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Mathematics teachers' views about measurement and evaluation dimension of new Turkish geometry curriculum

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Abstract

The aim of this study is to investigate mathematics teachers' views about measurement-evaluation dimension of new Turkish geometry curriculum. With this aim, 15 mathematics teachers who are selected from Artvin, Bayburt, Rize and Trabzon were carried out semi-structured interview. As a result, it was seen that teachers in our samples tend to apply traditional measurement and evaluation approach as they find the new measurement-evaluation dimension difficult and uneasy using the tools and methods. And the teachers are not aware of which tools are to be used in alternative measurement and evaluation approach or they do not know how to use it. Also, there are teachers who have negative views about new approach. These teachers have stated the main issue occurs due to time limitations, crowded classes, lack of tools and materials and density of class hours.

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1. Introduction

Recent advancements in technology have an impact on our education systems and this requires changes in the system, the foremost important of which is the change of curriculums. It is certain that the quality of teaching will increase if such changes are made and regulated according to social and scientific advancements (Erden, 1993). For this purpose, curriculum development has gained a rapid progress as it has around the world and geometry curriculum has been revised in the years of 2009 and 2010 respectively. In 2009, the revised geometry curriculum has been applied in 9th grades and in 2010 it has been applied in 10th grades. In this respect, radical changes have been noticed in terms of measurement and evaluation besides the teaching and learning process. With the recent curriculums, traditional product based approaches in measurement and evaluation have left its place to a process based approach. And this is an approach which suggests and encourages teachers to use techniques that assess what the students know rather than what they have done, encourages learning geometry and supports them to express their

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performance both verbally and non-verbally. For this reason, it demands teachers to make use of alternative measurement and evaluation techniques rather than traditional ones in order to evaluate students' performance.

Several works have been seen on approaches of measurement and evaluation in curriculum design when the literature has been analyzed. Gözütok, Akgün ve Karacaoğlu (2005), in their evaluation of new elementary school curriculums in terms of teacher proficiency, have reached the conclusion that teachers see themselves inadequate in measurement and evaluation with respect to the other dimensions of the curriculum. Özdaş, Tanışlı, Köse ve Kılıç (2005), in their work to evaluate elementary school mathematics lesson curriculum based on teachers' views, they have observed that the teachers believe it is required to evaluate individual differences, use various measurement and evaluation techniques and concentrate on the process rather than the product. Bukova Güzel ve Alkan (2005), Korkmaz (2006) ve Bulut (2006) have stated that in 2005, one of the most challenging areas in elementary school curriculum was measurement and evaluation area. In parallel, Güneş (2008) has stated that teachers need assistance in using alternative techniques of measurement and evaluation. Similar difficulties are seen in other countries as well. For instance, Cronin-Jones (1991) Handal and Herrington (2003) have mentioned that teachers haven't been able to apply the new curriculum and the learning-teaching approaches to the desired extent. Moreover, there exist works revealing the fact that the approaches in curriculums are not put into practice due to reasons such as lack of time and teacher experience, previous beliefs of measurement and evaluation, lack of resource and teaching tools and works that cannot reflect the measurement and evaluation dimension (Carnevale, 2006; Cavanagh, 2006).

It is a well-known fact that no kind of reform is successful so long as it is fully understood, embraced and efficiently made use of (Baki, 2002). It has also been seen through research that personal attitudes and beliefs of teachers play a crucial role in classroom practice (Tobin, 1987; Crawley ve Salyer, 1995; Yun-peng, et al., 2006). As a result, if a reform in teachers' practice is desired, the starting point is to change teachers' opinions and beliefs on the specific subject. The new geometry curriculum has proven a change from product based to process based approach and this is especially significant that teachers embrace and apply these changes that the curriculum requires. In order to attain success in this, teachers should evaluate the opinions of measurement and evaluation of the new geometry curriculum. At this point, through this study, it is aimed to investigate mathematics teachers' views about measurement and evaluation dimension of new geometry curriculum.

