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The Opinions of Mathematics Teachers on Homework and In-Class[*] Assessment: TIMSS 1999 and TIMSS 2007 Periods

Matematik Öğretmenlerinin Ev Ödevleri ve Sınıf İçi Değerlendirmelere Yönelik Görüşleri: TIMSS 1999 ve TIMSS 2007 Dönemleri

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Abstract

The purpose of this study is to compare the responses to the common items regarding opinions about homework and in-class assessment in "TIMSS Mathematics Teachers' Questionnaire" which were given by the mathematics teachers who participated to the TIMSS 1999 and TIMSS 2007 assessments. The sample from Turkey consists of 204 math teachers in TIMSS 1999 and 146 teachers in TIMSS 2007. The graphs which were generated from Mathematics Teachers' Questionnaire data were compared in TIMSS 1999 and TIMSS 2007. Besides, the data were analyzed with z-test whether there were significant differences between the response percentages of the teachers' opinions in TIMSS 1999 and 2007 periods. According to the findings, the frequency of homework, the amount of time to do homework and the giving frequency of type of homework such based on doing problem and routine exercises did not change, and checking homework and using homework as a contribution to student' marks increased from 1999 to 2007. In addition, importance given by the teachers to the national-scaled exams and exams of their own has increased more in time.

Keywords: Homework, mathematics teachers, TIMSS teacher questionnaire

Öz

Bu çalışmanın amacı, TIMSS 1999 ve TIMSS 2007 durum belirleme çalışmalarına katılan Türk matematik öğretmenlerinin "TIMSS Matematik Öğretmen Anketi"nde yer alan ev ödevleri ve sınıf içi değerlendirmeye yönelik ortak maddelere verdikleri cevapların yıllara göre karşılaştırılmasıdır. Araştırmanın Türkiye örneklemini 204 (TIMSS 1999) ve 146 (TIMSS 2007) matematik öğretmeni oluşturmaktadır. Elde edilen verilerden karşılaştırmalı grafikler oluşturulmuş ve öğretmenlerin ortak anket maddelerine verdikleri cevap yüzdeleri bakımından uygulama dönemleri arasında manidar farklar olup olmadığı yüzdeler arası farkın manidarlığını test etmede kullanılan z–testi ile sınanmıştır. Bulgulara göre, öğretmenlerin ödev verme sıklık ve süresi, algoritmik işlem gerektiren soru çözme, rutin alıştırma türü ev ödevleri verme durumu dönemler arasında değişme göstermemiş, ancak, öğretmenlerin ödevlerin kontrolü ve ödev sonucunu not olarak kullanma sıklığı zamanla artmıştır. Ayrıca zamanla öğretmenlerin öğrenci başarısını değerlendirmede ulusal düzeyde yapılan testlere ve kendi hazırladığı sınıf içi sınavlara daha çok önem verdiği saptanmıştır.

Anahtar Sözcükler: Ev ödevleri, matematik öğretmeni, TIMSS anketleri.

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Introduction

Education in a rapidly developing world is a dynamic system that is open to new developments and changes in technology. From this perspective, countries should ask themselves some questions about their educational systems. For example, "Where are we in the world in terms of educational indicators?", "In which field should we make educational investments?", "To what extent are the educational investments useful in solving educational problems?" In recent years, various studies have been completed to find answers to questions which carried out on the learning outcomes. Also, in these studies the perspectives of teachers, parents and school principals were surveyed through qualified questionnaires. For this purpose, there are several assessment programs in international level such, TIMSS (*Trends in International Mathematics and Science Study*), PIRLS (*Progress in International Reading Literacy Study*) and PISA (*Program for International Student Assessment*) studies which Turkey participate in certain periods.

TIMSS indicates the science and mathematics achievements of students at 4th and 8th grades from different countries. According to the results of TIMSS, each country is evaluated within itself and the students are placed into certain performance levels such as low, medium, high and the advanced according to their achievement in the TIMSS tests. Thus, information about the cognitive skills and learning levels of the students on each topic can be obtained (Mullis, Matin and Foy, 2008).

These international studies are important because they lead to educational policies of the participating countries. Many countries can change their educational policies based on these applications' results and/or they may investigate the educational policies of successful countries. For example, renewed curriculum for primary education that Ministry of National Education (MoNE) accepted in 2005, it was mentioned that applications like TIMSS, PISA and PIRLS were taken into consideration (MoNE, 2005).

Turkey participated in TIMSS studies in 1999 and 2007 years at the 8th grade. The first TIMSS study conducted in 1994-1995. In the first application (TIMSS 1999), Turkey took place in the 31st row among 38 countries and in the second application (TIMSS 2007) Turkey took place in the 37th row among 59 countries (Mullis, 2000). According to the 2007 results, the percentage of the Turkish students who were in the highest proficiency group was 5%. According to this result, although Turkey was above the international median percentage (2%), Turkish students were cumulated below the medium and low levels of proficiency. This finding indicated that Turkish students could not answer the questions that measure higher order thinking skills like analysis, synthesis, generalization, justification, solving problems which were not routine (Mullis et al, 2008; Mullis, 2000).

