sadece bu ilkinde bile böyle olmuştu. Çocuklardan, yani o çocuktan bir şey beklemiyordum mesela çok farklı bir şekilde bana geldi çünkü çocuğu daha tanımıyordum. Farklı bir gözle yaklaşmışım mm evet farklı diye. Olmadık bir şekilde geldi geri dönütü*
q100: *Bu soru mesela atıyorum yıldızlı soru diyorum. Herkes yapamıyor. 1-2 kişi yapsa dahi onları gururlandırıyorum işte sizin sözlünüz 100 ya da siz bundan yıldız aldınız. 3 yıldızınız olursa sözlü notunuz 100 olacak, yansıyacak falan diye soruyu sorarken söylüyorum*
q101: *Ben 1. dönem şey demiştim onlara 3 sınavının üçü de 85ten yukarı olursa işte bu sözlü notu olacak ya da işte hediye vereceğim falan gibisinden bir şart koşmuştum. 3 sınavının da üçü yüksek olan vardı hatta 2 tanesi 100, bir tanesi 98 olan da vardı yani böyle öğrenciler de var. Böyle öğrencilere ufak tefek hediyeler verdim dönem sonunda. Ama hiçbir şey yapamayan da var tabiki de. Hani o da ilk zaman etkili olmuştu mesela. Ya da şu an yaptığımız bir şey var. Ödev listelerimiz var. Bu ödev listelerinde 10 tane artısı olan bir tane yıldız alıyor. Dönem sonuna kadar işte 10 yıldız biriktirene bir sözlü notum 100 olarak gelecek. Kim olursa olsun. Böyle bir şablon var mesela şimdi*
q102: *Mesela ben 5'lerde şu sınıf çok iyi diyemiyorum çünkü öğrenciler bazında değerlendiriyorum. Hani bir sınıfa bakarsan evet 5, 6 kişi çok iyi, işte 5-6 kişi orta, işte diğerleri vasat. Hani genel anlamda şu sınıf çok iyi dediğim bir sınıfım yok mesela. Çünkü orada evet çok çok iyi öğrencilerim var mesela bir 5/G de Faruk var, Harun var, Ebru var. Hani isim vermek gerekirse. Ya da bir 5/E de Aynur var, Mine var, Fırat, bir Berna var. Mesela bu öğrenciler çok çok iyiler.*
q103: *Herşeyi böyle sana sorarak yapıyorlar. Hala o çocuk akılla oldukları için olmadık bir şey de sorabiliyorlar ya da sen bir söylediğini bir çok defa tekrar etmek zorunda kalabiliyorsun. Mesela ilk zaman, bu sadece ders anlamında değil, atıyorum bir ödev veriyorum diyelim. Mesela ben tahtaya yazıyorum işte su sayfalar ödev, deftere yapılacak ya da atıyorum üzerine yapılacak. Oradan birisi çıkıp deftere mi yapılacak ya da üzerine mi yapılacak diye soruyordu hala. Deftere yapılmayacak diyorsun. Ben deftere yapmayayım mı, ben yaptım diyorlar. Biri oradan kalkıyor, 5 dakika geçiyor sonra bir tane daha aynı şey çıkıyor falan böyle ama yine de iyi diye düşünüyorum. İlgileniyorlar en azından*
q104: *Mesela anlatıyorum diyelim, sorusunu da yapıyoruz. Şu şöyle olsaydı nasıl olurdu? Bu böyle olsaydı nasıl olurdu? diyerek sorgulamaya başlıyorlar. Daha çok onlardan alıyorum mesela öğrendiklerine dair geri dönütü. Yani bir şey anlattığımla kalmıyor mesela. Ya bu böyle olsaydı nasıl olurdu? Sorguluyor yani*
q105: *Sen üst düzeyde bir soru sormaya kalkıyorsun ama ona cevap verebilecek yetenekte öğrenci yok mesela bazı sınıflarda*
q106: *Mesela destek eğitimi verdiğim öğrencilerim var. Onlardan çarpmayı bilerek gelen çocuklar bölmeyi ve daha çok basamaklı sayıları çarpmayı ya da problem çözmeyi öğrendi*
q107: *Eve gidince öğrenci öğretmen bunu yapmıştı deyip te bir şeyler karalamaya çalıştığında ve bu nasıl olmuştu dediğinde az çok bir yerlere bir şey yerleşecek diye*

düşünüyorum. Tekrar etmiş olacak, bir de bazılarında mesela kaynak kitap falan yok yani evet olanlar var ama elinde olmayanlar da çok var. En azından bu şekilde o soruları kazanmış olsalar. 3 tane soru oluyorsa bunun ikisini kendi başına yapabiliyor olmaları benim için iyi bir şey. Bu yüzden ev defterini tutturuyorum zaten, ki iyi olduğunu da düşünüyorum

q108: *Öğrenme güçlüğü olan bir öğrencim var. Kanun gereği ona bireysel farklılıklarına uygun olarak düzenlediğim bir plan uyguluyorum. Çarpma konusunda iyiydi ama bölmeyi bilmiyordu. Tabii bunlarla ilgili problemleri de çözemiyordu. Ailesinin desteğiyle bölmeyi öğrendi, çarpma-bölme içeren problemleri çözebiliyor şimdi. Bunu onun ailesi tarafından da çalıştırılmasına bağladım*

q109: *Çocuk istekliyse senin anlatmamak, ona dönüt vermemek gibi bir şansın yok*

q110: *Hani dediğim gibi Türkçe'si bile sıkıntılıyken biz onlara matematik anlatmaya çalışıyoruz. Bu çok zor*

q111: *…anlamadıklarını fark ettiğimde ya da çocukların konuya olan ilgileriyle alakalı olabiliyor. Mesela diyorsun ki yarın bu konunun bu sınıfta şu kadarını işlerim diyorsun ama geliyorsun görüyorsun ki bir önceki konuda hala anlaşılmayan şeyler var, bunun üzerine düşmen gerekiyor. E hadi baştan oraya dönüyorsun. Onunla ilgili soru çözmek zorunda kalıyorsun ya da bir daha tekrar yapmak zorunda kalıyorsun. Bunun gibi değişiyor işte*

q112: *Önceden koşturuyormuşçasına anlatmak zorunda kalıyordun. Kimisi anlaşılıyordu, kimisi anlaşılmıyordu. Bir de bu kadar ağırlaştırılmış bir programda, daha biri bitmeden öbürü başlayan bir programda ders işlemek te, o çocuktan bir verim beklemek te çok sıkıntılıydı. Öğretmenden de verim beklemek sıkıntılıydı. Yani biraz daha azaltılarak, hani daha kalıcılık bir şey, kalıcı bir şekilde işlenmesi daha uygun olmuş bence. Biraz azaltılmış, hani mesela kesirlerde çarpma vardı geçen sene, şu an yok. Bir kere çocuklarda matematiğe olan bir ilgi başlayacak bence. Bu kadar ağır bir programdan sonra, yeter artık demelerindense en azından hani sindire sindire gidiyorsun. Çocuk bir anda şey görmüyor, hem korkmuyor da matematikten. Bir önyargı da oluşmuyor. Zaten o ön yargı var, üzerine koymuyorsun yani olumsuz bir şekilde. Kitabımız daha iyi olmuş, onu söyleyeyim. Geçen sene kullandığımızdan memnun değildim yani. Ama şimdi daha kullanışlı ve daha düşünülerek hazırlanmış bir kitap olduğunu düşünüyorum en azından. Daha adım adım yapmaya çalışmışlar sanırım, hani hepsini bir anda vermektense. Hem çok fazla etkinlik var içinde hem de soru fazla. Bir de daha yalınlaştırılmış bir şekilde. Göze batan bir şey yok mesela. Geçen seneki küçücük küçücük yazılar. İşte orada etkinlik, burada şöyle falan filan hani kullanışlılığı da yoktu. Bazı yerleri göremiyordun bile yani. O sıra sizdeleri mesela birlikte yaptığımız da oluyor. Öğretmene de fayda sağlıyor. Bizim kılavuz kitabımız yok mesela ama en azından orada neyi nasıl işlemen gerektiğini biliyorsun ya da ne kadarını vermen gerektiğini daha rahat görebiliyorsun. Geçen seneki 5 kitabında bu yoktu mesela ya da ben…çok fazla bulamadım yani. Artık anlamışlar sanırım o kadar matematik- o kadar ağırlaştırılmış program yerine biraz daha küçük adımlarla hedefe ulaşmayı*

q113: *Benim birebir görebildiklerimi ben daha çok önemsiyorum galiba. Gözlem yani. Direkt görebildiğim için. Evet yazılılar yapıyoruz ama o yazılıya da girerken de bir önceki derste ya da daha önce işlediğim derslerde bu çocukların nasıl olduklarını az çok kestirebiliyorsun. Yani o yüzden ben daha gerçekçi olduğunu düşünüyorum kendi gözlemlerimin*

q114: *Altıların da bir seçmelisine giriyorum. Sınav notu yok, sınav yok, hani onun bir yaptırımı yok. Öyle olunca da çocuk rahat yani. Bir yandan hani evet not olmasın, çocuklar sadece, gerçekten o becerileri kazansınlar. Bir işte ön yargı olmasın ya da kısıtlanmış olmasın ama olmayınca da çocuklar çok rahat olmuş oluyor bu sefer. Hiç bir not yok, işte şey..öğretmen geliyor, anlatıyor gidiyor. Hani bizim bir yaptırımımız yok. Not yok, sınav yok, kafamız rahat, kimisi kaçıyor bile seçmeliden. İşte bu yönleri de var. Çocukları da düşününce-ha bir yerde seçmelide de olsun diyorsun*

q115: *Tekrar ettiklerini ve benim anlattıklarımın daha kalıcı olabildiğini gördüm. Bence bu çalışmalar sorumluluk sahibi olmalarına, kendi kendilerine çalışma yeteneği kazanmalarına da katkı sağlıyor*

q116: *Biz derste teorik olarak gösteriyoruz, evet uygulama aşaması da oluyor ama daha çok bunun işte birçok becerinin birarada kullanılıp da onun dersteki işlenişini, yani madde olarak, bir somut örnek olarak yansıması performanslarla oluyor. Çocuğun kendini orada ifade etmesi gerekiyor, düşünmesi gerekiyor işte el becerisi gerekiyor, araştırması gerekiyor. Birçok şeyi kullanması gerekiyor. Hani ona bakıp ta sen zaten geri dönüt alıyorsun*

q117: *sözlü notu yerine artık bu performans konulmuş bir şey gibi geliyor bana. Yani çok da etkili olduğunu düşünmüyorum performansların açıkçası. Proje ödevlerinin de amacında kullanılmadığını düşünüyorum çünkü çocuklar kendileri yapmıyorlar, veliler yardım ediyorlar*

q118: *Yani…ben performans görevlerini performans değrlendirme olarak kullanıyorum. Diyorum ya performanslar-evet kendileri yaptıklarında evet o iyi bir değerlendirme olabilir ama çoğu kendisi yapmıyor. Yani kullandıklarımız da belli şeyler zaten de. Geçen dönem araştırma vermiştim. Araştırma sorusu oluşturdular. Herkese aynısını verdim. Araştırma sorusu oluşturacaklardı, o soruya göre anket yapacaklardı, yani bilgi toplayacaklardı. Bu bilgileri de düzenleyeceklerdi. İşte sütun grafiği yapacaklardı, sıklık tablosu oluşturacaklardı, çetele tablosu oluşturacaklardı. Sonra bununla ilgili rapor yazacaklardı. Yani dediğim gibi çok böyle işte şöyle…hep görmüşüzdür de işte yaşayarak öğrensin, yaparak öğrensin. Şöyle olsun, böyle olsun falan ama onları dediğim gibi pek yani ben azından kendi adıma söyleyeyim uygulayamıyoruz. Uygulayamıyorum da*