2. Method

2.1. Model of Research

In this study that is investigated perceptions of the mathematics teachers about measurement and evaluation dimension of new geometry curriculum, case study method was used.

2.2. Participants

This study has been carried out along with 15 mathematics teachers selected from Artvin, Bayburt, Rize and Trabzon who teach geometry classes. Following are the genders, teaching experiences and school types of teachers.

Table 1. Gender, teaching experience and number of teachers with respect to school types

| Gender | | Teaching Experience | | | School Type | |
|--------|------|---------------------|------|-----|-------------|------------------|
| Female | Male | 0-5 | 5-10 | 10+ | High School | Anatolian School |
| 5 | 10 | 4 | 6 | 5 | 8 | 7 |

2.3. Data Collection Tool and Process

Data have been collected through semi-structured interview method. A suitable time and setting for the interview has been decided with each teacher. The teachers were asked questions on interview as follows: "What are the approaches adopted by new curriculum? How is the view of curriculum to measurement and evaluation?" The

interviews have been recorded to avoid data loss. After this, data have been analysed by the help of 2 researchers and by receiving an expert opinion.

2.4. Data Analysis

Data have been formed through inductive analysis within the scope of content analysis. The irrelevant parts of the data collected have been left out as a result of first level coding and the relevant parts have been gathered under thematic codes. Themes formed as a result of the analysis are “Using the measurement and evaluation approach, view to the new measurement and evaluation approach and the application of measurement and evaluation approach”.

3. Findings

In this step, data obtained through the analysis of semi-structured interviews conducted with 15 mathematics teachers working in various school types (Anatolian High Schools and High Schools) from Artvin, Bayburt, Rize and Trabzon will be presented. Direct quotes of teachers will also be mentioned in the analysis as examples. Teacher opinions with higher frequencies have been selected.

Table 2. Views of new curriculum on measurement and evaluation

| | f | % |
|---|-----------|------------|
| 1. Using the Measurement and Evaluation Approach | | |
| 1.1. I agree with the Traditional Measurement and Evaluation Approach | 12 | 21,05 |
| 1.2. I make use of Alternative Measurement and Evaluation Approaches | 5 | 8,77 |
| 2. View to the New Measurement and Evaluation Approach | | |
| 2.1. Positive view | 9 | 15,79 |
| 2.2. No information | 6 | 10,53 |
| 2.3. Negative view | 5 | 8,77 |
| 3. View to the Practice of Measurement and Evaluation | | |
| 3.1. Consider it suitable | 3 | 5,26 |
| 3.2. Don't consider it suitable | | |
| 3.2.1. Having time issues | 10 | 17,54 |
| 3.2.2. Consider it uneconomical | 1 | 1,75 |
| 3.2.3. Doesn't appeal to the university exam system | 4 | 7,02 |
| 3.2.4. Not agreeable with student level | 2 | 3,52 |
| Total of views | 57 | 100 |

3.1. Using the measurement and evaluation approach

Two sub themes formed under this theme have been stated as follows. The total of statements under the theme “I agree with the Traditional Measurement and Evaluation Approach” have been estimated as 12. There are 6 teacher opinions in this theme (%37,5) making up %21,05 of the opinions and have stated that during student assessment an oral performance grade + or – is given and that students are assessed by asking questions on the board which is a determining technique and also that their assessment is made up of 2 written exams and 1 oral exam as in classical approach which leads to a “pass” or “fail” result. Following is the statement of the teacher coded as T-5:

“The measurement carry out in geometry classes includes a classical 2 written exams and 1 oral mark which I give by asking questions on the board so that I see what each student can achieve. For this reason I use a classical method, 2 written exams and 1 oral mark.”

The teacher with the code T-5 has stated that he applies classical approaches and the methods it requires to measurement and evaluation rather than the approach in the new geometry curriculum. With this claim, the teacher prefers to make a product based measurement and evaluation student performances according to the marks they

receive. Even though the teacher has a 3 year experience in teaching, why he doesn't choose to apply new methods is another issue to be discussed.