An important problem that mathematical achievement levels of the students at primary schools are low and if this problem is not solved, undesirable circumstances might appear in the future. From this perspective, it is important to determine the effect of students' and teachers' opinions about school and out-of-school factors that play role in students' achievements. In TIMSS application, the teachers and school principals answer items in the questionnaires. Items related with some in-class activities in mathematics and they would be effective on mathematical achievement of students. For example, in teacher questionnaires, some items related to the homework which is thought to have affected the students' math achievement; because it has been argued that homework has an important role in educational life of students (Cooper, 1989; Cooper, Lindsay, Nye and Greathouse, 1998; Cooper, Robinson and Patall, 2006; Epstein and Van Voorhis, 2001). Without giving homework it is impossible for most teachers to cover the intended curriculum contents. Despite the importance of homework in the educational system, there are contradictive findings about homework and students' achievement. Some studies has showed that homework has either negative relationship with math achievement or no effects on the students' achievements (Bennett and Kalish, 2006; Berberoğlu, 2008; Buell, 2004; Jaan, 2006). In addition to homework, items related to the in-class assessment activities are also available in

the TIMSS questionnaires and what kind of measurement and assessment activities teachers use in-class activities and what their opinions on this issues are examined.

The purpose of this study is to determine the opinions of Turkish mathematics teachers that participated in TIMSS 1999 and TIMSS 2007 towards homework and in-class assessment and to make comparisons taking the international means of percentages into consideration according to responses of the common items in the questionnaires in these periods. Within the framework of this purpose, the following research questions were investigated:

1) What are the opinions of mathematics teachers on homework in the TIMSS 1999 and TIMSS 2007 periods? Do their opinions significantly different between these two periods?

2) What are the opinions of mathematics teachers on in-class mathematics assessment activities in the TIMSS 1999 and TIMSS 2007 periods? Do their opinions significantly different change between these two periods?

Method

Sample and Data

The population of the study was composed of mathematics teachers working at primary schools' 8th grades in 1999 and 2007 years in Turkey.

The sample of the study was composed of 204 and 146 mathematics teachers that participated in TIMSS 1999 and TIMSS 2007 respectively. In the selection of the sample, two-stage stratified random sampling approach was used. First strata is geographic region, second strata is school type. The numbers of schools and students in the population were determined at each stratum. Then, firstly the school and then the grades were determined depending on their ratio in the sub-population and the opinions of the mathematics teachers of the each selected class were surveyed.

The gender distribution of the teachers in the sample was, 41.0% of the mathematics teachers that participated to TIMSS 1999 were females and 59.0% of them were males. In TIMSS 2007 study, 45.4% of the mathematics teachers were females and 54.6% of them were males. The percentages of male and female teachers in both years were close to each other.

The data of this sample were retrieved from the official web site of TIMSS & PIRLS International Study Center (*http://timss.bc.edu/timss2007/index.html, http://*timss.bc.edu/timss1999.html*).* The data were in the form of Almanacs. The *Almanacs included the percentage distribution of the teachers' responses to the each common item in the teacher questionnaire for each country.*

Instrument and Data Analysis

First, the Turkish version of the Mathematics Teachers Questionnaires of TIMSS 1999 and TIMSS 2007 were taken from Educational Research and Development Office of MoNE. After that, common items found in 1997 and 2007 periods were determined examining the "homework and in-class assessment" parts of the questionnaires. There are 8 common items in the "opinions about homework" parts of the questionnaire in 1999 and 2007. These are;

The length of time for doing homework,

The percentages and frequencies of giving homework in the form of doing problem/question sets,

The percentages and frequencies of giving homework in the form of gathering data and reporting,

The percentages and frequencies of giving homework based on finding one or more applications of the content covered,

Checking whether the homework is done or not,

Correct assignments and then give feedback to students,

Students correct their own homework in class,

Use the homework to contribute towards students' marks.

There are two items in part of assessment of the questionnaire. These are;

The state of giving importance to the exams composed of the items in test books or the ones you prepare in monitoring student achievement,

The state of giving importance to the national or regional achievement tests in monitoring student achievement.

In addition to this, two items which were found only in TIMSS 2007 teacher questionnaire and related to in-class assessment were examined as well. These items were particularly related to the other common items. These items were as follows:

Question types used in mathematics tests or exams,

The cognitive skill levels of the questions used in tests and exams related to mathematics.

After specifying the common items, the almanacs of the responses of the 8th grade mathematics teachers that participated to TIMSS 1999 and 2007 periods were retrieved from the official web site of TIMSS & PIRLS International Study Center (http://timss.bc.edu/timss2007/index.html, http://timss.bc.edu/timss1999.html). The Almanacs included the percentage distribution of the teachers' responses to the each common item according to the countries. The distributions values of these percentages according to the response alternatives were transferred to Excel format and comparative graphics were generated. Moreover, whether there was a significant difference between percentages of the responses to the common items in two periods was analyzed by means of z-test (Akhun, 1982; Kutsal and Muluk, 1972).

Results

The distribution of the mathematics teachers' responses to the items in the questionnaires related to homework and in-class assessment sections and the results of the z-test are presented below.

The results obtained from the responses given to the items related to homework:

There are eight common items in the homework part of the mathematics teacher' questionnaires. When the teachers' answers to these items are analyzed;

1) The distribution of the mathematics teachers' responses to the item "How long does it take for students to complete the homework?" is shown in Figure 1.

