Eğitim ve Bilim
2012, Cilt 37, Sayı 163

Education and Science
2012, Vol. 37, No 163

Primary School Teachers' Views on 4th Grade Mathematics Curriculum

Sınıf Öğretmenlerinin İlköğretim 4. Sınıf Matematik Dersi Öğretim Programına Yaklaşımları*

Gönül GÜNEŞ**, Adnan BAKİ***

Karadeniz Teknik Üniversitesi

Abstract

In this study, the opinions of elementary school teachers about the new mathematics curriculum and the learning environment that those teachers form are investigated. For this aim, qualitative data was collected via observations and interviews. The data gathered from classroom observations and 3 interviews with each of the 9 teachers working in the center and periphery of Trabzon in Turkey were analyzed and interpreted. It is shown that the teachers have positive ideas about the new curriculum. However, they have some problems in term of implementing new curriculum in their classrooms. Additionally, in spite of the fact that they are in favor of the new curriculum, it was observed that they could not create environment suitable for such student-centered approaches.

Keywords: Mathematics curriculum, learner-centered approach, learning environment.

Öz

Bu çalışmada, sınıf öğretmenlerinin yeni matematik dersi öğretim programı ile ilgili görüşleri ve oluşturdukları öğrenme ortamlarının karşılaştırılması amaçlanmıştır. Bu amaç doğrultusunda nitel araştırma yöntemi kullanılmış ve araştırmanın verileri gözlem ve görüşme yöntemleri kullanılarak elde edilmiştir. Trabzon merkez, ilçe ve köylerde görev yapan hizmet yılı birbirinden farklı dokuz 4. sınıf öğretmeni ile üç farklı zamanda yapılan görüşmelerden ve sınıf gözlemlerinden elde edilen veriler analiz edilmiş ve yorumlanmıştır. Araştırmadan elde edilen bulgulara göre, öğretmenlerin yeni öğretim programı ile ilgili görüşleri çoğunlukla olumlu yöndedir. Ancak öğretim programının uygulanabilirliği konusunda sorunları vardır. Aynı zamanda öğretmenlerin görüşlerinin olumlu olmasına rağmen, öğrenci merkezli öğrenme yaklaşımına uygun ortamlar hazırlayamadıkları tespit edilmiştir. Öğretmenlerin görüşlerinin, oluşturdukları öğrenme ortamlarına farklı şekillerde yansıdığı gözlenmiştir.

Anahtar Sözcükler: Matematik dersi öğretim programı, öğrenci merkezli öğrenme yaklaşımı, öğrenme ortamı.

Introduction

In Turkey, curriculum development studies started with the proclamation of the republic (1923) (Gözütok, 2003). Apart from the drafts, four main curricula, in 1926, 1936, 1948 and 1968 were implemented in the republic (Arslan, 2000). With the effect of the report prepared by John Dewey, who was invited to Turkey in 1924, preparation of the primary school curricula was prioritized during the early years of the republic (Demirel, 1997). The 1926 curriculum presented a new dimension by mentioning the concepts of social studies, mass education and job school. In that curriculum, it was decided that the courses should be taught with mass education (mass

* Bu çalışma, Karadeniz Teknik Üniversitesi, Fen Bilimleri Enstitüsü, İlköğretim Matematik Anabilim Dalı için hazırlanan doktora tezinin bir kısmından özetlenmiştir.

** Yrd. Doç. Dr., Karadeniz Teknik Üniversitesi, Fatih Eğitim Fakültesi, e-posta:gmgunes@ktu.edu.tr

*** Prof. Dr., Karadeniz Teknik Üniversitesi, Fatih Eğitim Fakültesi, e-posta:abaki@ktu.edu.tr

instruction) method by facilitating students' active participation and concerning environmental conditions (Gözütok, 2003). However, the application of this program hindered due to the reasons that the teachers were not ready, crowded classrooms and lack of classrooms and instructional tools (Gömleksiz, 2005).