q119: *Bence yanlış ta olsa öğrencinin yorum yapması bir katkı. En azından neyi bilip neyi bilmediğini tartıyorsun. Bir de çocuk düşünüyor demek ki. Yanlış ta olsa bir fikri var bu konuda. Oturup ta ses seda yapmadan bekleyen bir çocuk olacağına hiç değilse kendini bir ifade etsin. Çocuk bir şeyler söylesin, ben onun yanlışını düzelteyim. Hiç konuşmayanlar var mesela. Çok zor oluyor. Mesela ödevde çok yaşıyorum onu. Çok sessiz sedasız yani. Hani bir şey soruyorsun kafası önünde. Hiçbir şekilde tepki yok. Konuşmuyor çocuk yani konuşmuyor. Hiçbir kelime dahi etmiyor*

q120: *Posterler anlatıma evet bir işte görsellik kazandırıyorlar. İşte ne bileyim….(düşünüyor) becer..el becerisiymiş. İşte görsel, işitsel hani bu yönde becerileri kazanıyor olabilirler ama 5ler bunu ne kadar yapıyorlar. Ya da ne kadar yapma düzeyleri var şu an. O tartışılır. Hani o kadar da çok da ahım şahım şeyler yapacaklar diye düşünmeyelim mesela. Çünkü hala çocuk akılları var. Onlar için hala oyuncaklar var*

q121: *Karnesine de kötü gelecek diye-hadi anne yardım etsin, hadi baba yardım etsin; şöyle güzel olsun, böyle güzel olsun anlayışı var. Bir de..şey zannediyorlar: performansın içeriği değil sadece gösterilişi hani o görkemlik sanki önemliymiş gibi*

davranıyorlar. Mesela bir öğrencim var. Bu çocuk alakalı değil yani sadece yazı yazmak için…Çok derse katıldığı yok, ödevlerini evet ilk zamanlar da hele hiç yapmıyordu şu an az çok yapıyor. Böyle bir öğrencini...1. dönem performansı belli yani yazı karakteri bile farklı. Annesi yazmış. Şöyle bir şey ki kapağa-isim/soyisim kapağına, biz grafiklerden vermiştik ödevi. Sütun grafiği yapılmış kapağa. İsim-soyisim yazacak ya. işte dikeye adı, yataya soyadı. Bu çocuktan böyle bir şey beklemezsin. Eliyle yazmış ama öyle bir şey bile o çocuktan beklenecek bir şey değil. Biliyorsun yani. Anne yazmış, anne yapmış zaten artık anne ya da abla artık her kimse. Çok da etkili olmuyor işte böyle olunca performanslar

q122: S*ınavları çok iyi olmasa bile bütün ödevlerini yapmış işte kendini ifade etmeye çalışsa da becerememiş. Bir yerde zekayla, kapasiteyle de ilgili ne kadar çok uğraşsa da yapamıyor ama çaba gösteriyor. E sen bu çocuğun çabasını bir yere atamıyorsun. Öyle olunca vicdanen de bu çocuğun bu sözlü notunu hak ettiğini düşünüyorsun. Burada devreye giriyor*

q123: *Soruları çözememiş ama soruları kitaptan deftere geçirmiş ya da alakasız şeyler yazarak beni kandırmaya çalışmış. Yani sırf notu alabilmek için*

q124: *Ders işlenirken işte şu kadar köşesi vardı, bu kadar ayrıtı vardı diye hatırladılar. Anladıklarını düşünüyorum o yüzden. Ben performansı daha kolay diye düşünmüştüm çünkü konuyu anlatmıştım. Ama konuyu görmemiş olmalarına rağmen projeyi daha iyi yapmışlar. Belki bu geometrinin daha görsel olmasından ve dört işlem gerektirmeyen bir ödev olmasından kaynaklıdır*

q125: *Bazen tahtaya kaldırıyorum. Zaten hep parmak kaldıranları değil de, daha çok böyle kaldırmayanları böyle ara ara seçiyorum*

q126: *Kaldırıyorum işte. Eee onu puanlamıyorum. Sadece yapıp yapamadığına bakıyorum. Her ders yapmıyorum. Ara ara yapıyorum*

q127: *Şimdi ben orada şey yaptım. Eeee grup grup listelerini aldım. Çalışmayanları falan da gözlemledim, yanlarına notlar aldım. Kesirlerle yaptıkları toplamaları modellemeleri gerekiyordu. Grup olarak da bu modeli çizdiler. Kağıtlarını toplamadan önce şeylerine baktım-düzgün çizene, dikkat edene ya da daha başarılı çizene…O grupların da yanlarına notlar aldım*

q128: *Çizelgem yok işte. Gözlem yapıyorum ama çizelgemizin olması lazım. Evet. Tembellik yapıyorum (Gülüyor)).*

q129: *Müfredatı da o yüzden yetiştiremiyorum (gülüyor). 5lerde de o yüzden…çoğu kişi soruyorum diğer sınıflar-okullarda kitaptan yani, çoğu şey kitaptan gidiyor. Ben bir defter bitirtmişim yani soru yazdıra yazdıra. Eeee mesela bir tanıdığım var-kuzenim-5. sınıf. İki sayfa yazmış çocuk sene başından beri. Yazma-öğretmen yazdırmamış. Ee yazmanın çokluğu değil oradaki şey ama demek ki kitaptan yapıyor yani kitaptan hep soru çözüyor. Orada da sınırlı-hani yeter bu kadar diyor. Test kitaplarında öyle değil. Bir sürü çeşitli soru var. Ben soru çok yazdırıyorum matematik defterine, o yüzden defter bitmiş. Yani çeşitli sorular olsun, en azından görsün çocuk farklı bir şey olmadığını, endişelenmesin*

q130: *...ara ara şey yapıyorum, quiz gibi küçük böyle 3-4 soruluk şeyler yapıyorum. Çok az eee sözlüye etki ediyor. Yani sene sonunda, belli şeylerine göre, yani davranışları, quizler-hepsini birleştirip sözlü notu veriyorum. Eeee oradan anlıyorum. (Düşünüyor)… Bu ikisini yapıyorum*

q131: *Mesela 1. dönem çok yapma gereği duymadım. 1. dönemde 1. ünitede yapmıştım. Diğerleri zaten kolay olduğu için belli. Çocuklar anlıyordu zaten mesela yapmadım onu. Bunda da kesirlerde yaptım mesela. Kesirlerde 2 kere yaptım çünkü kesirler… zorluyor*

q132: *Quizleri ders içi performans olarak kullandım. Sene başından verdim ne yapacağımı. Soruları da çözdüm*
q133: *Mesela ödev verdiğimde de kitapta da bakıyorum böyle ödev kontrolünde de. Bakıyorum böyle ara ara baktığım zaman da. Yani çocuğun genel olarak yapılmış mı yapılmamış mı. Kimisi böyle çoğunu boş bırakmış, ya da atmış yani başka bir şeyler yazmış böyle alakasız şeyler. Eee genel bakıyorsun böyle konu zaten anlaşılmamış. Onları kontrol ediyordum-yani yaptınız mı, işte neleri yapamadınız falan. Bazen sözlü gibi işte kaldırıyorum tahtada yaptırıyorum. onları çözdürtüyorum bu arada tahtada- sonunda. Notlandırmıyordum da öyle yapıyorum*
q134: *Bu dediğim, derste de kullandığım test kitapları. Onları kullanıyorum. Bir de ders kitabını kullanıyorum. Yani en azından paralel gitmek için, çok farklı bir şey olmasın diye. Zaten dersteki sorularım da ona yönelik olduğu için..o ikisini o kullandıklarımı bir alıyorum, bir açıyorum. Ona benzer şeylerden gidiyorum. Bu arada şeyden de yapıyorum. Eee internetten diğer yazılıları bulup, onu böyle nasıl sormuşlar, değişik sormuşlar mı, oradan da bakıp ya da oradan da kullandığım sorular var. Ya da işte şeyini değiştiriyorum. Hani çözüm aynı ama mantık aynı da işte başka bir şey uyduruyorum o soruyu. Ama hepsine bakarım yani hazırlarken. Oturup ta önüme bir kağıt alıp hadi şimdi şunları yazayım demiyorum-demem yani*
q135: *Nasıl puan vermişim, onların cevapları ne, cevap anahtarında ne, fark ne diye hepsine baktırıyorum. Ama dağıtmıyorum çünkü çok kalabalık sınıflar. Bir de bir anda ayağa kalktılar mı falan hakim olmak zorlaşıyor. Biri bir şey yazar, siler bir şey olur falan takip edemem. En azından burada baksınlar. Hem daha rahat bakarlar cevap anahtarına-kargaşa olmadan. Sırayla böyle 5'erli 5'erli çağırıp baktırıyorum. En azından kağıtlarını da takip etmiş oluyorum*
q136: *Anlamadığından, öylesine bakıyor bence, sonuçlarını anlamıyor*
q137: *Beklediğim gibi ödevler geldi. Uzun bir tatil vardı. Bu yüzden evde rahatça bitirirler diye düşündüm. Tamamını evde yaptırdım. Çok büyük hatalar yok, zaten kolaylıkla yapabilecekleri basitlikte sordum*
q138: *Şeyde, açıkçası biz bunu eee üniversitede daha çok kullanıyorduk-o sunumlarda, şeylerde. Eeee burada kullandığım işte proje değerlendirmede falan kullanıyorum. Eee ama ben de çok bilgili değilim bu konularda. Yani evet üniversitede gördüm ama bunu çocuklara nasıl tam olarak uygulayacağım konusunda şey değilim gibi geliyor bana. Çok yani yeterli değilim gibi geliyor*
q139: *yaratıcılık ve materyal kullanımı ile ilgili kriterler zaten matematiksel becerileri ölçmeye yönelik. Yeni bir tane eklemeye gerek yoktu bence*
q140: *Çok güzel projeler veremedim çünkü geç kaldım-unutmuştum. O yüzden hızlı oldu. Sunmadılar. Normalde sundururdum ama konular da yetişmez diye sundurmadım.Prizma çeşitleri verdim; kapalı ve açık şekillerini çizip özelliklerini yazdılar. Kapalı şeklin maketini de aldım. Prizmaları işlemeden vermiştim ama projesi olanlara önceden biraz anlattım*
q141: *Aslında karıştırma değil ama açık hallerinden kapalıya dönüştürün demiştim ama diktörtgenler prizması diye gitmiş şurup kutusunu sarıp gelmiş*
q142: *Kimisi geliyor soruyor o puan nereden kırıldı diye. O ölçeği gösteriyorum. Bak burada, senin ödevin de şurasıydı. Eee mesela ilk dönem grafik yaptırmıştım. Sizin grafiğinizin şurası şöyleydi. Yani projelerde orada hata vardı, oradan 5 puan kırıldı, burada da yazıyor zaten deyip gösteriyorum. Ama sormayana şey yapmıyorum-göstermiyorum*

q143: *çocuk bir de diyorki ben de yaptım neden aynı değil notlarımız. Yani ödev geldiği için, kartona yapılmış ödev geldi, hepimiz 90 alacağız, hepimiz 100 alacağız diye bakıyorlar. Ama orada içeriğine, o grafiği nasıl çizdiğine bakıyorum. O şeyi nasıl yazdığına bakıyorum. Çocuğun nasıl yazdığına bakıyorum. Çünkü zaten o asılı-nelere bakacağım. Biliyor yani. Eeee ama gelip, o da kendi ödevinin çok güzel olduğunu düşünüyor demekki. Hatalarını görmek istemiyor demek ki*

q144: *Eee ama kesirlerde bayağı zorlandım yani onlar da baya zorlandı. Bilmiyorum. Aslında mantığını da çok vermeye çalıştım. Ya kesirlerde evet baya…Yani ben mesela, pasta, doğum günü partisi gibi yaptım. Onları böldük, dilimledik falan. Şekil çizdik ettik resimlerden falan filan, yani dikdörtgen-kare gibi resimler. Ama gözlemlerime göre gene de olmadı yani, hiçbiri işe yaramadı. Kesirlerin mantığını bir oturtamadım*