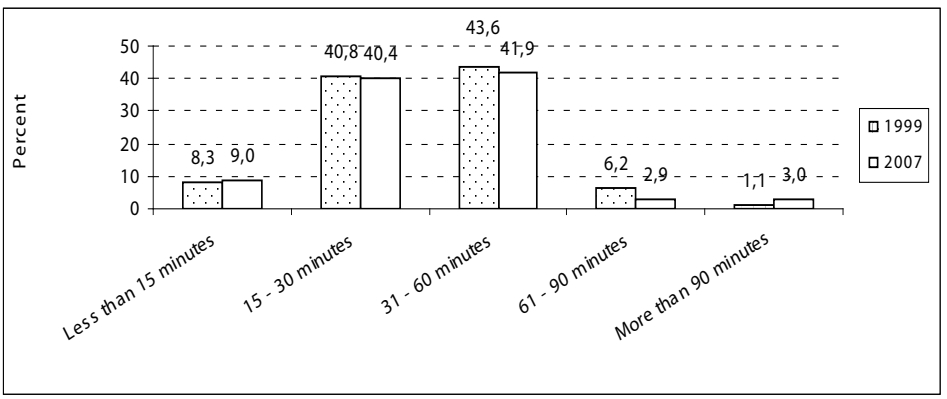

Figure 1: The length of time for doing homework

Table 1.
The length of time for doing homework according to the international mean of percentages

Years	International Mean of Percentages				
	Less than 15′	15-30′	31-60′	61-90′	More than 90′
1999 (%)	7.6	53.00	30.06	7.7	3.4
2007 (%)	13.8	52.00	27.06	3.6	3.54

According to the Figure 1, Turkish students mostly spent "*31–60 minutes"* (44%, 42%) on average daily for math homework in both TIMSS periods. There was no significant difference between the percentages of the answers given by the teachers who stated that they gave 31–60 minutes for doing homework in each period ($z_{(145, 01)}$=0.31, p>.01). On the other hand, there is no meaningful difference in terms of other time categories for doing homework. As seen at Table 1, the result of Turkey was higher than the international mean of percentages (30%; 27%) obtained from both TIMSS periods. School learning models (Bloom, 1976; Carroll, 1963) propose that time is an important determinant of learning. Homework contributes substantially to time on task in core subjects and thus provides an additional opportunity to learn. One of the main reasons for assigning homework is, thus, to increase the total study time (Walberg and Paschal, 1995). In NAEP study showed that 37% for 13-year-olds and 39% for 17-year-olds were doing homework more than one hour for each day (Campbell et al., 1996). In Turanlı's study (2009), many students thought that their teachers assigned too much homework and they spent more than two and a half hours per day doing their homework and they There are many studies which have been directed to the relationship between homework time and achievement. These studies showed contradictive findings. According to the findings of some studies, there is a positive correlation between homework time and achievement (Cooper, 1989; Cooper, Robinson and Patall, 2006; Trautwein, 2007). Some other studies found that there is either weak or negative correlation between homework time and achievement (Jaan, 2006; Jong, Westerhof and Creemers, 2010).

2) The second common item was "How often do you give mathematics homework on the following types?" In TIMSS 1999 and TIMSS 2007 periods, teachers answered three sub-items related to this item.

2a) Figure 2 illustrated the percentages and frequencies of teachers' giving homework in the form of doing problem/question sets.

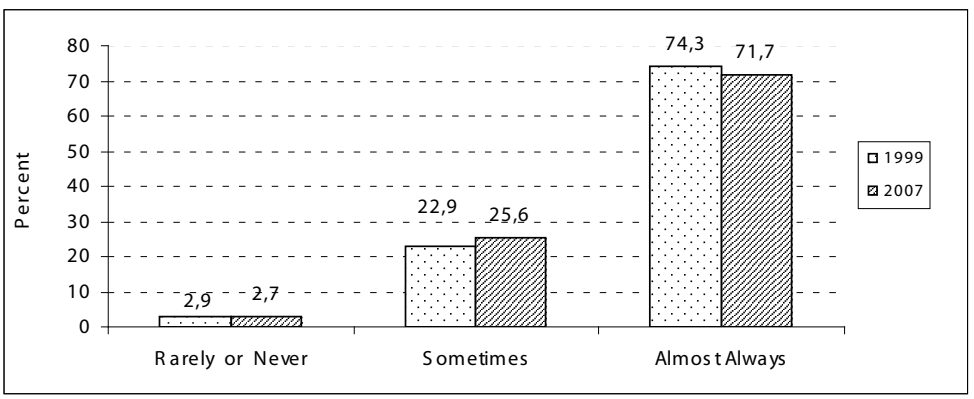

*Figure 2.*The frequencies of teachers' giving homework of "doing problems/question sets"

Table 2.
Frequencies of teachers' giving homework in the type of "doing problems/question sets" according to the international mean of percentages

Years	International Mean of Percentages		
	Rarely or Never	Sometimes	Almost Always
1999 (%)	10.9	37.1	53.0
2007 (%)	4.5	26.8	68.7

According to the Figure 2, most of the teachers (74% and 72%) stated that they were "*almost always*" giving homework of doing problems/question sets in TIMSS 1999 and TIMSS 2007 periods. There was no significant difference ($z_{(249, 01)}$=0.54, p>.01) between the percentages of the responses given by the teachers in these two periods. Turkish teachers were giving homework in the type of problems and exercise more frequently than other countries' teachers (53%, 68%). In MoNE 2005 curriculum, one of the educational objectives was developing "students' problem solving skill" Therefore, teachers might always give homework based on "*problem solving*". Moreover, most teachers thought that if homework was given more frequently, students could understand the topic easily (Berberoğlu, 2008). But, the studies indicated that when the frequency of giving homework increased, the students' achievements decreased (Berberoğlu, 2008; Jaan, 2006; Yayan and Berberoğlu, 2004).

2b) Figure 3 illustrated the percentages and frequencies of teachers' giving homework of "gathering data and reporting".