In the 1936 curriculum, the targets of national education were determined. The principles that should be taken into consideration from the first school day of students were listed clearly in a way to prevent any misunderstandings and misinterpretations (Arslan, 2000; Çelenk *et al.* 2000). The determination of instructional and educational principals of primary level is one of the most significant aspects of the 1936 curriculum (Çelenk *et al.* 2000; Gömleksiz, 2005).The curriculum aimed that students would learn in collaboration instead of learning only by listening. The curriculum concerned about attracting students' attention towards lesson and utilization of visuals. Additionally the curriculum was offering; when a student faces with a learning problem, he/she should seek different solutions ways, gather relevant information, compare and assess evidences, draw a conclusion and deliver a judgment, and he/she should investigate whether the result was true or false, as problem solving techniques imply. The teacher's role in this process was determined as guiding students and helping them to grow with scientific vision (Çelenk *et al*., 2000).

It can be said that the 1948 curriculum, prepared under the influence of the transition to multi-party democratic life, complied better with democratic ideas (Tazebay *et al*., 2000). The 1948 curriculum was put into practice on 1 November 1948 and it was applied for 20 years. While mathematics course was referred as "Hesap-Hendese[****]" (Calculation-Geometry) in 1936, it was called "Aritmetic-Geometrik" (Arithmetic-Geometric)in the 1948 curriculum (Çelenk *et al*., 2000). This curriculum was very condensed due to having too many units so it was not so flexible (Çelenk *et al*., 2000; Gözütok, 2003).In 1950s, Kate V. Wofford was invited to Turkey to determine the problems of application of the 1948 curriculum (Aslan, 2005).The report Wafford prepared after examining village schools led curriculum development studies on a systemic track (Demirel, 1997; Çelenk *et al*., 2000; Akbaba, 2004). During the 5th National Education Council Turkey, held in 1953, the primary school curriculum was mentioned and some arguments about revising it were put forward (Demirel, 1997; Çelenk *et al.,* 2000). A new curriculum development era started with the release of "The Principles Pertaining Alterations on Primary School Curriculum" by Primary Education Directorate Turkey in 1961 (Aslan, 2005).

The 1962 draft curriculum, which was taken as a model for the 1968 curriculum, was piloted in some schools for 5 years and then implemented on the condition to be improved in process (Demirel, 1997; Çelenk *et al*., 2000). The 1968 curriculum was put into practice across the country in 1 July 1968. This curriculum was mainly focused on improving social, personal, human affairs and economic aspects of individuals (Çelenk *et al*., 2000; Aslan, 2005). In the 1968 curriculum certain topics were recommended to suffice needs arising due to individual needs under the title of "Spare Topics on Supporting and Reinforcing Curriculum." It was noted that these topics might as extracurricular activities (Çelenk *et al*., 2000). After 1968, the holistic curriculum preparation application was replaced with preparing individual curriculum for each course (Arslan, 2000; Çelenk *et al*., 2000; Tazebay *et al*., 2000). The 1968 curriculum applied until the year 2004 with certain arrangements and improvements. It is evident that each of the curricula that had been applied by the 1980s particularly concerned being student centered, active participation of students and student interaction and cooperation. That each of the curricula deeply mentioned these aspects implies that the previous curricula had failed to reach these aims.

The prospects of continuity and standardization started in 1980s. General aims, unit and topic aims were mentioned in the model prepared after the preparations in 1983. In addition, specific targets and behaviors that are indicators of these targets were determined for all levels (Ababa, 2004). This arrangement on the Primary School Mathematics Course Curriculum was referred as a new milestone of mathematics education by some scientists (Albayrak & Aydın, 2002).

[****]Hendese is Arabic originated word which also means 'geometry'. It is also stem of the word mühendis; engineer.

MEB (Ministry of National Education Turkey) prepared the "Improving the National Education Project" in 1990s with the support of the World Bank. The aims of this project were determined as improving instructional programs, materials, course books and using them effectively (Yüksel, 2003). It can be said that assessment was also considered during this rearrangement efforts (Demirel, 1997). Intended behaviors, content, educational status and assessment criteria were included in curricula since 1980.

The 5+3= 8 year Primary School Mathematics Curriculum was formed in 1990 with the addition of 6th, 7th and 8th grade units by MEB. This curriculum was rearranged and implemented in 1998. In the 1990 and 1998 arrangements, the intended behaviors of the curriculum were reviewed and some intended behaviors were added; on the other hand some were removed from the curriculum (Çelenk *et al.*, 2000; Albayrak &Aydın, 2002).