q145: *Ama siz bize böyle öğretmemiştiniz diyenler oldu (gülüyor). Ki onlarda evet kesir takımı yoktu ama şey model çizdik (konuyu anlattığı zamandan bahsediyor) ama bu gelince bir kafaları gitti yani onların. Birim kesir olduğunu bir göremediler. Şey aradılar…mesela şey yazmışım: 1/3, 2/3 yazmışım. 1/3ü buldular, 2/3ü bulamıyorlar, oradan 1/3ler çıkartmaya çalıştılar falan. O şeydi yani. Orayı bir toparlayamadılar. Onların hepsinin birim kesir olduğunu, yani kaç tane ihtiyacım varsa alacağımı bulamadılar-2/3te 2 tane 1/3 olacağını-bayağı bir yardım gerekti yani. Konunun oturmamış olmasından kaynaklandığını düşünüyorum. Yani bir de kesir şeritleri hiç kullanmadığım için de, o yüzden de şaşırmış olabilirler. Aslında tanıtmıştım daha önce. Ben ders anlatırken de çiziyordum bütün olarak sadece, yani şeyle göstermiyordum. Kullansaydım bu kadar hata olmazdı belki*

q146: *Bunu konuyu anlatırken kullandım, yani arada fark olduğunun üstünde durdum. Prizmalardaki yükseklik boyutundan ve hacimden biraz bahsettim.*

q147: *Konunun işte anlaşılmadığını fark ettiğimde. Yani çocukların o şey bakışı var ya zaten, yani böyle bir anlatıyorsun ama karşıdan bir şey gelmiyor ya. Diyorumki evet burada bir çalışma yaprağıdır, quizdir, bir şey koymalıyım ki o bir şey olsun, hareketlensin. Çünkü bööyle bakıyor yani bir uyuma hali var derste. Öyle olduğu zaman hemen araya yapıştırıveriyorum*

q148: *Yani şöyle…kalkan çocuk hep kalkıyor. Kalkmayanı zaten bir iki dersten sonra görüyorum yani burada bir şey var hani 2-3 kişi kalkmıyor hiç. Hiçbir şey yapmıyor. Dolayısıyla o zaman diyorum ki hayır bugün işte Nurten kalkacak. Onu kaldırıyorum. Eee Nurten kalktığı zaman en çok takıntılı olduğum çarpım tablosu. Çarpım tablosunu, oradan bir çarpmayla ilgili bir şey soruyorum. İlkokul 2de öğrenmesi gereken şey. Hala bilmiyor. O yüzden çarpım tablosuyla ilgili 1. dönem sözlü de yaptım (Bunu abartılı bir durummuş gibi bir ses tonuyla anlatıyor). Bildiğimiz eski usul böyle kaldırıp sorduğum da oldu*

q149: *Sınıfın seviyesine uygun mu diye düşünürüm (sorulardan bahsediyor). Ortalamayı alıp yani. İşte bunu genel olarak sınıf çözer, bunu genel olarak çözemez diye. Bunu gözlemliyorum sınıfta. Yani çünkü sınıfta ne çözüyorsam ee onun paralelini sorarım yani. Çok böyle ekstradan farklı bir şey sormadığım için kimin ne yapıp yapamayacağını tahmin ediyorum. . Hani genelin ne yapacağı, o seviyesine göre-ortalama seviyeye göre bunu yaparlar, bunu yapamazlar diye şey yapıyorum yani. Düşünüyorum soruları hazırlarken*

q150: *Diğer değerlendirmelerde yapan yine yapmış, yapmayan aynı. İlk sınav sonuçlarıyla ve ders içi performanslarıyla aynı. Ders içi gözlemlerimden yola çıkarak yazılı sonuçlarını şu 100 alır diye zaten düşünüyorum, öyle de oldu. Benim zaten kanaatim o yöndeydi*

q151: B*ulunduğu basamağı da sayıyor mesela. Gözlemlerimden bunu yazılıda da yapamayacağını düşündüm ve öyle oldu*
q152: *Derste nasılsa sonuçta yine aynı. Şu şunları yapar dediğim yapmış. Yorumları da yapmış. Diğerleri ise yapamayanlar zaten. Derste de düzeyleri aynı zaten. Bir sürpriz yok yani*
q153: *Birkaç kişi, yazısıyla, oluşturdukları anlaşılır prizma modelleriyle, vs. çok güzel getirmişti. Bu öğrenciler normalde daha başarı seviyesi düşük olan öğrencilerdi*
q154: *Mesela bir öğrencim var.... Hala H-a-l-a ve her ders te hala da sorarım. Ve hala ezberleyeceğim diyor. Eee ama dersle alakası yok yani. Başka şeylerle böyle... İlgimiz yok yani. Her hafta ben bu hafta ezberleyeceğim diyor. Bakalım ben de inatla soruyorum. Ne zaman ezberleyecek? Onu bekliyorum. Yani bazı öğrencilerim benim aklımda*
q155: *Birebir, yüzde yüz işte tarafsız bir şekilde yapamıyor olabilirim o dengelenmeyi. Çünkü bir kısmını notlandırmıyorum, bir kısmını kendime göre-yani mesela Nurten'de çarpım tablosuna takılmış bir durumdayım. Mesela kendime göre o öğrendiyse benim için çok böyle sevindiğim veya işte bu çocukta olumlu bir şeyler var deyip mesela onun ders içi performansında belki onu da göz önünde bulundurarak biraz fazla şişirme de veriyor olabilirim. Bilmiyorum. Hani o dengeyi tam çok iyi yapıyor muyum emin değilim ama düşünceme göre Nurten bu durumdaysa ona sözlüsü biraz daha fazla olacak. Eee ilerleme var. Yani en azından işte çarpım tablosunda ilerlemesi var, ya da işte mmmm bir çaba var yani. Hani-evet benim geçmişim şey ama eksik ama yapmaya çalışıyorum-diyor*
q156: *Çünkü çocuk yapamayınca stress yapıyor ve kopuyor. O yüzden dikkat ederim yani*
q157: *Hani çocukta baya bir gelişim var. Böyle üstüne gidince gidince kimisinde oluyor*
q158: *mesela ¾ ve 7/12 demiştim. Hangisi daha büyük diye sormuşum.Orada sayıyı 7 ve 12 büyük gördüğü için hemen o büyüktür diyor*
q159: *Ya çocuk zaten bir kerede anlatınca öyle bir soru geliyor ki: şunu şuradan yapsak, işte-mesela genişletme anlatıyorum ya şimdi. Sadeleştirme, diyor ki şurada sadeleştirme de var ama değil mi diyor. Ya da şuna da bölsek olur mu diye soruyorlar. Yani o soruyla zaten çocuk kendini belli ediyor. Diğeri daha böyle sakin duruyor, yapamıyor ya da hani benim öğrettiğim kadarını yapıyor. Mesela 5/C de böyle zehir gibiler, atlıyorlar*
q160: *Ya işte zaten mesela çarpım tablosunu bilmeden geliyor. 2. sınıfta öğrenmesi gereken şeyi öğrenmiyor. 5. sınıfta dolayısıyla-mesela kesirlerde genişletme yapamıyor ya da normal çarpma-bölme yapamıyor 7-8 basamaklılarla. E öyle yapamayınca yapamadıkça not düşüyor*
q161: *Çünkü ee mesela 7lerde cebir karolarını kullandım. Orada bir karışık-geçen sene kullanmıştım-sınıfı toplamam çok zaman almıştı. Ama şey olarak yani karışıklık olarak değil, kafaları tamamen gitti. Ne işliyoruz biz deyip, böyle bir onları koyunca şaşırdılar yani. Onu şeye döndüremediler. Bilinmeyenin o olduğunu, o dikdörtgenin o aslında x, y neyse ne koyuyorsak o olduğunu. Sonra soru çözememeye başladılar. Ben bir daha anlattım bu sefer cebirsel ifadeler şöyle…Yani materyal girince işin içine karıştırdılar. Bir de belki hep böyle anlatsak…Hep zaten anlatım yapıyoruz ya bir anda bir şey girince çocuk farklı bir şey zannediyor olabilir yani*

q162: *Eskiden daha çok korkuyorlardı sanırım. Şimdi daha iyiler. Yani mesela dershanedeyken falan. Bakıyorum eee çok böyle korkarlardı. Şey yaparlardı. Eee çalışmayı sevmezlerdi. Mesela buradaki 5lerimiz öyle değil. Bana öyle gelmiyorlar. Eee geçen seneki okulumda da aynı şekildeydi. E bu seneki 5lerde şey var yani böyle. Belki biraz şeye bağlıyorum. Hani biz genciz falan. Yani çok katı, sert, yaşlı öğretmenlerden de korkuyor olabilirler yani*
q163: *Öğretmen de niye yapamıyorsun, ne oluyor falan diye sorarak o da üstüne gidiyor. Dolayısıyla sevmiyor yani*
q164: *Öğrencilerde tekrar eksikliği var. Sonuçlar da bu durumlarla uyumlu çıkıyor. Mesela uzunluk ölçülerinde bazı sıkıntılar var ve geçmiş konular unutulmaya başlanmış*
q165: *Yetiştirmekte sıkıntı var bir kere. Eee yetiştiremeyince bu sefer eee etkinlikleri ya da işte çocukları ön plana çıkarma (öğrenci merkezli olmaktan bahsediyor) geride kalıyor. Ne oluyor? Normal anlatım yöntemi, işte soru yazıyoruz arada çocukları kaldırıyoruz falan. Öyle yapıyoruz yani. Eee dolayısıyla bu yöntemi uygulayınca da çocukları gözlemlemek için ne yapıyorum işte, ya quiz yapıyorum-küçük şeyler*
q166: *Mesela ben kesirleri hiç sevmem. Böyle kesirler konusu bana böyle bir şey gelir. İşte belki de o yüzden çocuklara da biz onu şey yapamıyor olabiliriz. Kesirlerde ben o yüzden kendime de bir suç buldum yani. Sevmediğim için acaba isteksiz mi anlatıyorum? Çünkü bir an önce şeyim. Şu kesirleri bir atlatsak, bir atlatsak şeklindeyim çünkü çok bunaldım yani sevmediğim için*
q167: *Yani bize de anlatıldı, öğrendik; şimdi onlara anlatıyoruz. Biz de çok böyle şeyin içinde olup, atıyorum işte-matematik için söyleyeyim-matematiğin içinde olup, biz de bir şey yaratmadık. Bir şey yaratmadık yani. Problem yaratmadık mesela öğrenciliğimizde. Dolayısıyla çocuğa da-bizde de olmadığı için-biz de onu aktaramıyoruz. O uyumsuzluk eee biz de çok iyi bilmediğimiz için bence çok büyük bir zorluk*
q168: *Eee şimdi çocuk ortaokulda farklı öğretmenler görüyor, ilkokulun şeyini atamıyor. Eee mesela 6. sınıftan başladıklarında böyle olmuyordu. Çocuklar hazırdı: biz arık ortaokuluz diye. Bir anda 5ler ortaokul oldu: sanki biz sınıf öğretmeniyiz, öyle davranıyorlar. Eee şey gibi böyle işte ilkokul 2 öğrencisi gibi. Çöpümü atabilir miyim, onu yapabilir miyim, yan başlık mı falan böyle…O bir zorluk getirdi. En azından 5. sınıfta sınıf öğretmenleri de hazırlıyordu. Çocuk bir şey oluyordu. Bir de ders sayıları arttı*
q169: *Çünkü proje ve performansta belli bir şeyleri görüyorum ama yazılıda ne anlatmışım onu görüyorum*
q170: *Mmm yazılı sınavlar çocuğun hazır cevaba nasıl diyeyim hazır cevabı görmemesini sağlıyor. Yani daha çok yönlü düşündüğünü düşünüyorum. E çünkü o zihninde ne varsa, ne oluşturmuşsa onu yansıtıyor bize. Çünkü yazılıda ortada bir kopya yani ona bir ipucu verebilecek hiçbir şey yok. O işlemi, o şeyi, o sonucu nasıl kafasında canlandırdıysa biz anlattığımızda onu oraya yazıyor*
q171: *Bence tüm olarak matematikteki bütün yaptığı her şeydir. Dersteki oturuşu bile yani dersteki o dikkatli bakışı bile, eee dersteki konuşup konuşmaması bile. Zaten diğer-tahtaya kalkması, yazılılar, yani benim için yazılılar, performans görevi, proje gibi puanladıklarım da etkiliyor bir öğrencinin matematikteki performans değerlendirmesini. Bunlar zaten performansın içinde ama yani diyorum ya dersteki o defterini getirip o düzeni bile matematikteki tutumunun, o duruşunun-hepsinin*