"I make use of Alternative measurement and evaluation Approaches" includes 5 teacher opinions (%31,25) which makes up %8,77 of the total opinions. In their statements about alternative measurement and evaluation, they have pointed out that they assign students with performance tasks, mid-term tasks similar to project works, multiple choice questions already available in tool of measurement and evaluation, questions with short answers and open ended questions. The teacher coded as T-8 has mentioned that:

"We ask questions such as filling the blanks, questions with short answers, completion of missing parts which fit the activities at the end of the book."

Despite the fact that the teacher doesn't apply the methods of the measurement and evaluation in the new curriculum, he states that he makes use of some of the tools of the approach in the exams. However, it is observed that as examination method, classical approach is applied by the teacher.

3.2. A View to the New Measurement and Evaluation Approach

3 sub themes have been obtained from the theme "A View to the New Assessment and Evaluation Approach". These sub themes are "Positive view", "No information" and "Negative view". 6 of the teachers (%37,5) have a positive view on the approach, 5 of them (%31,25) have no information about the approach and 4 of them (%25) have a negative view on the approach. Finally, one teacher has stated no opinion on the approach.

The teacher coded as T-6 has stated that:

"What we are expected to do here as measurement is to evaluate student's final progress and what we are asked to do here is to evaluate student progress." And this statement expresses that the teacher is aware of the progress evaluation and also approves it.

T-11 has expressed his opinions as follows which clearly shows that he has a positive view on the approach and is used to applying it.

"As a teacher of two years of experience, I believe this approach exists for some time. I can say I'm used to it."

One of the teachers coded as T-5 having a negative opinion on the new approach has stated that;

"It is hard for me to adapt to this approach as I have 30 hours to teach and also different classes. It is more of a class teacher's job to keep portfolios, assess students' performance and so on. It seems more logical if class teacher informs us about his observations after assessment."

and believes it is not his duty to do these tasks, rather the class teacher's. The reason for this is the busy class hours and the number of classes to teach which will not result in a healthy assessment.

3.3. A view to the Application of Assessment and Evaluation Approach

"A view to the application of Measurement and Evaluation Approach" theme is of two sub themes and they have been formed by taking into account whether teachers find the approach applicable. Opinions of teachers who do not agree with the use of this approach have resulted in the forming of other sub themes. These sub themes have been coded as "having time issues", "don't consider it economical", "doesn't appeal to the university system" and "not agreeable with student level".

The number of opinions that approve of the application of the approach is 3 (%5, 26) and clearly has a little share. Those teachers who express a negative side on the approach have given reasons such as time limitations, inappropriate conditions to apply the methods even though they support the ideas put forward, economic reasons as they need more stationery to apply it, the need for universities to apply similar methods in assessment and that it is an approach not applicable to every student.

In the sub theme of "Having time issues" 10 expressions (%17,54) represents %37,5 of teachers. The common view of 6 teachers (%37,5) is time limitations. Following are the opinions:

"It is needed to assign classroom the assignments that are done at home. How is this possible when we do not have adequate time for it? This is the biggest issue in the new system." (T-2)

"It is impossible to fit these assessment and evaluation practices in just two hours a week. Even if it is, I believe no teacher would volunteer to do it."(T-6)

As seen in the opinions mentioned above, there exists no harmony between the weekly class hours of geometry and the needs of approaches of the new measurement and evaluation in terms of teachers. The approaches and techniques are referred to by the teachers as “time-consuming”. And due to time limitations teachers tend to continue with traditional measurement and evaluation.

The sub theme of “Consider it uneconomical” has been formed by considering the view of teacher coded as T-2. It has been considered appropriate to mention it as it adds to the diversity of the negative opinions even though there is only 1(%1, 75) view. In addition, this view has been stated as follows;

“Consider all students products. Consider which student has gained and hasn’t gained. This is all a lot of stationery for us.”

The sub theme “*It doesn’t appeal to the university exam system*” expressed through 4(%7, 02) views includes 2 teacher views.