Finally, thanks to the efforts to render the curricula contemporary, to make the curricula favor the concept of knowledge and knowledge society and to improve an instructional vision based on life-long learning approach; the curriculum development studies resumed and proper models have been sought.1st to 5th grade Mathematics, Turkish, Survival, Science & Technology, Social Awareness courses curricula have been changed so far. After being piloted at 120 schools in nine provinces (Ankara, Bolu, Diyarbakır, Hatay, İstanbul, İzmir, Kocaeli, Samsun, and Van) in 2004, these curricula have started to be applied in all elementary schools in 2005-2006 educational year (MEB, 2008). The reasons for improving these curricula can briefly be listed as:

- To render curricula contemporary,
- To form new standards,
- To escalate knowledge concept and knowledge society notion,
- To disseminate a teaching conception shaped by life-long learning,
- To comply with the European Union criteria (Akbaba, 2004).

Turkish Educational System is mainly based on behaviorist psychology and learning theory. Behavioristic approach defines educational goals as intended behaviors and investigates the experiences leading to these behaviors (Çınar *et al.* 2006). After 2004 alterations, the authorities in charge asserted that the changes are fundamental reforms and the upcoming generations educated with this curriculum are going to be successful as individuals and as society (MEB, 2008).

The 2005-2006 reforms were different from the previous educational applications. These differences and their aims are summarized briefly below (MEB, 2008):

- Shifting from the behaviorist education system to the constructivist one,
- Activating students mentally and physically,
- Adopting student centered instruction instead of teacher centered,
- Including process assessment besides product assessment and employing alternative assessment techniques (e.g. self-assessment scales, group work assessment scales, diary etc.)
- Considering students' individual skill and performance differences, increase social interaction and group works in the classroom to support student learning.

According to the student-centered approach, forming the base of the new Mathematics curriculum, learners' comprehending of knowledge and learning how to learn are important elements of instructional process. To manage this, the student has to be taken to the center. The new and contemporary aim of the educational system is educating individuals aware of when and how to use knowledge, know and apply self-learning methods effectively, and utilize previous knowledge to produce new knowledge (Baki, 2008).

A glance over the Turkish Educational System since the proclamation of the republic may show that it is based on behaviorist learning theory. Our traditional understanding of education

also resembles behaviorist approach. Behaviorist approach defines educational goals as behaviors and focuses on the experiences leading to these behaviors (Çınar *et al.*, 2006). After the 2004 renovations, the authorities responsible for development and implementation of the curricula remarked that they conducted one of the most significant reforms in the history of Turkish Education (MEB, 2007) and they added that the next generations educated with this curriculum will be more successful in personal, social and international point of view (MEB, 2008).

When all the curricula so far were examined in terms of being contemporary, all of them except for the latest one have discoursed national aims. However, the 2004 curriculum underlined that international educational standards were considered. As it was done on curricula of different countries, the 2004 curriculum was developed by prioritizing the student centered learning approach to catch up with the contemporary education level, students' constructing their own knowledge and to improve independent thinking skills. The student centered approach is reorganizing educational system so as to guarantee continuous student participation by minding individual differences for students who; possess scientific thinking and communication skills, know how to learn, is productive, can access and use information, internalize universal values, can use technology effectively, attained self-actualization (Taşkıran, 2006, s.20). As a result of this curriculum, it is expected that substantial changes will occur on teacher roles in instructional process and together with these changes student centered learning environments will be formed.

The Significance of the Study

The theoretical framework of the primary school first stage (1st to 5th grade) curricula was intended to be transformed from teacher centered structure into student centered one in the renovation period undergone by the MEB since 2004 (MEB, 2008).Along with this idea, it is necessary to conduct careful investigations of the projections of the renovated curricula onto applications on the field and to make necessary regulations.

The implementation of school-based innovations generally fails since teacher dispositions on teaching and learning are persistent (Orrill & Antony, 2003). For this reason teachers fail to carry on the innovation and go back to their old habits (Richardson, 1990). Concerning all the factors above, with this study it was aimed to state the opinions of the teachers about the learning approach which is the principal base of the new curriculum. It is expected that these opinions will explain certain situations and differences that may occur in the classroom applications.

It is a fact that when an innovative curriculum is launched the curriculum is subjected to certain trial periods and an extensive pre-investigation (Jacob & Frid, 1997). For this reason, in order to evaluate the primary school curricula that were recently put into practice; namely primary school mathematics curriculum, there is a need for effective scientific researches.