ölçülmesi değerlendirilmesi bence. 5lerde de tüm bunlara dikkat ediyorum. Yani hepsine bakarım, sene sonunda defterlere de bakarım

q172: *Daha önceleri sınıfta sunduruyordum ama bu performans görevlerinin ya da projelerinin sunumu yapılmayacak çünkü kesirler ve uzunluk ölçüleri konusunda umduğumdan çok vakit kaybettik. Yetişmeyecek*

q173: *Örneğin bir sınıfım çok karmaşa bir sınıf. Onların diğer iki çalışmayı yapması karmaşa yaratır diye düşündüm. Karışıklık olabilir diye düşünmüştüm çünkü organize olmakta ve edilmekte zorlanan bir sınıf*

q174: *Ama işte ya karışıyoruz. Ben mesela açıklıyorum. Çok süssüz yani süssüz derken düzgün gelmeyen bir ödev hoşuma gitmiyor yani. O yüzden şöyle yapın-renkli karton kullanın, şunu yapın bunu yapın. Orada bir yaratıcılık da pek kalmıyor zaten. Bir matematik dergisi oluşturun desek mutlaka herşeyi anlatıyorum yani*

q175: *Yetiştirmemiz gereken bir müfredat var deyip geçiyoruz yani. Daha hızlı geçiyoruz. Böyle olunca o çocuk performans, projeden de-biz de zaten geçiştirme ödevler veriyor gibiyiz, yani biz de oturup çalışsak, biz de yaratıcı bir şey çıkarsak. Böyle şey olsa-biz böyle sürekli anlatmasak, daha geniş olsa, çocuk mantığını anlasa e üzerine de bir de proje versek bence çok şey olur, çocuk anlar. Ama biz zaten normal anlatıyoruz. 8lerde de, 5lerde de hepsinde teste yönelik te çalıştırıyoruz bunları-eninde sonunda çünkü bir sınava girecekleri için- e performans ve proje bizim için de öğrenci için de yük oluyor*

q176: *Drama bizde pek..şey olmuyor herhalde. Yani matematikte. Kullanılacak bir yer hiç aklıma gelmedi. Eee ama kullanılacaksa herhalde tarih, coğrafya gibi sosyal derslerde, Türkçe'de falan herhalde kullanılır. Canlandırma yapıldığı için öyle düşünüyorum. Bizde bilmiyorum aklıma gelmedi hiç*

APPENDIX H

PERMISSION FOR THE CODINGS OF DR SUZIE ABDUL RAHIM

Permission for your codings(2)
nihanucar@ymail.com

07/17/14 at 10:43 AM
Suzieleez Syrene Abdul Rahim <suzieleez@um.edu.my>
To
nihanucar@ymail.com

08/15/14 at 6:41 AM
Dear Nihan,

Thank you for your interest in my thesis. Yes you have my permission to refer to my coding system in Appendix J and Appendix K in my thesis. Please acknowledge and reference the source of this coding system, which is from my thesis, in your completed thesis.

Thank you for your interest. Best wishes with your study.

Kind regards,
Dr Suzie

APPENDIX I

CODING OF DR SUZIE ABDUL RAHIM (2012)

Theme Smmary Sheet

Research question: Role and purpose of assessment

CATEGORY	THEME
1.Directs pathway of teaching	***Feedback for instructional decisions***
2.Teaching pace	
3.Teaching effectiveness	
4. Adjustments for future assessments	
5.Reporting, forecasting, testimonials	***Communication of students' progress and achievement***
6.Identify high-achieving and low-achieving students	***Feedback regarding students***
7.Informs students' learning	
8.Ranking	
9.Informs coping ability	
10.Identify students who can follow the lessons	
11. Identify areas of strengths and weaknesses	
12.Understand students better as individuals	
13. Monitor students' progress	
14. Encourage revision	***Motivating students in their learning***
15. Encourage students to study	
16. Motivation to perform better	
17. Prepare for external exams	***Preparation platform for external examination***

APPENDIX J

PERMISSION DOCUMENT GOTTON FROM THE RESEARCH ETHICS COMMITTEE OF MIDDLE EAST TECHNICAL UNIVERSITY

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY

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ÇANKAYA ANKARA/TURKEY
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ueam@metu.edu.tr
www.ueam.metu.edu.tr

Sayı: 28620816/90 -187

17.02.2014

Gönderilen : Doç. Dr. Erdinç Çakıroğlu
İlköğretim Fen ve Matematik Alanları Eğitimi

Gönderen : Prof. Dr. Canan Özgen
IAK Başkanı

İlgi : Etik Onayı

Danışmanlığını yapmış olduğunuz İlköğretim Fen ve Matematik Alanları Eğitimi Bölümü öğrencisi Nihan Uçar Sarımanoğlu'nu "A case study about the use of assessment techniques in 5th grades in a public school: Teachrs' views" isimli araştırması "İnsan Araştırmaları Komitesi" tarafından uygun görülerek gerekli onay verilmiştir.

Bilgilerinize saygılarımla sunarım.

Etik Komite Onayı

Uygundur

17/02/2014

Prof.Dr. Canan Özgen
Uygulamalı Etik Araştırma Merkezi
(UEAM) Başkanı
ODTÜ 06531 ANKARA

APPENDIX K

PERMISSION DOCUMENT GOTTON FROM THE MINISTRY OF NATIONAL EDUCATION

T.C.
ANKARA VALİLİĞİ
Milli Eğitim Müdürlüğü

ÖĞRENCİ İŞLERİ
DAİRESİ BAŞKANLIĞI
Ev. Arş. Md. Saat:

Sayı : 14588481/605.99/1814129 07/05/2014
Konu: Araştırma izni

ORTA DOĞU TEKNİK ÜNİVERSİTESİNE
(Öğrenci İşleri Daire Başkanlığı)

İlgi: a) MEB Yenilik ve Eğitim Teknolojileri Genel Müdürlüğünün 2012/13 nolu Genelgesi.
b) 22/04/2014 tarihli ve 4677 sayılı yazınız.

Üniversiteniz Eğitim Fakültesi Doktora Öğrencisi Nihan UÇAR SARIMANOĞLU'nun **"Bir devlet okulunun 5. sınıflarının matematik derslerinde ölçme değerlendirme tekniklerinin kullanımlarıyla ilgili bir durum çalışması: Öğretmen görüşleri"** başlıklı tezi kapsamında çalışma yapma talebi Müdürlüğümüzce uygun görülmüş ve araştırmanın yapılacağı İlçe Milli Eğitim Müdürlüğüne bilgi verilmiştir.

Görüşme formunun (5 sayfa) araştırmacı tarafından uygulama yapılacak sayıda çoğaltılması ve çalışmanın bitiminde iki örneğinin (cd ortamında) Müdürlüğümüz Strateji Geliştirme Bölümüne gönderilmesini arz ederim.

Müberra OĞUZ
Müdür a.
Şube Müdürü

Güvenli Elektronik İmzalı
Aslı İle Aynıdır.
07/05/2014

12.05.2014-7754

Yaşar SUBAŞI
Şef

Bu belge, 5070 sayılı Elektronik İmza Kanununun 5 inci maddesi gereğince güvenli elektronik imza ile imzalanmıştır
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Konya yolu Başkent Öğretmen Evi arkası Beşevler ANKARA
e-posta: istatistik06@meb.gov.tr

Ayrıntılı bilgi için: Emine KONUK
Tel: (0 312) 221 02 17/135

APPENDIX L

TURKISH SUMMARY

Giriş

30 yılı aşkın bir süre önce, Bloom, Hatings ve Madaus (1971) sınıflardaki ölçme uygulamalarının birer araç olarak kullanılmasının önemine vurgu yapmıştır. O zamandan günümüze ölçme ve değerlendirme metodları ve amaçları ile ilgi çalışmalar yapılmaya devam edilmektedir.

Yapılan çalışmalar, öğretmenlerin ölçme-değerlendirme çalışmalarını öğrencilere not vermek, onları motive etmek, özel öğrenime ihtiyacı olan öğrencileri belirlemek, öğrencilerin başarılı olmak için beklentilerini belirlemek, ya da kendi öğretim performanslarını gözlemleyebilmek için yaptıklarını ortaya koymaktadır (Ohlsen, 2007; Stiggins, 2001).

Matematik sınıflarında ise öğretmenler ölçme çalışmaları sonucunda öğrencilerin matematik kapasiteleri, performansları ve başarıları konusunda karar vermektedirler (Nisss, 1993). Bu anlamda matematik derslerinde yapılan ölçme çalışmaları da yıllar içinde değişime uğramıştır. Örneğin 30 yıl öncesine kadar çoktan seçmeli ya da kısa cevaplı sorular uygulanırdı (Wolf, 1995). Özellikle ilköğretim gruplarıyla çalışan öğretmenler kağıt, kalem gerektiren testler gibi geleneksel yöntemleri tercih etmekteydi (Krajcik, Czerniak, ve Berger, 1999). Öğrenci merkezli eğitim modelllerinin önemsendiği günümüz toplumlarında ise artık test, kompozisyon gibi ölçme yöntemleri öğrencilerin fikir çeşitliliğini ortaya koymak konusunda zayıf kalmaktadır (Krajcik ve diğerleri, 1999). Bu anlamda matematik öğretmenlerine yapılan öneriler, ölçme çalışmalarını öğrencilerin matematiksel düşünmesini çalıştıracak, onları dinleyerek bu düşüncelere cevaplar verebilecek öğretim bölümü olarak uygulamalarıdır (Suurtamm, Koch, ve Arden, 2010).

Ders gözlemleri, yazılılar, proje çalışmaları, ve performans değerlendirmeye yönelik uygulamalar, kendi güçlü ve zayıf yanları olduğundan, birbirlerini

tamamlayan ölçme yöntemleridir (Clarke, 1997). Birlikte kullanıldıklarında ise hem daha zengin bir bilgi kaynağı oluştururlar, hem de ortak bir geçerlilik kontrolü yapmış olurlar (Anderson, 1998).

Türkiye'de, ortaokul matematik müfredatı öğrencilerin gerçek yaşam tecrübeleriyle matematik kavramları arasında anlamlı ilişkiler kurması üzerine inşa edilmiştir (MEB, 2013). Bu anlamda beklenen, hem öğrenim çıktılarının hem de öğrenim sürecinin ölçülmesidir. Milli Eğitim Bakanlığı, ölçme-değerlendirme çıktılarının düzenli olarak toplanmasını ve analiz edilmesini sağlayan aktivitilerin düzenlenmesini ve bu aktiviteler uygulanırken öğretmenlerin rehber görevinde olmalarını önermektedir (MEB, 2013).

Milli Eğitim Bakanlığı (MEB) uluslarası platformlarda yer alan ölçme çalışmalarına da katılarak çalışmalarına devam etmektedir. Öğrencilerin matematik öğrenimini uluslararası bağlamda ölçen TIMSS, Uluslararası Matematik ve Fen Eğitimi Araştırması raporlarına göre Türkiye, 8. Sınıflar kategorisinde, 1999 yılında 38 ülke arasından 31., 2007 yılında ise aynı araştırmada yer alan 49 ülke arasından 30. sırada yer almıştır (Eğitim Araştırma ve Geliştirme Dairesi Başkanlığı, 2003; 2011). 2011 yılında yapılan TIMSS çalışmasında ise 8. sınıflar kategorisinde 42 ülke arasından 24.; 4. sınıflar kategorisinde ise 50 ülke arasından 35. sırada yer almıştır (Mullis, Martin, Foy, ve Arora, 2012). Her TIMSS çalışmasında ülkeler ve ülkelerin niteliklerinin değişmesi üzerine yapılan tartışmalar bir yana bırakılırsa, çalışmanın raporları Türkiye'nin matematik başarısının birçok ülkenin gerisinde olduğunu göstermektedir (Mullis ve diğerleri, 2012). Benzer bir şekilde çeşitli ülkelerin katıldığı PISA, Uluslararası Öğrenci Başarısının Değerlendirme Çalışması'nın, 2003 yılında yayınlanan uygulama raporları ise katılımcı öğrencilerin % 50'sinin matematik okur yazarlığı bağlamında güçlük çektiğini ortaya koymuştur (EARGED, 2005). PISA 2003 sonuçlarının anlatıldığı ilgili raporda eğitim sisteminin amaçlarının netleştirilmesi de tavsiye edilmiştir.