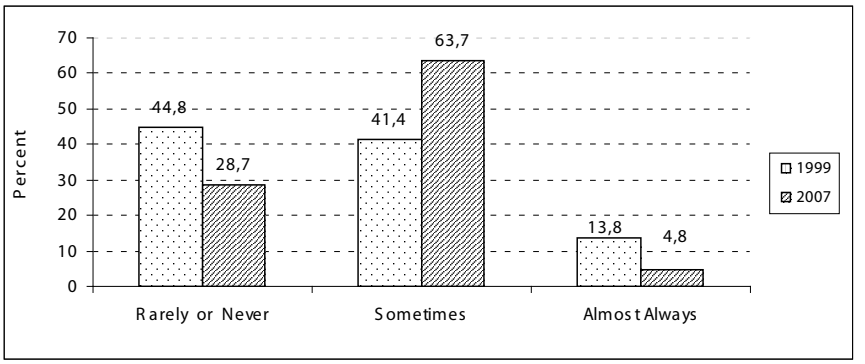

Figure 3. Frequencies of teachers' giving homework of "gathering data and reporting"

Table 3.
Frequencies of teachers' giving homework of "gathering data and reporting" according to the international mean of percentages

Years	International Mean of Percentages		
	Rarely or Never	Sometimes	Almost Always
1999 (%)	52.4	34.5	3.9
2007 (%)	39.1	56.8	5.9

According to the Figure 3, Turkish teachers *"sometimes"* (41.4% and 63.7%) give homework of gathering data and reporting. There was a significant difference in the percentages of answers given by the teachers who stated that they sometimes gave this type of homework ($z_{(170, 01)}$ =4,04, p<.01). When the international means of percentages (35%, 57%) were examined, it was seen that Turkish teacher gave homework of gathering data and reporting more frequently. When the renewed curriculum (MoNE 2005) was taken into account, this situation was expected. However, it is the fact that the frequency of giving homework of gathering data and reporting

was "sometimes" could not indicate that this kind of activities were accomplished accurately and adequately in education. Among the major objectives of the renewed mathematics curriculum, it was explained to develop skills of students on investigating, producing and examining information. Besides, these skills were among the skills that were expected from the students (MoNE, 2005). Project homework, whose importance increased with the new curriculum were based on gathering data and reporting skills. However, according to the study carried out by Berberoğlu et al (2003), the students' mathematics achievement decreased with the frequently given project based homework.

2c) Figure 4 illustrated the percentages and frequencies of teachers' giving homework based on "finding one or more applications of the content covered",

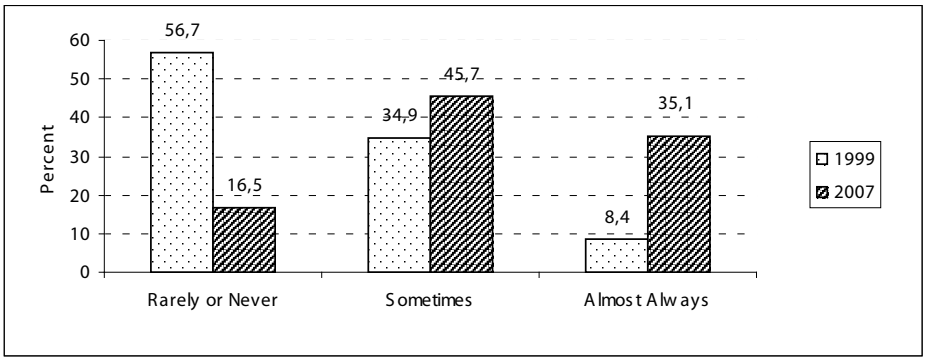

Figure 4. Frequencies of teachers' giving homework based on finding "one or more applications of the content covered",

Table 4.

Percentages and frequencies of teachers' giving homework based on "finding one or more applications of the content covered" according to the international mean of percentages

Years	International Mean of Percentages		
	Rarely or Never	Sometimes	Almost Always
1999 (%)	52.6	35.8	11.8
2007 (%)	29.1	54.3	17.2

While the frequency of giving homework of finding one or more applications of the content covered was fewer in the TIMSS 1999 period, this increased in time and the percentages of the teachers who replied as "*sometimes"* or "*almost always"* increased in TIMSS 2007 period. However, there was no significant difference in the percentages of the teachers who stated that they sometimes gave homework of finding one or more applications of the content covered depending on the periods ($z_{(132,\ 01)}$=2,01, p>.01). When the international mean of percentages was compared with Turkey's results in TIMSS 1999, there was a similarity in the same period, but in TIMSS 2007 period the percentage of Turkey in "almost always" response category was above the international mean of percentages. The reason of this situation was that teachers used activities in which the students could be active in higher order thinking skills. However, it was doubtful whether these kinds of activities have been realized in classrooms. Because in the TIMSS 2007 results, 5% of the Turkish students were able to answer the items in which the high order thinking skills were examined.

3) Another common item in homework parts of teachers' questionnaires in TIMSS 1999 and TIMSS 2007 was the item "How often do you do the following behaviors about the homework?"

There were four sub-items related to this item.

3a) Figure 5 illustrated the distribution of percentages and frequencies of teachers' "checking whether the homework was done or not".