The implementation of the curriculum is affected by several factors like; the content and clarity of the curriculum, degree of the complexity of the change, support of the local authorities, quality and affinity of the teacher labor force, quality of the school, culture of the teacher and government support *etc*. According to Clarke (1997) and Fullan (2001), among these factors, teacher role; particularly teacher role in the classroom, is extremely important (Yun-peng, *et al.*, 2006). It is expected that; the more the weaknesses of the curricula are strengthened and the more they are renovated along with the advancements both in society and science fields; in other words the more the curricula improved, the better the quality of education. Teachers, who have the leading role on every level of education (Crawford *et al.*, 1998), are well aware of the weaknesses of the curriculum. Apart from that, they need to understand curriculum-bound new methods and believe the usefulness of them. Teachers' beliefs and awareness about change increase the likelihood of teachers' changing their instructional methods (Thompson, 1992; Crawford *et al.*, 1998). From this point of view, the knowledge, beliefs, feelings and worries of teachers must be taken into consideration before every single step of any types of educational innovations (Crawford *et al.*, 1998). Thus, it is obvious that teacher opinions, beliefs and instructional approach they use have a leading role in evaluation of curricula (Schremer, 1991; Erden, 1998). In conclusion, it is

essential to collect opinions of teachers about the curriculum and its applications, to reveal their instructional approaches, to utilize these opinions during curriculum planning, development and evaluation processes.

In spite of well-prepared instructional plan, the teacher's attitude affects the application of this plan. This is one of the reasons why students with similar attributes end up with different levels as a result of instructional process (Açıkgöz, 2003). For effective Mathematics teaching, teacher is as important as the instructional plan (Clarke, 1997; Fullan, 2001; Yung-peng *et al.*, 2006). Considering all these factors, it is important classroom teacher opinions to be collected about Elementary Mathematics Curriculum (EMC) and their classroom applications to be evaluated. The results of the present study are believed to be useful for educators and experts in curriculum development.

The purpose of the research

The purpose of this study is to obtain the reflections of 4th grade teachers' opinions about the new elementary mathematics curriculum on the learning environments and opinions of teachers regarding student-centered learning, how is reflected in this environment.

Method

The study is a case study. Case study method is preferred for this study because case study provides researchers with the opportunity to focus on a special case or phenomenon and to define different factors within the field of the study (Hammersley, 1993; Maykut & Morehouse, 1994; Yin, 1994; Bogdan & Biklen, 1998). The primary concern of the case study is to inquire 'How' and 'Why.' Reviewing the literature, it can be said that studies on curriculum development, teacher applications and reforms on curricula have used the case study (Remillard, 1992; Prawat *et al.*, 1992; Remillard, 1999; Brewer and Daane, 2002; LeSage, 2005; Yun-peng *et al.*, 2006; Stone, 2006). Our case; Trabzon sample is important in terms of providing clues about the general. Since the studies about curriculum reform, teacher applications, instructional materials of curricula, teacher knowledge and teacher beliefs need deep and detailed investigation the case study method has also been popular among them (LeSage, 2005; Remillard; 1996; Steele, 1995). Qualitative data were obtained through interviews and observations as data collecting tools.

Since the state of socioeconomic infrastructure and location of the schools are important in terms of developing learning environments, maximum variation sampling, a purposeful sampling method, was used (Yıldırım & Şimşek, 2005). The study was carried out with 9 different 4th grade classroom teachers working for state schools in the center, suburbs and villages of the province Trabzon. While the primary schools were being chosen; the location of schools and average continuous income level of the student families were considered as determining factors. Again, the schools were chosen so as to have 4^{th} grade teachers from different experience levels. The reasons why 4^{th} grade teachers were chosen as target group for this study can be listed as:

- The number and variation of the courses increase in 4^{th} grade,
- Classroom teachers start to share the courses with branch teachers in 4^{th} grade
- Some of the educational attainments of the Primary School 4^{th} Grade Mathematics Curriculum were included in lower grades of the former curricula.

After getting related permissions from teachers and administrators, the teachers were interviewed three times and their instructions were observed for 14 class hours.