Milli Eğitim Bakanlığı da TIMSS ve PISA çalışma sonuç raporlarında önerildiği gibi, eğitim sisteminde net amaçlar konulmasını önemsemektedir. Bu bağlamda, öğrenmenin sadece sonuçlarının değil sürecinin de üstünde durmaktadır. Buna rağmen, önceki müfredatların uygulanmasında olduğu gibi, öğretmen yetersizlikleri, materyal ya da teknolojideki eksiklikler, okul sayısındaki artış ya da

fiziksel koşullar gibi sorunlar hala devam etmektedir.

Çalışmanın Amacı ve Araştırma Soruları

Bu çalışmanın amacı matematik öğretmenlerinin, 5. sınıflarda ölçme ve değerlendirme çalışmalarını incelemek amacıyla yapılmıştır. Bu anlamda, matematik öğretmenlerinin ölçme prosedürleri ve değerlendirme sonuçlarını nasıl kullandıkları araştırılmıştır. Ayrıca öğrencilerin matematiği nasıl öğrendikleri, matematik öğretimini etkileyen faktörler ve matematik öğrenimini ölçme konularındaki öğretmen görüşleri incelenmiştir. Bu amaçla aşağıdaki sorular oluşturulmuştur:

1. Katılımcı matematik öğretmenleri 5. sınıflarda hangi ölçme prosedürlerini kullanmaktadırlar?
2. Katılımcı matematik öğretmenlerinin formal ve informal ölçme uygulamaları arasında nasıl ilişkiler vardır?
3. Katılımcı matematik öğretmenleri 5. sınıflarda ölçme sonuçlarını biçimlendirici (formative) olarak nasıl kullanmaktadırlar?
4. Katılımcı matematik öğretmenlerin öğrencilerin matematiği nasıl öğrendikleri, matematik öğretimini etkileyen faktörler ve matematik öğrenimini ölçme konularındaki görüşleri ile ölçme prosedürleri arasındaki ilişkiler nelerdir?
5. Katılımcı matematik öğretmenlerinin algılanan ölçme uygulamaları ve onların 5. sınıfların matematik öğrenimini ölçme konusundaki görüşleri arasındaki çelişkiler nelerdir?

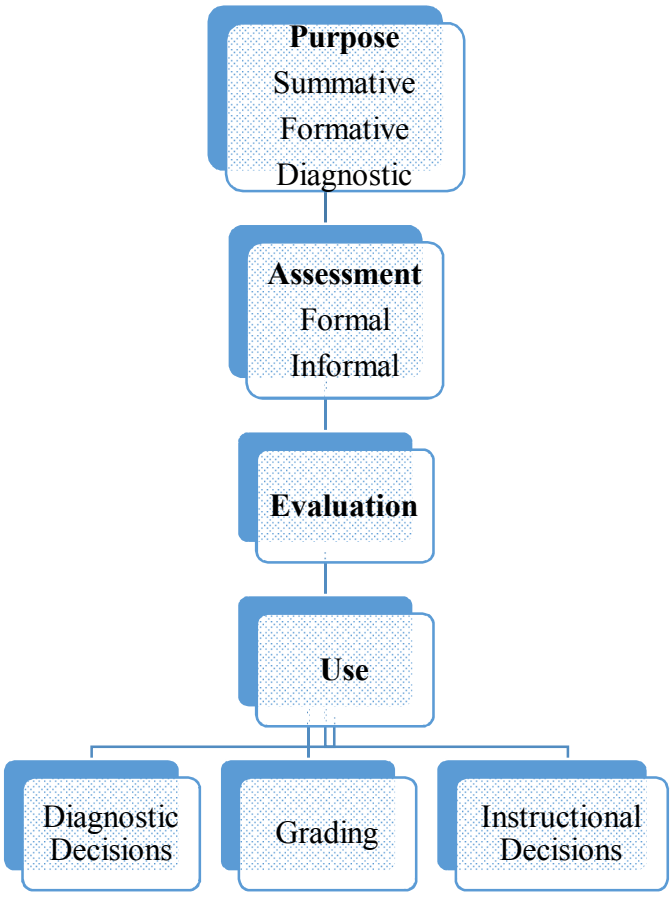
Çalışmanın Önemi

Matematik öğretmenlerinin müfredatlarla önerilen değişikleri gerçekten algılamaları, bu önerilerin kalıcı olarak uygulanabilmesini sağlayabilir. Türkiye'de birçok matematik öğretmeni, 5. sınıflarda son birkaç yıldır ders anlatıyor. Bu durum, bu yaş grubundaki öğrencilere ders anlatabilmek ya da onlarla iletişim kurabilmek gibi konularda öğretmenlere sorun çıkarabilir. Öğrenciler için de ortaokul ortamında yeni olmak bazı problemler doğurabilir. Matematik öğretimi ve öğreniminin

geliştirilmesine katkıda bulunmak adına, 5. sınıflarda yapılan ölçme-değerlemdirme çalışmalarının özelliklerinin belirlenmesi, matematik öğretmenlerinin ve 5. sınıf öğrencilerinin yaşadığı ya da yaşayabileceği sorunların çözümünde faydalı olabilir. Etkili ölçme çalışmaları yapabilmek için sınıflarda yapılan ölçme ve değerlendirme çalışmalarının gözlemlenmesi şarttır (National Council of Teachers of Mathematics, 2000). Bu yüzden öğretmenlerin matematik derslerinde uyguladıkları ölçme ve değerlendirme çalışmalarını sınıf ortamında araştırmak, matematik sınıflarında dengeli bir ölçme sistemininin inşa edilmesine de yardımcı olacaktır. Bu gerekliliğie dikkat çekmek bağlamında, öğretmenlerin ölçme ve değerlendirme çalışmaları araştırılmaya değer bulunmuştur. Bunun yanında, çalışma öğretmenlerin ölçme ve değerlendirme çalışmaları konusunda analizler üzerine kurulduğu için müfredatın uygulanmasıyla ilgili muhtemel aksaklıkları da ortaya çıkarabilecektir. Böylece müfredat geliştiren ya da öğretmen yetiştiren bireylere de bu aksaklıklarla ilgili bir çeşit bilgi kaynağı olabilecektir.

Kavramsal Çerçeve

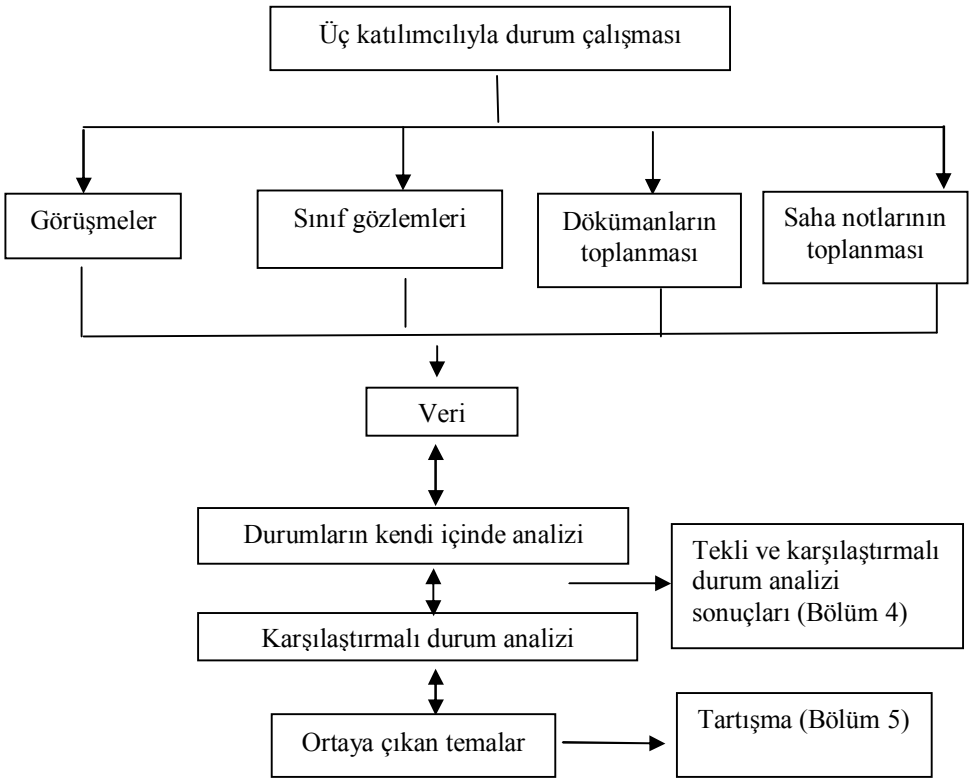
Ölçme ve değerlendirme eğitimin 'bağımsız' bir parçası değildir ve hem öğretim hem de müfredat alanlarında etkili bir süreçtir (National Research Council, NRC, 2001). Bu süreç dört temel parçayla tamamlanmaktadır (McMillan, 2007): amaç (purpose), ölçme (measurement), değerlendirme (evaluation), ve sonuçları kullanma (use). Amaçlar değer biçme (summative), biçimlendirme (formative) ve teşhis etme (diagnostic) şeklinde olmaktadır (Airasian ve Russell, 2008; Deneen & Deneen, 2008; Hackling, 2004; Popham, 2011). Değerlendirme (assessment) kavramı bu çalışmada ölçme (measurement) aşamasını da kapsayacak şekilde kullanılmakta olup formal ya da informal ölçme-değerlendirme yöntemlerini içermektedir (Airasian ve Russell, 2008; McMillan, 2007; Wrag, 2001). Puanlama (evaluation) yaptıktan sonra ise öğretmenler çalışmalarını not vermek (grading), öğretime yönelik kararlar almak (instructional decisions) ve teşhis edici kararlar almak (diagnostic decisions) için kullanmaktadırlar (McMillan, 2007). Tüm bunları özetleyen ve Şekil 1'de gösterilen ölçme-değerlendirme süreci ise bu çalışmanın kavramsal çerçevesini oluşturmuştur:



Şekil 1. Ölçme-değerlendirme sürecinin kavramsal çerçevesi (McMillan, 2007, p. 9)

Araştırmanın Yöntemi

Çalışmanın yöntemi niteliksel bir araştırma yöntemi olan çoklu durum çalışmasıdır. Veri toplama süreci 2013-2014 eğitim-öğretim yılının bahar döneminde, Ankara'da bulunan bir devlet okulunda çalışan üç matematik öğretmeniyle tamamlanmıştır. Şekil 2'de sunulan çerçeve, çalışmada veri toplama ve toplanan verileri analiz etme süreçlerinin nasıl gerçekleştirildiğini özetlemektedir:



Şekil 2: Veri toplama ve analiz etme sürecinin çerçevesi

Katılımcılar

Çalışma üç gönüllü ilköğretim matematik öğretmeniyle gerçekleştirilmiştir. Tüm katılımcılar kadındır ve geçmişte 5. sınıflara matematik dersi anlatmış öğretmenlerdir. Çalışma boyunca öğretmenlerin gizlilik haklarını korumak adına onlardan Ms. Kaya, Ms. Solmaz ve Ms. Yılmaz takma adlarıyla bahsedilmiştir. Katılımcılar ve özellikleri Tablo 1'de verilmiştir:

Tablo 1: Katılımcıların Özellikleri ve Tecrübeleri

Takma ad	**Cinsiyet**	**Eğitim**	**Öğretmenlik Tecrübesi (yıl olarak)**	**Hangi sınıflara ders anlattığı**
Ms. Kaya	Kadın	İlköğretim Matematik Eğitimi mezunu. Eğitim yönetimi, teftişi, planlaması ve ekonomisi alanında yüksek lisans derecesi var	4	5., 6., 7. ve 8. sınıflar. Gözlemlendiği sırada 5., 6. ve 7. sınıflar
Ms. Solmaz	Kadın	İlköğretim Matematik Eğitimi mezunu.	2	5., 6., 7. ve 8. sınıflar. Gözlemlendiği sırada 5. ve 8. sınıflar
Ms. Yılmaz	Kadın	İlköğretim Matematik Eğitimi mezunu.	5	5., 6., 7. ve 8. sınıflar. Gözlemlendiği sırada 5. ve 8. sınıflar