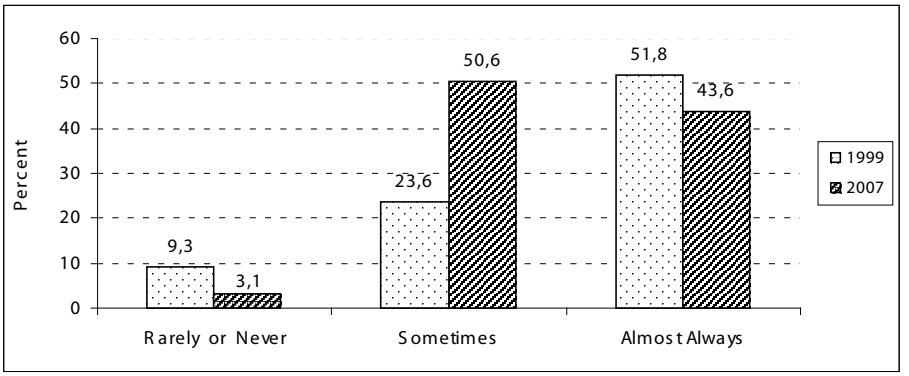

Figure 5. Frequencies of teachers' "checking whether the homework was done or not"

Table 5.
Frequencies of teachers' "checking whether the homework was done or not" according to the international mean of percentages

Years	International Mean of Percentages		
	Rarely or Never	Sometimes	Almost Always
1999 (%)	9.5	27.9	60.0
2007 (%)	3.5	16.5	79.9

When Figure 5 was examined, it can be seen that 76% of the teachers according to the TIMSS 1999 findings and 94% of the teachers according to TIMSS 2007 "*sometimes"* and "*more frequently"* check whether the students had done their homework or not. The frequency of teachers, who stated that they "almost always" checked the homework, isn't difference in both periods but the frequency of teachers who stated that they "sometimes" checked the homework, is higher in 2007 period than in 1999 period. This finding indicated that teachers more frequent checked whether the homework was done or not and this increased in time ($z_{(282, 01)}$=4,59, p<.01). Moreover, according to the Table 5, the percentage of Turkey in 2007 period was lower in "almost always" category than the international mean of percentages. The findings of some studies showed that checking out and reviewing students' homework in class was negatively correlated or not correlated with the mathematics achievements (Akyüz and Berberoğlu, 2008; Altun, 2007, Jong, Westerhof and Creemers,2010).

3b) Figure 6 illustrated the distribution of teacher's responses according to the frequencies of "correct assignments and then give feedback to students".

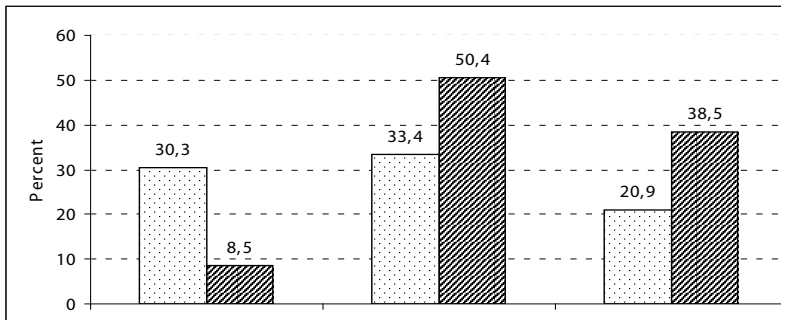

Figure 6. Frequencies of teacher's responses "correct assignments and then give feedback to students".

Table 6.
The percentages and frequencies of teacher's responses "correct assignments and then give feedback to students" according to the international mean of percentages

Years	International Mean of Percentages		
	Rarely or Never	Sometimes	Almost Always
1999 (%)	20.6	34.9	41.9
2007 (%)	8.9	34.2	56.7

While 21% of the teachers stated that they "almost always" correct assignments and then give feedback to students in TIMSS 1999 period, the ratio for this was 39% in TIMSS 2007. There was significant difference in the ratios on response frequencies by the time ($z(94)=3,56$, $p<.01$). When Table 6 was examined, Turkey's result was below the international mean of percentages in two periods in terms of the teachers who stated that "they almost always correct assignments and give feedback". This result showed that the Turkish teachers were below the international average in terms of giving feedback about student's homework performances. In Turanlı's study; students and their parents thought that many teachers do not give enough feedback/corrections about homework assignments. Large classes and heavy workload can be the reason for this situation in Turkey. However, Jaan (2006) found that a negative correlation (-0.47) between the TIMSS 2003 results and correct assignments and giving feedback. In the same study, it was found that teachers corrected their students' assignments and gave feedbacks in countries that had low level proficiency in TIMSS 2003.

3c) Figure 7 illustrated the percentages and frequencies of teachers' accomplishing the activity "students correct their own homework in class".

Figure 7. Frequencies of "students correct their own homework in class"

Table 7.
Frequencies of students correcting their own homework in class according to the international mean of percentages

Years	International Mean of Percentages		
	Rarely or Never	Sometimes	Almost Always
1999 (%)	21.7	40.7	24.1
2007 (%)	21.3	47.5	31.9

When Figure 7 was examined, teachers "*sometimes"* or "*more frequently"* let the students correct their own homework in class. When we combined the percentages of "sometimes" and "almost always", and we compared the sum of percentages in both period, there was no significant difference ($z_{(238,\ 01)}=0.44$, $p>.01$). The percentages of Turkey in 2007 were below the

international means of percentage. On the other hand, MoNE 2005 mathematics curriculum, it was emphasized that teachers should provide opportunities for students to correct their own and their friends' homework (MoNE, 2005). Researchers view homework as a tool to help students develop self-regulatory skills and self efficacy for academic tasks (Bembenutty, 2009; Kitsantas and Zimmerman, 2009). Simons (1989) considers two main goals of homework: the didactic and the pedagogic functions. The didactic function aims to improve learning processes and the pedagogic function aims to teach students how to study independently. Checking and correcting homework by students with criteria which were given by teachers could be an effective feedback on student achievement. Jong, Westerhof and Creemers (2010)'study showed that there was a little positive correlation between achievement and the frequencies of students correct their own homework.