Interviews aimed to determine the opinions of the teachers about the new Mathematics curriculum. Semi-structured interviews have been perceived advantageous since they provide opportunity to alter predetermined questions and they offer detailed inquiry opportunities (Yıldırım & Şimşek, 2005). The first one was at the beginning of the implementation of the new

curriculum (at the beginning of 2005-2006 educational year), the second one was at the end of that year and the third and the last one was in 2006-2007 educational year. The first interview was performed in September 2005; to collect preliminary opinions of the teachers about the Revised Primary School Mathematics Curriculum, to determine the level of adequacy of the introduction given to the teachers about the Primary School Mathematics Curriculum, and to identify the teachers' opinions about the educational approach offered by the new curriculum. The second interview was conducted to collect information about the opinions of the teachers about the Primary School Mathematics Curriculum applications in June 2006. The last interview was carried out to identify how a-year long Renewed Primary School Mathematics Curriculum applications have affected their experiences and opinions about the Renewed Primary School Mathematics Curriculum. In order to assess reflections of teacher opinions about the curriculum, 14-hour classroom observations performed with each teacher. The data coming from the observations were used to observe the lessons in real classroom environment and to compare their opinions about the renewed Primary School Mathematics Curriculum and applications in classroom.

In order to increase the validity and reliability of this study, the data diversified by putting different data collecting tools into practice. This is a common practice in qualitative methodology (Yıldırım & Şimşek, 2005). Similarly, the duration of the study was extended for the sake of validity and reliability. The researchers tried to get to know the teachers in the sample and their students and introduced them the study by frequently visiting their classrooms. The researchers explained that this was a scientific study and the results would be used only for scientific purposes and then started to the classroom observations in the second term of 2005-2006 educational year. In order to avoid probable data loss, the observations recorded not only with researcher notes but also with a camera recorder. On the other hand, the semi-structured interviews provided a throughout picture of the opinions of the teachers. Interview data were analyzed by HyperResearch 2.6 program. Themes and codes formed to categorize the data. The results were tabulated with the help of these codes. Sometimes, some direct quotations were also given to refer the exact teacher opinions.

The real names of the teachers were not used. Codes from T1 to T9 were used to represent them.

Findings and Discussion

The teachers' opinions about Elementary Mathematics Curriculum (EMC) divided into two titles. The first one is applicability of EMC and effectiveness of EMC on student learning. Before these titles, the teachers' opinions about 'how much they know the curriculum' and 'how much they informed about the curriculum' were presented.

The teachers' opinions about 'how much they know the curriculum' and 'how much they informed about the curriculum'

In the first interview, only T6 reported that she had the curriculum and 4 others (T1, T2, T7, T9) said they didn't have it, but they had seen it and finally two of them said they had had opportunity to check it. The rest; 5 teachers hadn't seen the curriculum yet.

Teachers were asked how they were informed first about the curriculum. T6 joined and inset introducing the new curriculum in June 2004 by MEB. The rest were informed in the two-week seminar session in June 2005. The latter seminar's instructors were chosen by the Province Directorate of MEB from the teachers and supervisors having the 2004 inset. For this reason, the teachers think that this second-hand information was not sufficient to make them apply the new curriculum appropriately.

These extracts are from the first teacher interviews;

T1: "… Supervisors visited our schools and informed us at the end of the school year (2004-2005). We still lack information. … We were not educated to comply with the needs of this

curriculum. This is student centered but we were applying student centered on. … Both teachers and student have to be ready for it. Besides to take student to the centre you need a special learning environment. You need materials making student reach target knowledge. …"

T3: "It was end of the year, we joined the seminar. Our friends informed us. They explained how it works, they gave information about pilot schools. It wasn't too bad. We weren't completely unaware. Moreover I have been teaching for years so I have my recollections."

T7: "It was insufficient. The seminar was held but it wasn't efficient due to lack of resources. … There were no experts. … We have hesitations about what and how to do."

T1 mentioned application phase and noted their undergraduate education does not fit the needs of the new curriculum. At the same time, he reported that students are not ready for the new system either. The teachers seemed not to understand philosophy, vision and difference of the EMC from the other curriculum. They state that they need an inset or help for how to apply the EMC. They persist that they need that help even in the last interviews.