Veri Toplama Süreci ve Veri Kaynakları

Veri toplama sürecinde öncelikle, 2014 yılının Mart-Şubat ayları arasında, detaylı görüşme soruları pilot edilmiş; daha sonra da, 2014 yılının Mart ayının ortası ve Haziran ayı sonuna kadar, ana çalışma gerçekleşmiştir. Veri toplama sürecinin zaman aralığı Tablo 2'de verilmiştir:

Tablo 2: Veri Toplama Sürecinin Zaman Aralığı

Çalişma	**Zaman aralığı**
Görüşme sorularının hazırlanması	Ocak 2013-Ocak 2014
Detaylı görüşme sorularının pilot edilmesi	Ocak 2014-Şubat 2014
Data toplama araçları üzerinde gerekli değişikliklerin yapılması	Şubat 2014
Katılımcılarla detaylı görüşmelerin yapılması	Şubat 2014-Mart 2014
Sınıf gözlemleri ve etkinlik-sonrası görüşmeleri	Mart 2014-Mayıs 2014
Saha notlarının ve dökümanların toplanması	Mart 2014-Mayıs 2014
Final görüşmeleri	Haziran 2014

Veri toplama süreci üç aşamada tamamlanmıştır. Birinci aşamada, her katılımcıyla derinlemesine ve detaylı birer görüşme yapılmıştır. İkinci aşamada video kaydı kullanılarak sınıf gözlemleri yapılmıştır. Her ölçme etkinliğinden sonra, katılımcılarla ayrı ayrı etkinlik-sonrası görüşmeleri yapılmıştır. Veri toplama sürecinin sonunda her katılımcıyla final görüşmesi yapılmıştır. Üçüncü aşama olarak ise saha notları ve kapsamlı dokümanlar toplanmıştır.

Görüşmeler ve Sınıf Gözlemleri

Çalışmada kullanılan detaylı görüşme soruları katılımcılardan önce üç farklı, gönüllü matematik öğretmeniyle pilot edilmiştir. Pilot çalışmasına katılan tüm öğretmenler, veri toplama sürecinde 5. sınıflara matematik anlatıyorlardı. Birinci katılımcı 32 yıllık öğretmenlik tecrübesine sahipti, ikinci katılımcı 1 yıl, üçüncü katılımcı ise 16 yıllık öğretmenlik deneyimine sahipti. Tüm görüşmeler ses kayıt cihazıyla kayıt altına alındı. Pilot çalışmaların sonucunda zaman kazanmak ve soruların daha anlaşılır olmasını sağlamak için bazı sorular kısaltıldı, birleştirildi ya da çıkartıldı.

Ana çalışma sırasında, öncelikle katılımcılarla detaylı görüşmeler yapıldı. Daha sonra her bir katılımcıyla sınıf gözlemleri yapıldı. Sınıf gözlemi yapılsın ya da yapılmasın her katılımcının yaptığı formal ya da informal ölçme çalışması sonrası etkinlik-sonrası görüşmesi yapıldı. Tüm görüşmeler kayıt cihazıyla kayıt altına alındı. Detaylı görüşmeler ortalama 60 dakika sürereken, etkinlik-sonrası görüşmelerin 10 ila 20 dakika arasında bir sürede tamamlandığı gözlemlendi.

Araştırmacı, sınıf içindeki ölçme sürecini gözlemleyebilmek için, dört adet etkinlik hazırladı, danışman ve jüri üyelerine onaylattı ve bunları katılımcılara sundu. Onların seçtiği zamanlarda, ders planlarına uygun olarak bu çalışmalar katılımcıların seçtikleri 5. sınıf gruplarında uygulandı. 'Problem çözme etkinliği' ve 'kısa sınav (quiz)' etkinlği öğrenciyle etkileşimi çok olmayan, daha çok yazılı tarzında çalışmalardı. Bu yüzden katılımcı öğrenciyle etkileşimin daha fazla olduğu ve bu yüzden öğretmenin ölçme uygulamalarına yönelik daha fazla veri toplayabileceği 'kesirlerle toplama' ve 'dikdörtgen oluşturma' etkinliklerini sınıf ortamında gözlemledi. Ayrıca, Ms. Kaya'nın kendi hazırladığı ve öğrencilerine uygulattığı performans-görevi etkinliği de sınıf ortamında gözlemlenmiştir. Sınıf gözlemleri sırasında araştırmacı tüm süreci kamera ile kayıt etmiştir. Her bir katılımcının uyguladığı aktiviteler, onlarla yapılan görüşmeler ve bu çalışmaların süreleri Tablo 3'te özetlenmiştir:

Tablo 3: Etkinlikler ve gözlem süreleri

Katılımcı	Etkinlik adı	Gözlem	Kamera ile kayıt süresi	Etkinlik-sonrası görüşme
Ms. Kaya	Kısa sınav (quiz)	-	-	+
	Kesirlerle toplama	İki ders saati	45 dakika	+
	Problem çözme	-	-	+
	Dikdörtgen oluşturma	Bir ders saati	32 dakika	+
	1. yazılı	-	-	+
	2. yazılı	-	-	+
	3. yazılı	-	-	+
	Performans-görevi	İki ders saati	72 dakika	+
	Proje çalışması	-	-	+
Ms. Solmaz	Kısa sınav (quiz)	-	-	+
	Kesirlerle toplama	Bir ders saati	30 dakika	+
	Problem çözme	-	-	+
	Dikdörtgen oluşturma	Bir ders saati	34 dakika	+
	1. yazılı	-	-	+
	2. yazılı	-	-	+
	3. yazılı	-	-	+
	Performans-görevi	-	-	+
	Proje çalışması	-	-	+
Ms. Yılmaz	Kısa sınav (quiz)	-	-	+
	Kesirlerle toplama	İki ders saati	68 dakika	+
	Problem çözme	-	-	+
	Dikdörtgen oluşturma	Bir ders saati	26 dakika	+
	1. yazılı	-	-	+
	2. yazılı	-	-	+
	3. yazılı	-	-	+
	Performans-görevi	-	-	+
	Proje çalışması	-	-	+

Bu çalışma sırasında ders gözlemleri, ders gözlemlerinden sonra alınan betimsel notlar ve kamera kayıtları katılımcıların informal ölçme-değerlendirme çalışmalarına yönelik arsştırma sorularını cevaplandırırken görüşmeler ve dökümanlarla yapılan analizlere destekleyici veriler olarak olarak kullanılmıştır.

Saha Notları ve Dökümanlar

Veri toplama sürecinin bir başka aşaması da saha notlarının ve dökümanların toplanmasıdır. Saha notları tüm çalışma boyunca toplanmıştır. Bu bağlamda,

katılımcı öğretmenlerle kısa süreli ayaküstü görüşmeler yapılmış ve 5 dakika içinde bu görüşmeler yazılı olarak not edilmiştir. Bu görüşmeler öğretmenlerin diğer görüşmelerde bahsetmedikleri ve ölçme-değerlendirme alanındaki uygulamaları ile ilgili olan görüşmelerdir. Dökümanlar ise öğretmenlerin yıllık ve günlük planlarını; okuldaki matematik zümresinin karar tutanaklarını; öğrenci aktivite, quiz, yazılı, ödev, performans görevi, proje ödevi gibi çalışmalarını; 5. sınıf ders kitabını kapsamaktadır. Tüm saha notları ve dökümanlar; çalışma sırasında yapılan detaylı görüşmeler, etkinlik-sonrası görüşmeler, final görüşmeleri ve sınıf gözlemleri ile elde edilen verileri desteklemek ve aydınlatmak amacıyla kullanılmıştır.

Veri Analizi

Toplanan veriler iki aşamada analiz edilmiştir. Birinci aşamada her durum kendi içinde analiz edilmiş, ikinci aşamada ise karşılaştırmalı durum analizi yapılmıştır. Araştırmacı, öncelikle tüm görüşmelerin kayıtlarını yazılı dokümana çevirmiştir. Kodlama aşamasında ise öncelikle benzer bir çalışmayı daha önce yapmış olan Suzieleez Abdul Rahim (2012) isimli araştırmacıya ait bazı kodların söz konusu çalışmaya da uyum sağladığı farkedilmiş ve kendisinden alınan izin doğrultusunda bu kodlarla çalışılmaya başlanmıştır. Kodlamalarla ilgili yapılan ilk çalışmalar Ms. Kaya isimli katılımcının verileri üzerinde denemiş ve tez danışmanı tarafından kontrol edilmiştir. Tez danışmanın da verdiği düzeltmeler sonrası araştırmacı kodlamalara son halini vermiştir. Tüm katılımcılarla yapılan tüm görüşmeler kodlandıktan sonra bir başka asistan-doktora öğrencisi tarafından tekrar kodlanmıştır. Araştırmacının ve ikinci kodlayıcı araştırmacının kodlamaları karşılaştırılmış ve % 80 oranında bir uyum gözlemlenmiştir. İkinci kodlayıcının da verdiği öneriler doğrultusunda, kodlamalar son halini almıştır.

Durumlar kendi içlerinde analiz edilirken ortaya çıkan anahtar temalar karşılaştırmalı durum analizleri yapılırken temel oluşturmuştur. Karşılaştırmalı durum analizinde, katılımcıların (durumların) ölçme prosedürleri ve değerlendirme sonuçlarını nasıl kullandıkları; onların öğrencilerin matematiği nasıl öğrendikleri hakkında, matematik öğretimini etkileyen faktörler hakkında ve matematik öğrenimini ölçme hakkında ortaya koydukları veriler farklılıklar ve benzerlikler

şeklinde karşılaştırılmıştır.

Veri analizleri sonuçları yazılırken, kamera kayıtları, sınıf gözlemleri ve dökümanlar görüşmeleri desteklemek, açığa kavuşturmak ve ihtiyaç duyulan noktalarda okuyuculara daha net bilgiler sunmak amacıyla kullanılmıştır. Analiz sonuçları, okuyucuya sunulurken, öncelikle her bir durum çalışması için ayrı ayrı anlatılmıştır. İkinci aşamada durumların karşılaştırılması sonucu ortaya çıkan bulgular anlatılmıştır. Durumlar kendi içlerinde ve karşılaştırmalı olarak anlatılırken okuyucuya okuma kolaylığı sağlamak ve çalışmanın amacına bağlı kalmak adına tüm başlıklar araştırma sorularına uygun hazırlanmıştır. Ayrıca, gerekli görülen yerlerde tablolar ve dökümanlara ait figürler (resimler) kullanılmıştır.

Bulgular ve Tartışma

Çalışma sonuçları, tüm katılımcıların ölçme ve değerlendirme uygulamalarının McMillan (2007) tarafından önerilen kavramsal çerçeveyle uyumlu olduğunu göstermiştir. Örneğin ölçme amaçlarını yerine getirmek için, katılımcıların hem informal hem de formal ölçme yöntemlerini sınıflarında uyguladıkları gözlemlenmiştir. Daha sonra cevap anahtarları ya da puanlama-kılavuzu kullanarak ölçme çalışmalarını değerlendirmişlerdir. Sonuçları ise, not vermek (grading), öğretime yönelik kararlar almak (instructional decisions) ve teşhis edici kararlar almak (diagnostic decisions) için kullanmışlardır. Sonuçlar beş anahtar tema açığa çıkarmıştır.