3d) Figure 8 illustrated the percentages and frequencies of teachers' "using the homework to contribute towards students' marks".

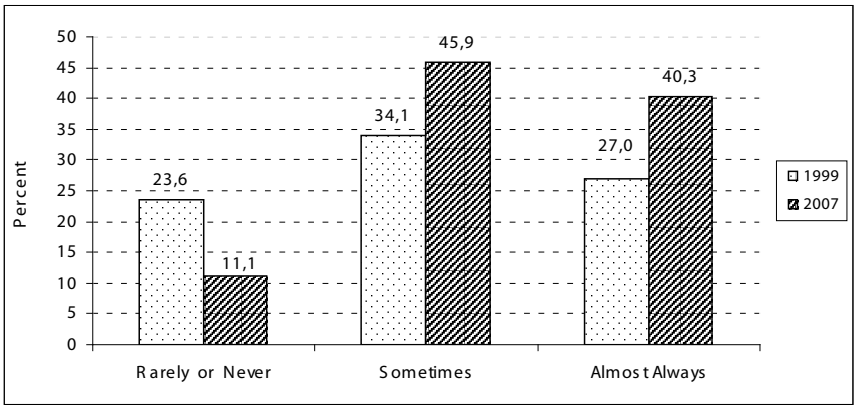

Figure 8. Frequencies of teachers' "using the homework to contribute towards students' marks"

Table 8.
Frequencies of teachers' "using the homework to contribute towards students' marks according to the international mean of percentages

Years	International Mean of Percentages		
	Rarely or Never	Sometimes	Almost Always
1999 (%)	39.6	33.1	24.6
2007 (%)	27.3	44.1	33.3

When we combined the percentages of "*sometimes*" and "*almost always*" to compare the sum of the percentages in both periods, 61% of the teachers used the homework to contribute towards students' marks in TIMSS 1999, however this ratio increased to 86% in TIMSS 2007. According to this finding, the frequency of teachers' using homework as a contribution towards their marks increased in time ($z_{(244,01)}$=5,11, p<.01). When both periods were examined, it was observed that the frequencies of teachers using homework as a contribution towards their marks were higher than the international mean of percentages.

According to Jaan (2006)'study based on TIMSS 2003 findings, the mathematics achievement of students in countries which stated that the students corrected their own homework, the homework was used as a discussion topic and as a contribution towards student' marks, were lower than the one which stated they did these less frequently.

Results obtained from the answers given to the items related to in-class assessment:

In this part, there were two common items related with in-class assessment in TIMSS 1999 and TIMSS 2007 and there were also two items which belonged to only TIMSS 2007 questionnaire. If these items were examined sequentially:

1) There were two items to determine what teachers did in order to assess the students' improvement in mathematics course.

1a) Figure 9 illustrated how much importance teachers gave to "the exams composed of the items in test books or teacher-made test" in monitoring student achievement.

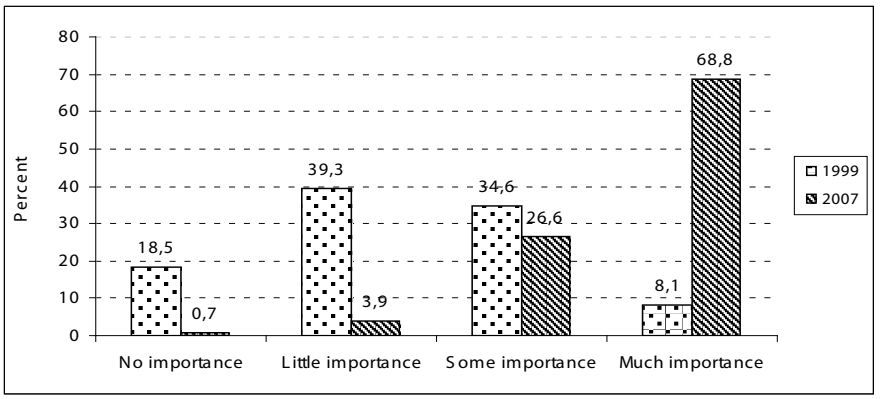

Figure 9. The importance teacher gave to the exams composed of the items in test books or teacher- made test in order to monitor students' improvement in mathematics course

Table 9.
The importance teacher gave to the exams composed of the items in test books or teacher-made test in order to monitor students' improvement in mathematics course according to the international mean of percentages

Years	International Mean of Percentages			
	No Importance	Little Importance	Some Importance	Much Importance
1999(%)	14.1	33.7	38.7	12.7
2007 (%)	1.6	4.2	29.6	65.6

When Figure 9 was examined, it could be seen that from TIMSS 1999 to TIMSS 2007 Turkish teachers gave "*more importance"* to the exams which were composed of the items in test books or teacher- made test for monitoring student achievement. This percentage (response category "much importance") increased (from 8.1% to 68.8%) remarkably in time ($z_{(113,\,01)}$=11,75, p<.01). The point to be emphasized here was how valid and reliable and how adequate the tests they used in exams (teacher made exams or prepared exams from test books), so they were assessing students' achievement with them. Some studies showed that teachers' knowledge was not adequate in measurement and assessment area (Anıl and Acar, 2008; Bıçak and Çakan, 2004; Daniel and King, 1998; Gelbal and Kelecioglu, 2007; Ulutaş and Çıkrıkçı-Demirtaşlı, 2005; Yanpar, 1992). When compared with the international mean of percentage, Turkish teachers gave more importance to that kind of exams in both periods. This finding can be explained by the density of central exams in Turkey. In recent years much more 8th grade students have been prepared themselves for high-stake exams. As a result, some test books or teacher-made test with multiple choices were used by teachers in classroom activities. On the other hand, Berberoğlu and et al (2010) showed that there is no relationship between frequency of solving multiple choice questions from test books and achievement at science and mathematics.