One of the teachers who believe that the approach isn’t parallel with the university exam assessment system and hence, doesn’t find applying these approaches beneficial. The reason for this is that it doesn’t fulfill the needs of students. Another teacher has stated that it is challenging to keep students on track of the lessons if the lessons are not suitable to the university exam questions. This reveals that %13, 33 of teachers tend to prepare their questions taking into account the needs and priorities of their students rather than the curriculum.

One of the opinions forming the sub theme “*Not agreeable with student level*” is the view of the teacher coded as T-11:

“It is an approach that leads the student to the answer step by step but is not agreeable with and suitable to student level. Moreover, some assessment questions in the textbook are too simple for students.”

4. Discussion and Results

Discussion and results obtained from the interpretation of research findings are given in this section. The theme of using Measurement and Evaluation Approach consists of two sub themes: namely “I embrace the traditional approach and I use the alternative assessment and evaluation approaches”. Under the heading of traditional approaches there are 12 expressions that express the idea that majority of teachers apply traditional measurement and evaluation approaches. Even though the new curriculum requires process based approach towards geometry, teachers who have been taught with that approach choose to apply traditional methods. Gözütök vd. (2005), Bukova Güzel and Alkan (2005), Korkmaz (2006) and Bulut (2006) have suggested in their research that measurement and evaluation is a field teachers have difficulty most and that they feel inefficient in. In parallel with these studies it can easily be said that teachers in our samples tend to apply traditional measurement and evaluation approach as they find the new ones difficult and that they find themselves uneasy using the tools and methods. There is research carried out abroad which display similar problems about using the desired tools and methods in learning and teaching at the desired level (Cronin-Jones, 1991; Handal ve Herrington, 2003). 5 teacher views can be mentioned under the sub theme “I make use of Alternative measurement and evaluation approaches”. These teachers have stated that they assign students with performance tasks, term papers similar to projects, multiple choice questions that already exist in assessment and evaluation tools, questions with short answers and open-ended questions. Even teachers using alternative approach do not use the tools and methods required by the approach. This may result from the fact that teachers are not aware of which tools are to be used in alternative measurement and evaluation or they do not know how to use it. In her study, Güneş (2008) has concluded that teachers are in need of assistance in utilising the tools of measurement and evaluation. Due to this, teachers must be informed about alternative measurement and evaluation approach that geometry curriculum recommends.

The view to the new measurement and evaluation approach consists of three sub themes: positive view, negative view and no information. Majority of teachers in our samples finds the view of new geometry curriculum to assessment and evaluation positive. Özdaş et al. (2005) have stated that they find the process approach measurement and evaluation positive. The new geometry curriculum also suggests process approach measurement and evaluation. The result obtained from this study shows parallelism with Özdaş vd. (2005)’s result. However, there are teachers who have a negative approach as well. Teachers who have a negative view on the approach have stated that the main issue occurs due to time limitations, crowded classes, lack of tools and materials and density of class hours. Throughout literature, there are studies showing that teachers in fact are not willing to apply methods required by

this approach because of the above reasons (Yılmaz, 2006; Korkmaz, 2006; Carnevale, 2006; Cavanagh, 2006). The theme of view to the application of evaluation approach includes four sub themes; namely “having time issues, consider it uneconomical, doesn’t appeal to the university exam system and not agreeable with student level”. The theme mostly articulated by teachers is the time issue and many have stated to have experienced problems while putting into practice the methods recommended by the approach. Similarly, there is also a group of teachers who suggest that these tools and materials do not appeal to the university exam system and are not in parallel with it. For all these reasons, the majority of teachers display a negative attitude towards the curriculum and do not wish to put them into practice in their classrooms.

5. Suggestions

In order to the measurement and evaluation dimension of geometry curriculum to reach the desired outcomes, the first and foremost issue is for teachers to try to change their negative attitudes and prejudices about measurement and evaluation tools and materials of the curriculum. Another point to be pointed out is that teachers must be provided with in-service courses that give insight to the implementation of the tools and materials of measurement and evaluation. In addition, number of students in classes should be minimised, lesson contents and curriculum should be decreased to fit the class hours.

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