Birinci tema katılımcıların ölçme prosedürleri hakkındadır. İnformal ölçme yöntemleri için tüm katılımcılar sınıf içi gözlemler ve tüm sınıfın üzerinde çalıştığı soruları kullanmışlardır. Ms. Solmaz ve Ms. Yılmaz düzenli ödev kontrolleri uygulamış, Ms. Solmaz ayrıca matematik günlüğü tutturmuştur. Sadece Ms. Yılmaz quiz uygulamış, sadece Ms. Kaya öğrencilerin ders sırasında, kendi aralarında yaptıkları fikir tartışmalarını da informal ölçme metodu olarak kullanmıştır. İnformal ölçme proserürlerinde ise genel olarak hepsi sınıf içinde dolaşarak gözlemler yapmışlar ve kısa cevaplı sorular sormuşlardır. Ayrıca hiçbiri ders içi gözlemleri için yazılı kayıtlar tutmamıştır. Bunun yanı sıra hepsinin, ders gözlemleri sırasında, öğrencilerin çalışmalarına müdahele ettikleri gözlemlenmiştir. Sonuçlar, ayrıca,

hiçbir katılımcının informal ölçme ve değerlendirme çalışmalarının sonuçlarının öğrencilerin yılsonu notlarına katkısı konusunda bir oran belirlemediğini ortaya koymuştur. Ms. Kaya ve Ms. Solmaz'ın informal ölçme ve değerlendirme sürecinde velilerle temas hainde olduğu da tespit edilen sonuçlar arasındadır.

Formal olarak ise tüm katılımcıların, Milli Eğitim Bakanlığı'nın (MEB, 2013a) uygulama ve takvim konusundaki mevzuatlarına uydukları gözlemlenmiştir. Bu bağlamda katılımcılar üçer tane yazılı sınav, bir performans görevi ve bir proje çalışması uyguladılar, yazılı ve performans görevlerini en az bir hafta önce duyurdular. Sonuçları ise 10 iş günü içerisinde anons ettiler. Proje çalışmalarını ise Aralık ayında duyurup, Nisan ayında topladılar. İçerik açısından da, katılımcılar yazılılarda genellikle çoktan seçmeli, doğru-yanlış, kısa cevaplı, boşluk doldurma gibi öğretim programına uygun soru tiplerine yer verdiler. Uygulamalardan önce cevap anahtarlarını ya da puanlama-kılavuzlarını hazırladılar ve ortak sınav raporlarını idareye sundular. Özet olarak, tüm katılımcılar hazırlama, uygulama ve değerlendirme aşamalarında matematik öğretim programının önerilerine uygun hareket etmiştir. Ders kitabını ise soru hazırlama ve matematik görevlerini tasarlama aşamalarında kullandıkları gözlemlenmiştir.

Araştırmalar, öğretmenlerin proje çalışmaları ve performans görevleri ile ilgili amaç, içerik, uygulama ve değerlendirme açısından sorunlar yaşadıklarını ortaya koymuştur (Meydan ve Öztürk, 2008; Tüfekçioğlu ve Turgut, 2008). Söz konusu çalışma da araştırmalarla paralel sonuçlar ortaya koymuştur. Örneğin katılımcılar performans görevi ve proje çalışmaları için kullandıkları puanlama kriterlerini (puanlama-kılavuzu) kendileri hazırlamamışlar, internetten adapte etmşlerdir. Bunun yanında bazı katılımcılar, performans göreviyle ilgili çalışmaları vakit sıkınıtısı ya da 5. sınıf öğrencilerinin hazır bulunuşlarındaki eksiklerden dolayı sınıf ortamında gerçekleştiremediklerini söylemişlerdir. Bu söylemler, veri toplama sürecinde yapılan gözlemlerle de ortaya konmuştur. Buna ek olarak, proje çalışmaları ve performans görevlerinin evde tamamlanan aşamalarında velilerin yardım etmesi de söz konusu çalışmada katılımcılar tarafından sorun olarak dile getirilmiştir. Bu ve benzeri sonuçlar geçmiş saha çalışmalarında da açığa çıkarılmıştır (Acar ve Anıl, 2009; Arı, 201; Baki ve Bütüner, 2009). Ayrıca, yine benzer çalışmalarda ortaya konduğu gibi, proje ya da performans görevlerinin öğrencilere uygulanan yazılı

sınavlar ya da sınıf gözlemlerinden bağımsız olarak notlandırılmadığı da ortaya konmuştur. Örneğin Ms. Solmaz'la yapılan görüşmeden yapılan aşağıdaki alıntı bu durumu net olarak özetlemektedir:

> Yani o puanlama ölçeklerinin çok da şey ne bileyim ben çok geçerli ve güvenirli olduğunu düşünmüyorum ben açıkçası. Ya evet onun o amaçlı, hani öğretmen daha objektif olsun, daha gerçekten de işe yarar bir şekilde verilsin notlar diye yapılıyor ama hani çok öyle olduğunu düşünmüyorum. Mesela atıyorum…(düşünüyor) çocuk çaba gösteriyor. O…yani o puanı hak ettiğini düşünüyorsun. E puanı verirken mesela işte oraları doldurmaya çalışıyorsun (gülücük). Şuradan şu kadar gelse, buradan bu kadar gelse falan diye. Formalite icabı yani. Yani bazen öyle şeyler oluyor. (q73)

Çalışmanın ikinci anahtar bulgusu ise informal ve formal ölçme-değerlendirme çalışmalarının sonuçların kullanılması aşamasında bağlantılı olabildiğidir. Ussher ve Earl (2010) tarafından önerildiği gibi, ölçme-değerlendirme ister değer biçme (summative), ister biçimlendirme (formative) amaçlı olsun, sonuçlar hepsi için kullanılabilir. Bu anlamda çalışmanın katılımcılarının değer biçme amacıyla uyguladıkları ölçme uygulamalarını değerlendirdikten sonra biçimlendirme amaçlı kullandıkları gözlemlenmiştir. Teşhis koyma amacı da çalışmalarda bir çeşit biçimlendirme amacı olarak tanımlanmaktadır (Crisp, 2012; Keeley ve Tobey, 2011; Sach, 2012). Çalışma bu anlamda da örnekler sunmuştur. Örneğin Ms. Kaya performans görevi sonuçlarını (değer biçme amaçlı), kesirlerle işlemleri modelleyemeyen öğrencileri belirlemekte (teşhis koyma) kullanmıştır. Ms. Yılmaz ise yazılı sınav (değer biçme amaçlı) sonuçlarını uzunluk ölçülerin üst katlarına çeviri yapmakta zorlanan ya da kesirleri sıralamakta, ondalık kesirlerle toplama yapamayan öğrencileri tespit etmekte (teşhis koyma) kullanmıştır. Ms. Solmaz'ın yazılı sonuçlarıyla geometri konularında iyi olan öğrencileri belirlemesi (teşhis koyma) de informal ve formal ölçme uygulamalarının kullanma aşamasındaki ilişkilerine bir örnek olarak çalışmada ortaya konmuştur.

Çalışmanın üçüncü anahtar bulgusu olarak tüm katılımcıların değer biçme amaçlı yaptıkları ölçme uygulamalarının sonuçlarını biçimlendirme amaçlı da kullandıkları başka alanlar da gözlemlenmiştir. Örneğin, ölçme sonuçlarını öğretim ve ölçme uygulamalarıyla ilgili kararlar almak veya öğrencilerin matematik öğrenimlerini geliştirmek amaçlı kullanmışlardır. Sonuçlar diğer benzer çalışmalarla da desteklenmektedir (Abdul Rahim, 2012; Trotman, 1997; Uçar, 2007).

Çalışmanın kendisine özel ya da ilgili çalışmalarda karşılaşılmayan sonuçları da olmuştur. Örneğin Ms. Solmaz ölçme ve değerlendirme sonuçlarını öğrencilerin notlarını yükseltmeye yönelik ödül vermek için kullanmıştır. Bu aslında davranışçı yaklaşımın sınıfta uygulanmasıdır ama ortaokul matematiğinde çok rastlanmayan bir sonuçtur. Ms. Solmaz uygulamasıyla ilgili aşağıdaki açıklamayı yapmıştır:

> Ben 1. dönem şey demiştim onlara 3 sınavının üçü de 85ten yukarı olursa işte bu sözlü notu olacak ya da işte hediye vereceğim falan gibisinden bir şart koşmuştum. 3 sınavının da üçü yüksek olan vardı hatta 2 tanesi 100, bir tanesi 98 olan da vardı yani böyle öğrenciler de var. Böyle öğrencilere ufak tefek hediyeler verdim dönem sonunda. Ama hiçbir şey yapamayan da var tabiki de. Hani o da ilk zaman etkili olmuştu mesela. Ya da şu an yaptığımız bir şey var. Ödev listelerimiz var. Bu ödev listelerinde 10 tane artısı olan bir tane yıldız alıyor. Dönem sonuna kadar işte 10 yıldız biriktirene bir sözlü notum 100 olarak gelecek. Kim olursa olsun. Böyle bir şablon var mesela şimdi (q101)

Yukarıda Ms. Solmaz'a ait olan alıntıdan anlaşılacağı gibi, katılımcı notla ya da bir hediyeyle ödüllendirmenin öğrencilerin matematik çalışmalarına pozitif etki ettiğini görmüş ve bu yüzden uygulamasına devam etmiştir. Veri toplama sürecinde de, hakettiğini düşündüğü öğrencilere, ders içi performans notlarını daha yüksek vererek ölçme ve değerlendirme sonuçlarını ödüllendirme amaçlı kullanmaya devam etmiştir.

Dördüncü bulgu ise katılımcıların görüşleriyle ölçme prosedürleri arasındaki ilişkidir. Örneğin düzenli tekrar yapmanın önemine vurgu yapan bir katılımcı öğrencilerine düzenli olarak tekrar yapmalarını sağlayan matematik günlükleri tutturmuştur. Bunun yanında aynı fikirdeki katılımcıların ders kitabı dışındaki kaynaklardan ödev ya da çalışma kâğıtları vermeleri de bu ilişkiyi ortaya koymuştur. Bunun yanında, tüm katılımcılar, zaman yetersizliğinin ölçme-değerlendirme sürecine negatif etki ettiğini savunmuşlardır. Ölçme çalışmalarında poster hazırlatma, drama, ürün dosyası hazırlatma gibi çalışmaları uygulamayışları da bu görüşlerinin uygulamalarına etkisi olarak gözlemlenmiştir. Katılımcılar öğrencilerin Türkçe konusundaki zayıflıklarının matematik öğretmeyi güçleştirdiğini belirtmişlerdir. Bu konudaki fikirlerinin yansıması ise performans görevlerini ve projeleri değerlendirirken kullandıkları puanlama kriterleri arasında Türkçe'yi kullanma üzerine de bir kriter bulunmasıdır. Performans görevi ve proje çalışmalarını

formalite icabı uyguladıklarını dile getirmelerinin yansıması da bu ölçme yöntemleriyle ilgili kullandıkları puanlama-kılavuzlarında özellikle gözlemlenmiştir. Öğrencilerin ya da kendilerinin geometriye karşı ilgilerinin daha yüksek olduğunu belirten katılımcıların da geometri konusunda proje çalışmaları vermesi bu iki veri arasındaki lişkiyi göstermektedir. Başka bir ilişki de, ders kitabının faydalı olduğunu belirten katılımcıların, yazılı sorularını hazırlarken de ders kitabından faydalanmaları bağlamında gözlemlenmiştir. Son olarak gözlemlenen, katılımcıların ders içi gözlemleri tüm diğer ölçme yöntemlerinden daha önemli bulmalarıyla bu görüşlerinin onların ölçme prosedürleriyle ilişkisidir. Örneğin katılımcıların ders içi etkinliklerde sınıf içinde dolaşmaları ya da tahtada öğrencilerin çalışmalarını gözlemlemeleri, grup çalışmaları uygulamaları ya da yazılı sorularını ve cevap anahtarlarını, performans görevi ya da projedeki uygulamalarının aksine, kendilerinin hazırlamaları bu ilişkinin gözlemlendiği prosedürlerdir.