In the second and the last interviews the teachers who still reported they didn't know enough about the curriculum quoted below:

T7: "… I can not evaluate these forms (assessment forms) in this way. It says; pupils who don't have behaviors in a sufficient level should be supported with activities. But what are the activities? Guidance is not complete. It says make pupils speak. But, they don't speak. It is not written how to do that."

T8: "I cannot say that I know what to do exactly. I give the requirements of the curriculum. I have no difficulty during the process. But, I cannot say I fully understand. I haven't gotten the hang of it, yet."

The teacher's opinions about the applicability of the EMC

Teachers' opinions about the applicability of the EMC were obtained through the interviews and were analyzed and presented in the Table 1.

Table 1.
The Teacher Opinions about the Applicability of the EMC

Theme		Codes	I1	I2	I3
Applicability of EMC	Positive	The missing of the curriculum can be eliminated by time during the application.		T6	
		The teacher has the largest part in the application.		T6	
		Have expectation of increasing in the number of suitable materials for the new system.		T6	
		It must be kept instructing with activities.		T1,T6	
		Having lesson with activities.	T3	T3,T7,T8,T9	
		Promotes course teachers cooperation.		T5	
		Teachers adjust themselves to changes.		T4,T6,T9	T2,T4,T6,T7,T9
		It is applicable if the guide book is followed			T3,T4,T7
		The curriculum is easier to apply than the old one		T4	T1
		The curriculum is enjoyable to apply		T2	
		The curriculum provide opportunity different materials to be developed			T9
	Negative	Lack of infrastructure	T1,T7	T7,T9	T3,T5,T7,T9
		Overcrowded classrooms	T5	T2	T5,T6
		Need for caring pupils individually		T2	
		Sudden shifting to the EMC		T1,T5,T8	T8
		Inability to apply assessment part		T6	T2, T8
		Condensed EMC content		T1,T4	
		EMC is not suitable for general examinations.		T6,T5	T1,T4,T5,T7
		Disbelief about the change will be permanent.		T5	T6,T7,T8
		Students are not ready for the new system	T1,T5	T6	
		Having not enough class hours	T5		T5,T6,T9
		Differences between applications of different teachers			T2,T3,T8
		Lack of guardian support	T1,T5,T7		T5
		Teachers do not understand the curriculums philosophy	T1,T2,T3, T4,T6,T9		
		Application of the curriculum depends on student number	T1,T2,T4,T5, T6,T8,T9		
		Need for equipped classroom to application of the curriculum	T4,T5,T6, T7,T8		

As Table 1 implies the positive and negative comments of the teachers about the EMC were limited in the first interview since they did not have enough information about the EMC. Then in the second and the third interviews their positive views increased. However the negative ideas went up more.

The frequencies of teacher opinions about applicability of the curriculum are in Table 2 below.

Table 2.
Frequency Table of Teacher Opinions about Applicability of the EMC

Opinions / Teachers	Number of Positive Opinions				Number of Negative Opinions			
	I1	I2	I3	Total	I1	I2	I3	Total
T1	-	1	1	2	5	2	1	8
T2	-	1	1	2	2	3	2	7
T3	1	2	1	4	1	-	2	3
T4	-	3	2	5	3	1	1	5
T5	-	1	-	1	6	4	5	15
T6	-	6	1	7	3	2	3	8
T7	-	1	2	3	3	1	3	7
T8	-	1	-	1	2	1	5	8
T9	-	2	1	3	2	1	2	5
Total	1	18	9	28	27	15	24	66

When we check the Table 2 it can be seen that except for the second interview teachers give more negative ideas than positive ones. In other words, the teachers' positive opinions about 'applicability of the EMC' peaked in the second interview. When we compare for all we see that number of negative opinions (66) is more than two fold of the positive opinions (28).

Teacher opinions about effectiveness of EMC on student learning

Teacher opinions about effectiveness of EMC on student learning collected as a result of repeated three times in the interviews are tabulated below in Table 3.

Table 3.
Teacher Opinions about Effectiveness of EMC on Student Learning

Theme	Codes		I1	I2	I3
Effect of EMC on student learning	Positive	Relating the subjects to daily life	T4	T4	
		Diluted curriculum content	T7		
		Improving student skills		T4,T6	
		Pupils' discovery of knowledge by themselves		T2,T4,T9	
		Student workbook's (SWB) positive effect on student learning		T5	
		Student is active in the classroom	T1,T2,T3,T7, T6,T8,T9	T4,T6,T1	T4,T6,T1
		Causing increase in material use	T9		
		Positive effects of omission of lecturing on learning		T1,T2,T6,T7	
		Curriculum directs student to reasoning		T2	
		Increase in student Mathematics achievement		T9	
		Activities contribute student learning by attracting them		T1,T3,T7,T9	
		Facilitates persistent learning		T2	T2
		Students' developing positive attitudes for Mathematics		T9,T6	T8
		Increasing student participation		T5,T6,T9	
		Using Teacher's Guide Book's (TGB) effect on the classroom environment		T1,T3,T5, T7,T9	
		No knowledge load			T2
		Enabling knowledge transfer to other disciplines			T2
		Helping student comprehension			T1,T2,T4
		Including activities like projects and performance			T1
	Negative	Ineffectively of the curriculum on student learning		T8,T1	T8
		Expectations' fail because of infrastructure		T7	
		Students' not being ready for the curriculum	T5,T1,T2		
		Instructing Mathematics teacher centered for the sake of student learning	T1		

As it was shown in Table 3 teacher opinions indicating the curriculum affected student learning positively accumulated in the second interview. The teachers think that the EMC supports student learning in certain ways. In the last interview none of the teachers put forward that the EMC has not contribute to student learning.

Table 4.
Frequency Table of Teacher Opinions about Effectiveness of EMC on Student Learning

Teacher	Number of Positive Opinions				Number of Negative Opinions			
	1G	2G	3G	Total	1G	2G	3G	Total
T1	1	4	3	8	2	1	-	3
T2	1	4	4	9	1	-	-	1
T3	1	2	-	3	-	-	-	-
T4	1	4	2	7	-	-	-	-
T5	-	3	-	3	1	-	-	1
T6	1	4	1	6	-	-	-	-
T7	2	3	-	5	-	1	-	1
T8	1	-	1	2	-	1	1	2
T9	2	6	-	8	-	-	-	-
Total	10	30	11	51	4	3	1	8

* 1G, 2G and 3G represent the first, second and third interviews with teachers.

By comparing the teachers' positive and negative opinions about the contribution of the EMC to student learning from Table 4, the teachers stated positive opinions; 10 times in the first interviews, 30 times in the second and 11 times in the last one. Based on the interviews 1G and 2G, the teachers seemed like to think that the EMC has positive effects on student learning in the first implementation year (2004-2005 educational year). However, there was a decrease in the number of positive opinions in the last interview (3G). Besides, the number of negative opinions also decreased gradually.

It was sought how the teachers' ideas about the EMC affect setting student-centered classroom environment with the help of the data obtained from teacher interviews and classroom observations.

Most of the teachers report that for variety of reasons the curriculum is hard to implement. Only T3 thinks that the curriculum is applicable. However all the teachers thought that the new curriculum effects student learning positively.

Backed with the available data, it can be said that the teachers think that the EMC contributes to student learning but it is hard to implement. In the observations it was determined that the teachers who are aware of the philosophy of the EMC tried to apply the new curriculum. It was observed that; T2 and T6 kept student-centered learning environment in the classroom, T1, T3, and T9 tried to stick to the instructions of the Teacher's Guide Book and to be student-centered, T4 and T8 didn't try to implement the EMC but there are some learning-centered elements in their classrooms, T5 and T7 classroom environments were completely traditional.

Out of the teachers who think that the EMC is inapplicable because of it is not suitable for the central examinations (T1, T4, T5, T6, and T7) only T6 was observed as had an effort to set a learner-centered environment. T5 and T4 solved multiple choice tests in the classroom, T1 and T7

kept instructing in a traditional way with the same aim. Acat and Demir (2007), with a different point of view, cited that teachers working in the city centers continue traditional instruction because of the examination pressure.

When the classroom environments of T1, T3, T5, T7, T9, who argue that the EMC is inapplicable due to infrastructure reasons, observed it was clearly seen that lack of student-centered elements was not due to infrastructure but the teaching philosophy of the teachers instead. Only T3 and T9 had attempts to set a learner-centered environment. Yapıcı and Demirdelen (2007) cited that infrastructure problems hinder implementation of new programs. Similar findings stated in the research of Çınar *et al.* (2006).

In the present study it was observed that the infrastructures of the classrooms were not suitable for setting a learner-centered environment. First of all, classrooms should be neat physically and proper infrastructure be supplied. The requirements of the learner-centered environment and the traditional one are different. In traditional, it was assumed that there are a middle number of students in a traditionally built classroom, the students sit and listen passively (Acat & Ekinci, 2005). Whereas while student-centered classroom environments should be multilateral, flexible, providing movement opportunity and open for participation (Şimşek, 2004). The teachers who don't have a suitable environment had some difficulties while trying to set learner-centered environments. For example; T2: "… We had troubles when the classrooms got crowded. Large numbers make activities harder. Besides restricted classroom area hinder students' standing and joining to activities comfortably. Once they were going to line in geometric shapes. But there wasn't enough space."

It was determined that the teachers who have milder and more positive ideas about the EMC were more enthusiastic to set learner-centered environment. This datum was supported by Doğanay & Sarı (2007). Authors stated that there is a positive correlation between the teachers' attitudes and their applications.

In observations of T5 and T7 it was observed that they didn't alter their applications, in spite of the change in curriculum and philosophy. Innovations fail – in general, when the teacher beliefs related to teaching and learning persist. And according to Richardson (1990), for this reason teachers fail to conduct the innovation and turn back to fossilized teaching habits (Orrill & Antony, 2003). Traditional teaching styles of T5 and T7 prevent them to apply the curriculum.

For educational reforms to be successful teachers should be persuaded about the change is beneficial. Whereas, volunteer teachers equipped with the related skills do not guarantee the success. They should have the knowledge and competences to carry out the application (Battista, 1994). It is obvious that the teachers who don't know about learner-centered environment would carry on implementations with their own methods. T3 and T9 are the examples of this situation. Although they tried to form learner-centered environments, their lack of knowledge hinders their setting environments of proper attributions. And their learning environments were found close to teacher-centered teaching as a result of observations, in spite of the fact that they revealed more student-centered opinions.

Conclusion

Based upon the obtained data, it was concluded that teachers' opinions about the EMC reflect directly to the classroom applications.

Teachers' having enough knowledge about the learner-centered environment, the base of the new EMC, enables them to reflect this knowledge to the learning environments.

The teachers have been in need of get to know the curriculum and get help during the study. But they couldn't get help whenever they need. For this reason, the teachers aware of the fundamental philosophy of the curriculum tried to reflect it onto classroom environments. T2 and T6 kept learner-centered environment in their classrooms, T3 and T9 tried to include student-

centered elements by assigning activities, T4 and T8 set environments with student-centered although they said they didn't try to apply the EMC and finally T5 and T7 were teacher-centered.

The teachers' opinions about the applicability of the EMC did not reflect to their classroom applications directly.

When we look at the teacher ideas about the applicability of the EMC; T3 gave mostly positive answers 6 teachers (T1,T2,T5,T7,T8,T9) gave mostly negative answers and T4 and T6 gave equal number of positive and negative answers. But the teachers sharing the same opinions had different classroom applications. A teacher who said the curriculum was applicable performed more teacher centered application in the classroom even she tried to apply the new curriculum. The EMC applications of the 6 teachers who think the curriculum is not applicable varied.

Teacher opinions about effectiveness of the EMC on student learning had little effects on the learner-centered environment settlement.

Although all the teachers noted that the EMC has a positive effect on student learning, their classroom learning environments were not student-centered completely. Most of the teachers (T1,T3,T4,T5,T7,T8,T9) set teacher centered learning environments except T2 and T6 who set more student-centered than teacher-centered environment.

Suggestions

The results of the present study showed that the teachers went on applying their own teaching methods along with implementing the new curriculum. Their opinions about the curriculum do not affect their classroom environment. For these reasons, if teachers are expected to change the learning environments they form, they first should be educated in under-graduate education and then they should be trained by practical in-service courses periodically. Teachers should be acquainted about the features of the learner-centered environment with variety of scientific source types such as; seminars, courses, teacher portals, and journals.

This study was carried out in the first year of the EMC implementation. Considering teacher adaptation is not easy in the first year, further similar studies in future terms will provide opportunity of comparison with the results of the present study.

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