1b) Figure 10 illustrated how much importance teachers gave to the exams composed of the national or regional achievement tests in monitoring student achievement.

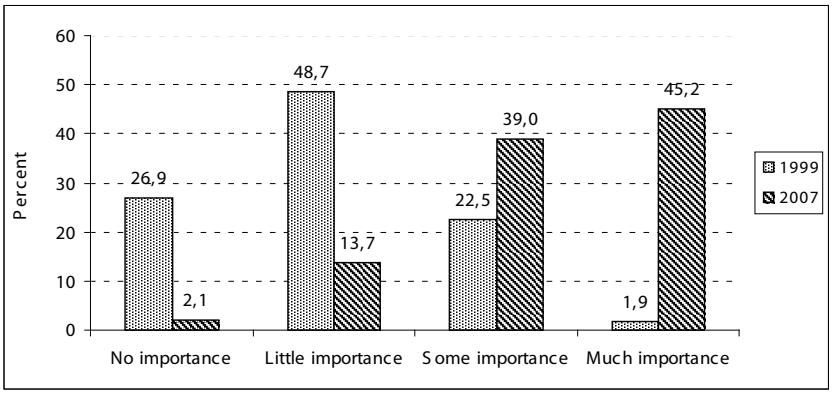

Figure 10. The importance teachers gave to the exams composed of the national or regional achievement tests in monitoring student achievement

Table 10.
The importance teachers gave to the exams composed of the national or regional achievement tests in monitoring student achievement according to the international mean of percentages

Years	International Mean of Percentages			
	No Importance	Little Importance	Some Importance	Much Importance
1999 (%)	23.6	39.7	29.0	7.7
2007 (%)	35.1	38.1	38.0	27.0

While 1.9% of the teachers gave "*much importance*" to the national and regional test in monitoring students' achievements in TIMSS 1999, 45% of the teachers gave much importance to the national and regional tests in TIMSS 2007. According to this finding, there was a significant difference between the percentages of giving importance to national and regional tests in years ($z_{(66,\ 01)}$=9,89, p<.01). Compared to the international mean of percentages, the frequency of Turkey was higher. This change in between periods showed that the importance of national central exams (previously known as OKS and now known as SBS) increased dramatically.

2) Figure 11 illustrated what kind of items mathematics teachers used in tests and exams in TIMSS 2007 findings.

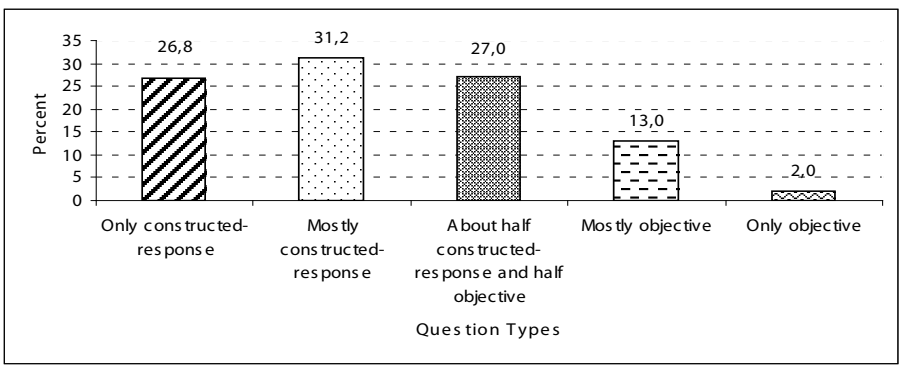

Figure 11. Percentages of used item types in mathematics tests and exams by teachers

Table 11.
Used item types in mathematics tests and exams by teachers according to the international mean of percentages

Years	International Mean of Percentages				
	Only Constructed Response	Mostly Constructed Response	About Half Constructed Response- Half Objective	Mostly Objective	Only Objective
2007	12.6	31.2	40.6	14.4	2.4

It was observed that 57% of the teachers stated that they used "*only or mostly*" constructed response items in tests and exams, while 27% of them used both about "*half constructed response-half objective"* test items and 15% of them used "*only or mostly"* objective test items. This indicated that teachers mostly used constructed response items in tests and exams. However remarkable amount of teachers have already used objective test' items. The reason for preference of constructed response tests versus objective tests items is that the former ones are prepared easily than the latter ones by teachers. Moreover, preference of single type item; constructed response or objective item, was observed more frequently. Compared to the international mean of percentages, teachers mostly (41%) used "*about half constructed response-half objective items"*. McMillan (2000) emphasized that teachers should use several measurement tools and approaches which had different superiorities together instead of single type measurement tool. However, when the studies were reviewed, it was determined that teachers mostly preferred multiple choice tests or open ended items for in-classroom assessments (Çakan, 2004; Güven, 2001; Kaynak, 2000; Kilmen and Demirtaşlı, 2009; Mertler, 1999; Yıldırım and Semerci, 2006).

3) In Figure 12. the features of the items mathematics teachers used in tests and exams in terms of cognitive skill level were presented.

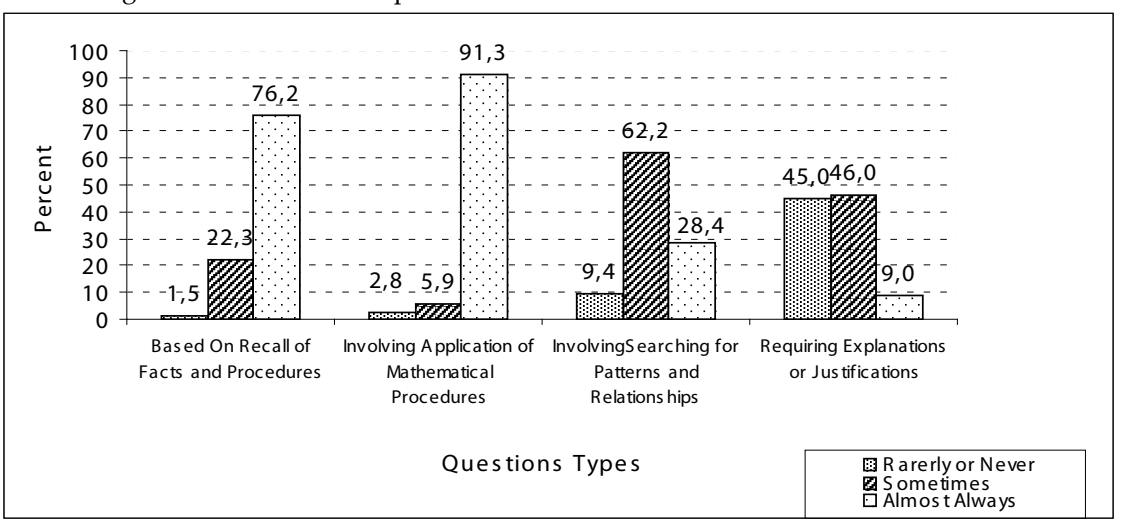

Figure 12. Percentages of item types that mathematics teachers used in tests and exams in terms of cognitive skill levels

Table 12.

The items that mathematics teachers used in tests and exams in terms of cognitive skill levels according to the international mean of percentages

	International Mean of Percentages			
TIMSS 2007	Based On Recall of Facts and Procedures	Involving Application of Mathematical Procedures	Involving Searching for Patterns and Relationships	Requiring Explanations or Justifications
Rarely or Never (%)	5.3	1.7	9.4	10.7
Sometimes (%)	42.1	24.4	67.7	56.1
Almost Always (%)	52.3	73.8	22.3	32.1

Teachers stated that they mostly used items which required "*based on recall of facts and procedures*" (76.2%) and involving application of mathematical procedures (91.3%). In addition to this, it was observed that less place was given to the items which required higher order thinking skills like searching for patterns and relationships, explaining and proving the relationships between concepts. The frequency of Turkey was below the international mean of percentages in terms of these ratios. According to the results of TIMSS 1999 and TIMSS 2007 periods, while 59% of the Turkish students were at the level of low efficacy in which the knowledge and recall items were common, only 5% of them were at the level of highest efficacy (Mullis et al. 2008). This revealed that teachers did not use enough items to improve the high level of thinking processes of students and the Turkish students who had not seen these types of items before failed in TIMSS 2007. Moreover, the study of Yıldırım and Semerci (2006) showed that Turkish teachers used the items which could be answered easily and at the level of recall and comprehension. When the international mean was examined, the items based on recall of facts and procedures (52%) and involving application of mathematical procedures (73.8%) were used less frequently than Turkey.

Conclusions and Recommendations

Major results were obtained from the answers given by the teachers to the common items in mathematics teacher questionnaires of TIMSS 1999 and 2007. Some conclusive remarks should be made as follows:

1) Teachers gave mostly 31-60 minute long homework on a daily basis and the length of time spent for doing homework did not change significantly in both periods. It can be given as a recommendation that the length of time spent for completing homework should be taken into account. When the success of Turkey was examined in TIMSS periods, giving homework more frequently couldn't be effective alone on students' achievement.

2) Teachers mostly give homework such as doing problems/ question sets according to the results in both periods. However, it was found that teachers gave fewer homework assignments for gathering data and reporting or finding one or more applications of the content covered. Because of this reason, teachers should more frequently give the homework of gathering data and reporting or finding one or more applications of the content covered in which students can utilize the knowledge with daily life.

3) As for the homework, it was determined that teachers checked whether the homework was done or not more frequently in TIMMS 2007 than TIMSS 1999. However, the frequencies of correcting homework and giving feedback to the student about the homework and giving opportunities for students to check their own homework in class did not change in time. Moreover, it was also found that teachers used homework as a contribution to students' marks more in 2007 than 1999.

4) In this study, it was observed that teachers gave more importance to the items in test books or teacher-made test in order to monitor students' improvement in mathematics in 2007 than 1999. Besides, the importance teacher gave to the national and regional tests in order to monitor students' improvement in mathematics increased as well. In recent years, the numbers of students who enter to high-stake exams (especially at the end of primary education) are increased. This situation has an impact on teachers' teaching and assessment methods. As a result, teachers have preferred the test books in teaching and assessment more frequently

5) According to the results, most of the teachers used constructed response or objective items in mathematics tests or exams. It means that teachers were using exams which include single type items in order to determine the student's achievement. Furthermore, most of the items in the tests and exams were in recall and comprehension level in terms of cognitive skills. Instead of this, teachers can utilize various measurement and assessment techniques together which would reveal student's performance. Besides, the renewed curriculum emphasized this as well (MoNE, 2005).

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