Çalışmanın beşinci ve aynı zamanda son anahtar bulgusu öğretmen görüşleri ve onların algılanan ölçme uygulamaları arasındaki çelişkilerdir. Örneğin tüm katılımcılar ders içi gözlemlerin en önemli ölçme yöntemi olduğunu belirtmiştir ve öğrencilerin yılsonu notlarını verirken bu gözlemlerden faydalandıklarını söylemişlerdir. Ancak, çalışma sırasında araştırmacı tarafından algılanan ölçme uygulamalarına göre katılımcılar sınıf gözlem sonuçlarının, yılsonu notlarına katkısı üzerine herhangi bir oran belirtmemişlerdir. Ayrıca tüm katılımcılar performans değerlendirmenin performans görevleri aracılığıyla yapıldığını düşünmektedir ama hiçbiri puanlama-kılavuzlarında öğrencilerin matematiksel becerilerini ölçmekle ilgili bir kriter belirmemiştir. Dahası katılımcılardan ikisi performans görevlerini yaparken öğrencileri gözlememişlerdir. Son olarak katılımcılar performans görevleri ya da projelere velilerin yardım etmesinin negatif bir durum olduğunu dile getirmişlerdir fakat katılımcılardan ikisinin performans görevlerinin tüm aşamalarını eve ödev olarak vermeleri bu düşünceleriyle uygulamaları arasındaki çelişkiyi göstermiştir.

Yapılan çalışmalar, öğretmen görüşleri ve onların algılanan ölçme uygulamaları arasındaki çelişkilerin mesleki tecrübelerinin az olmasından kaynaklı olabileceğini belirtmektedir (Bol v.d., 1998; Zhang ve Burry-Stock, 1998). Bu çalışmada da, katılımcıların çalışma yılları 1 ve 5 arasında değişmektedir. Bu yüzden

görüşleri ve uygulamaları arasında gözlemlenen çelişkiler, onların çalışma tecrübelerinin az olmasından kaynaklı olabilir.

Katılımcılar genel olarak performans görevlerinin uygulanması üzerine problem yaşadıklarından bahsetmişleridr. Bu durumla ilgili olarak Milli Eğitim Bakanlığı 2013-2014 eğitim-öğretim yılından sonra performans görevlerini zorunlu ölçme yöntemi olmaktan çıkarmıştır (MEB, 2014). Bu durumda bu çalışmadaki ya da bununla ilgili benzer çalışmalardaki katılımcı öğretmenlerin performans görevleri hakkındaki negatif görüşleri bir çeşit öngörü olarak düşünülebilir.

Katılımcılar ayrıca farklı tipte performans değerlendirme metodlarını sınıflarında uygulamamışlardır. Bu durum benzer çalışmalarda sunulan sebeplerden kaynaklanabilir. Yapılan çalışmalar, öğretmenlerin performans değerlendirmeye yönelik ölçme ve değerlendirme çalışmalarında, bu tip metodların uygunluğundan emin olmadıkları için uygulamadıklarını ortaya koymaktadır (Cooney, Bell, Fisher-Cauble ve Sanchez, 1996; Ohlsen, 2007). Ayrıca bazı çalışmalar, performans değerlendirme metodlarını hazırlama ya da uygulama konularında öğretmenlerin kendilerini yetersiz hissetmesinin de onların çalışmalarını olumsuz etkilediğini göstermiştir (Bıçak & Çakan, 2004; Doğan, 2005; Duban & Küçükyılmaz, 2008; Gelbal & Kelecioğlu, 2007). Bu tip sonuçlar sözkonusu çalışmada da gözlemlenmiştir. Örneğin Ms. Yılmaz dereceli puanlama cetveli hazırlamayla ilgili bir soruya aşağıdaki yanıtı vermiştir:

> Şeyde, açıkçası biz bunu eee üniversitede daha çok kullanıyorduk-o sunumlarda, şeylerde. Eeee burada kullandığım işte proje değerlendirmede falan kullanıyorum. Eee ama ben de çok bilgili değilim bu konularda. Yani evet üniversitede gördüm ama bunu çocuklara nasıl tam olarak uygulayacağım konusunda şey değilim gibi geliyor bana. Çok yani yeterli değilim gibi geliyor (q138)

Çalışma sırasında yapılan tespitler, Türkiye'de süregelen bazı öğretmen görüşlerin hala etkisinin sürdüğünü göstermiştir. Örneğin Ms. Solmaz, evde ödev olarak çözülen soru sayısının etkili bir ödev olduğunu düşünmektedir. Araştırmalar ödev yapmanın matematik öğrenmeye olana olumlu katkılarının çok soru çözmek ile bağlantılı olmadığını bulmuşlardır (Rosário, Núñez, Vallejo, Cunha, Nunes, Mourão, ve Pinto, 2015).

Doğurgalar

Bu çalışma sunduğu beş temel sonuca ek olarak matematik öğretmenlerinin ölçme ve değerlendirme uygulamalarına yönelik birçok örnek de barındırmaktadır. Örneğin çalışmada informal ve formal birçok ölçme-değerlendirme uygulaması, sınıf içi uygulamalar ve gözlemlerle ilgili bulgularla anlatılmıştır. Öğretmenler, çalışmanın ortaya koyduğu bu sonuçlarla kendilerinin ölçme-değerlendirme sonuçlarını nasıl kullandıklarını kıyaslayabilirler. Ayrıca katılımcıların ölçme-değerlendirme sonuçlarını hangi matematiksel alanlarda kullandıkları konusunda da birçok sonuç ortaya konmuştur. Örneğin, öğretmenler, bu çalışmadan; katılımcıların ne zaman bir konuyu tekrar ettikleri, öğrencilerin matematiğin hangi alanlarında güçlü ya da zayıf oldukları, katılımcıların ölçme-değerlendirme sonuçlarını kullanarak öğrencilerin matematiksel gelişimlerini nasıl takip ettikleri, onları bireysel çalışmalara nasıl teşvik ettikleri, onların öğrencilerine nasıl not verdikleri, biçimlendirici dönütleri nasıl verdikleri, öğrencilerin kaygılı hissetmesini engellemek için ölçme-değerlendirme sonuçlarını nasıl kullandıkları gibi konularda yardım alabilirler. Öte yandan, katılımcı görüşleri ve uygulamaları arasındaki çelişkiler ve ilişkiler de öğretmenlere yardımcı olabilecektir. Eğitim fakültelerinde de ölçme ve değerlendirme derslerinde özellikle puanlama-kılavuzları hazırlama, nitelikli performans görevleri ya da projelerin özellikleri üzerinde daha çok durulabilir. Böylece öğretmen adaylarının, çalışmadaki katılımcıların ortaya koyduğu düşünceler ve uygulamalar arasındaki çelişkileri yaşamadan ölçme ve değerlendirme yapmaları kolaylaşabilir.

Katılımcıların dile getirdiği bir diğer problem de ortak sınavlardır. Ortak sınav Milli Eğitim Bakanlığı mevzuatında yer almaktadır (2013a). Ancak katılımcılar, bu sınavlarda tüm soruların kendileri tarafından hazırlanmaması ya da sınıf seviyelerinin birbirinden farklı olması gibi sebeplerin, ortak sınavların geçerliliğini olumsuz yönde etkilediğini belirtmişlerdir. Bu anlamda Milli Eğitim Bakanlığı'nın düzenlemeler yapması, öğretmenlerin bu konudaki streslerini ve endişelerini giderebilir.

Son olarak, Milli Eğitim Bakanlığı ve matematik programını hazırlayanlar da, katılımcıların yaş grubunun uygun olmamasıyla ilgi görüşlerini dikkate alarak, proje yönteminin 5. sınıflarda uygulanması konusundaki zorunluluğu tekrar gözden geçirebilirler.

Araştırmanın Sınırlılıkları

Çalışma katılımcıların görüşleri, anlayışları ve tecrübeleriyle sınırlıdır. Daha önce hiçbiri video çekimi yapılan bir sınıfta ders anlatmadığından, ders gözlemleri sırasında rutin sınıf çalışmalarında olduğundan daha farklı davranmış olabilirler. Bu sırada araştırmacının sınıfta olması da onların ve öğrencilerin davranışlarının günlük ders ortamından daha farklı olmasına sebep olmuş olabilir. Öte yandan çalışma bir durum çalışmasıdır. Bu yüzden genelleme anlamında sınırlıdır ve sonuçlar okul, matematik müfredatı, okulun matematik zümresi bağlamında değerlendirilmiştir. Son olarak tüm çalışmada veri toplayıcı, gözlem yapan, veri analizi yapan kişi araştımacının kendisi olduğundan bazı durumlarda odaklanamama ya da bazı verilerin gözden kaçırılması gibi araştırmacıdan kaynaklı durumlar da araştırmayı sınırlamıştır. Bu sınırlılık araştırmacının katılımcılarla aynı zamanda meslektaş ve geçmişte çalışmış olma pozisyonunda olmasını da kapsamaktadır.

Gelecekteki Çalışmalar için Öneriler

Benzer bir çalışmanın gelecekte hem özel okullarla hem de devlet okullarıyla yapılabilir. Böylece devlet ve özel okul öğretmenlerinin ölçme uygulamaları arasındaki farkların sebepleri ortaya konulabilir. Çalışma ayrıca ortaokulun farklı gruplarına uygulanabilir. Örneğin 6. sınıf, 7. sınıf ya da 8. sınıflara uygulanabilir. Ayrıca lise gruplarına da uygulanabilir. Böylece benzer çalışmada farklı sonuçlar ortaya konur ve öğretmenler, daha etkili ölçme-değerlendirme çalışmalarının nasıl yapılabileceğini sorgulayabilirler.

Benzer bir çalışma öğretmen adaylarıyla da gerçekleştirilebilir. Sonuçlar en çok da öğretmen görüşlerinin ve uygulamalarının arasındaki çelişki ve ilişkiler bağlamında değerlendirilebilir. Zamanla ölçme-değerlendirme hakkında görüşler pozitifken, negatif olarak mı değişiyor, incelenebilir. Eğer öyleyse, sebebi araştırılabilir.

Çalışma kısıtlı sayıda sınıf gözlemine dayanmaktadır. Aslında, sınıf gözlemleri öğretmenlerin çalışmalarının ortaya konmasında çok detaylı ve nitelikli veriler ortaya koymaktadır. Bu yüzden, gelecekte benzer çalışmalar daha fazla sınıf içi gözlemiyle oluşturulabilir.

Son olarak, öğretmenlerin performans görevi, proje, puanlama-kılavuzu ve not verme konularında gelişmelerine katkıda bulunulması için seminerler ve hizmetiçi eğitimler hazırlanabilir.

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APPENDIX M

CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: Uçar Sarımanoğlu, Nihan
Phone: 05055353668
email: nihanucar@ymail.com

EDUCATION

Degree	Institution	Year of Graduation
Ph.D.	Middle East Technical University, Elementary Education	February, 2016
MS	Middle East Technical University, Elementary Science and Mathematics Education	May, 2007
BS	Middle East Technical University, Elementary Mathematics Education	February, 2004

WORK EXPERIENCE

Year	Place	Enrollment
2015 June-Present	DG of Innovation and Educational Technology, MoNE	Teacher
2004-2015	Ministry of National Education, MoNE	Teacher

FOREIGN LANGUAGES

Fluent English
Beginner German

International Concerence Presentations

Uçar Sarımanoğlu, N. *"A Study on Seventh Grade Students' Misconceptions in Their Algebra Practices".* Paper presented at the European Conference on Educational Research (ECER), Budapest, Hungary, 2015.

Uçar Sarımanoğlu, N. & Esen, Y. *"Elementary School Students' Understandings of the Graphical Representations"*. Paper presented at the European Conference on Educational Research (ECER), Berlin, Germany, 2011.

Uçar Sarımanoğlu, N. *"Elementary school teachers' views about their implementation of the assessment techniques recommended in the new mathematics curriculum in Turkey"*. Paper presented at the European Conference on Educational Research (ECER), Helsinki, Finland, 2010.

HOBBIES

Swimming, Rowing

APPENDIX N

TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü ☐

Sosyal Bilimler Enstitüsü ■

Uygulamalı Matematik Enstitüsü ☐

Enformatik Enstitüsü ☐

Deniz Bilimleri Enstitüsü ☐

YAZARIN

Soyadı : Uçar Sarımanoğlu
Adı : Nihan
Bölümü : İlköğretim

TEZİN ADI (İngilizce): Assessment in the 5th Grade Mathematics Classrooms: A Case Study of the Teachers' Practices

TEZİN TÜRÜ : Yüksek Lisans ☐ Doktora ■

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. ☐

2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. ☐

3. Tezimden iki (2) yıl süreyle fotokopi alınamaz. ■

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: