



## THE STUDY OF VISUAL QUESTIONS IN MATHEMATICS TEST OF THE FIFTH GRADE FREE BOARDING AND SCHOLARSHIP EXAMINATION

Cenk KEŞAN

*Dokuz Eylül University, Faculty of Education, İzmir, 35380, Turkey*

[cenk.kesan@deu.edu.tr](mailto:cenk.kesan@deu.edu.tr)

Süha YILMAZ

*Dokuz Eylül University, Faculty of Education, İzmir, 35380, Turkey*

[suha.yilmaz@deu.edu.tr](mailto:suha.yilmaz@deu.edu.tr)

Deniz KAYA

*Ministry of Education, Afyonkarahisar Provincial Education, Afyonkarahisar, 03500, Turkey*

[denizkaya50@yahoo.com](mailto:denizkaya50@yahoo.com)

### ABSTRACT

The purpose of this study is to determine the content of the questions by examining the questions in mathematics test of the fifth grade free boarding and scholarship examination made regularly by The Ministry of National Education in 2006-2012 in terms of visibility. The document examining method that is a qualitative research approach was used in the study. In the analysis of the questions containing the visuals in the free boarding and scholarship exam's mathematics tests; the interactive model of Miles and Huberman, the data belonging the last six years was found by applying coding and note-taking techniques. At the end of the study, it was stated that increasing the number of the questions visual themed, distributing the questions according to the type and content in a balanced way would be useful.

**Keywords:** visibility, mathematics, free boarding and scholarship examination

### INTRODUCTION

The primary curriculum for 1-5<sup>th</sup> grades have been revised and used since 2005-2006 academic year. With the renewed curricula more importance has been given to student centered applications in education system, it's been tried to construct a thinking system based on how learning happens. It has also been targeted to improve the students' critical and original thinking, communication, problem solving, research, decision making, entrepreneurship and using information technologies skills (Yaşar et al., 2005; Gömleksiz, 2005; Kiroğlu, 2006).

The revised curriculum has brought many changes with it. In recent years, as it is known, in the light of the developments in science and technology, fundamental arrangements in education system have been implemented. With these arrangements, taking the education system as a whole, it has been targeted improving the quality of education, providing the students to achieve information hardware and competitiveness that they will need in the future in an environment influencing positively their psychological and social developments. At the beginning of these arrangements, the studies of reorganization of educational programs' according to realities of the world with a modern approach, in the light of the innovations and changes occurring in science and technology, and with a constructive approach have been included (Circular, 2008/77). The basic approach of this program has been stated that students in this age group will construct their opinions from their interactions with their peers, concrete objects and the environment besides being active participants in the math education (Pesen, 2005). While adopting learning and teaching model of constructivist theory in new math program, the training concept of behavioral theory was receded. It is important to decide and implement the change in theory in new curricula in terms of education (Kızıltepe, 2004). In addition, it emphasizes learning the rules instead of memorizing these; the acquisition of mathematical concepts, the use of qualifications helping their understanding how it works in life, art, other courses and transition disciplines; and improving spatial skills and aesthetic emotions (Bulut, 2004).



The importance of assessment and evaluation process has increased in the light of the above mentioned information and the information age transforming rapidly. This change in the Primary School Mathematics (1-5) Curriculum requires identification of teaching strategies which the student is active and in the centre and the editing of learning environments in direct proportion to this situation (Gömleksiz and Bulut, 2007). It is seen that the assessment and evaluation approaches differentiate due to these changing targets in the program. Accordingly, alternative assessment and evaluation approaches based on process took the role of those traditional approaches (MNE, 2004; MNE, 2006; EARGED, 2006).

Ministry of National Education carries out the Public Boarding and Scholarship Examination every year, whose aim is to contribute financially to the poor and successful students, in accordance with the Scholarship and Social Welfare, Public Boarding in Primary and Secondary Schools of the Ministry of National Education Regulations. Public Boarding in Primary and Secondary Schools of the Ministry, putting the Regulation of Scholarship and Social Assistance into practice; due to the Ministry's inscription dated to 17.4.2008 No.3185, in accordance with the article 14th of the Law dated to 17.6.1982 No.2684, was determined by the Council of Ministry in 26.5.2008 (Regulation, 2008/13763). In the subparagraph of the 2nd paragraph of 5<sup>th</sup> article entitled as "Application Terms and Place" of the related regulation, these are the requirements asked to the students applied for the "Free Boarding and Scholarship Examination (d); the net quantity per capita of the sum of the annual incomes, belonging to the previous financial year, of the family, the provision being lack of financial means less than at least three times of Ministry of National Education school board fee situated in the (M) marked schedule of Central Government Budget Law of current financial year, is located (Regulation, 2008/13763).

While preparing the new program, it was benefited from multiple intelligence theory. According to this theory, "people with visual-spatial intelligence, are highly sensitive to the issues such as space, time, colour, line, shape, form and pattern and to the relations among these issues. Therefore, people who have strong visual-spatial intelligence learn the assets best by visualizing the events or the facts, or studying with pictures, lines and colours" (Saban, 2005). When the questions of public boarding and scholarship examination have been analyzed, it is seen that visual themes gained more importance with the renewed primary program. "Visuals in education have taken the functions such as concretization, motivation, repetition, decoration, symbolization, editing, annotation and transformation" (Winn, 1993; Heinch, Molenda ve Russel, 1999; transference: Çam, 2006: 17). Visuals helps students in attracting their attention, motivating them, giving them tips and asking questions, giving feedback to them, reconstructing the information as its source in learning (Akpınar, 1999). Visuals used in the training have different functions. "Visuals utilized in education; are useful tools in attracting students' attention, may help in presenting the subjects that are difficult to do and may concretize the information, emotion, complex and abstract concepts which cannot be told verbally" (Kuru, 2008: 40). The main roles of the visuals in education:

- Providing concretization the words and the thoughts,
- Being the tools attracting the students' attention,
- Being used in simplification of the thoughts difficult to understand,
- Providing one more channel,
- Providing alternatives to words and statements,
- In addition, supporting the oral information (URL-1).

When the literature reviewed, there are very few similar samples of the study. However, at the end of Tabak's (2012) study titled as analyzing the questions containing the visuals in SBS Turkish Test, these recommendations were found. Due to the reflection of visualization on every aspect of daily life and giving place to visuals in SBS as an indication of this reflection, in the 6-8th grade Turkish Teaching Program, the necessity of including those to the visual reading and visual presentation area as a different learning field and the distribution of the questions' supported with visuals being balanced according to the variety and the content was stated. In addition, it should be provided the teachers to



use the image interpretation scale with the visual reading and presentation from in order to follow the students' level and development of visual reading and presentation skills (Kuru, 2008).

### Method

In this study, document analysis method giving information about the facts and event with a qualitative research approach, including the analysis of written materials has been used. Document analysis contains the analysis of written materials including information about the facts and events which was targeted to research (Yıldırım and Simsek, 2008). In relation with the research problem, examining written and visual documents, is very important due to providing a richer and more extensive inference (Akturan, 2008).

### The aim of the study

The purpose of this study is to determine the content of the questions in math test in fifth grade public boarding and scholarship exam by examining those in terms of visibility. In addition, this was needed because of the limited studies' made in this field and shedding light on future studies.

### Data gathering and analysis

In the study which document analysis method one of the qualitative research approaches has been used, firstly question booklets of Public Boarding and Scholarship Examination applied in 2006-2012 composing the research material of the study have been found from the web site belonging to the Ministry of National Education Innovation and Education Technologies General Directorate. The question booklets including the last six years period has been recorded on the computer in portable document format (URL-2). As data, 83 math questions were gathered from these booklets and Miles and Huberman's (1994) interactive model was used in data analysis. Besides this, coding and note taking were applied.

Totally 150 math questions, from the last six years exams which 25 questions was placed each year, were classified as containing and not containing visuals examining one by one. 83 of 150 math questions supported by visuals were determined. According to Punch (2005: 193), "two basic processes that move analysis are coding and note taking". During analysis, the questions supported by visuals were classified by applying coding and note taking in terms of variety and content. The questions supported visually, were classified as shapes, symbols, pictures, graphs and table form in terms of diversity; and geometrical shapes, fractions, math in our life, area and volume measurement, the world of numbers and multiply and divide operations in terms of content. In the following table, basic concepts, classified according to the qualification of the questions, where the content took place in detail according to the teacher's guide book with the decision dated 18.12.2009 No. 297 of the Ministry of National Education the Council of Training and Discipline are involved (URL-3).

Table 1. The basic concepts of contents

Contents	Basic concepts
Geometrical Shapes	Data Editing, Polygons and Finery, Quadrangles, Symmetry and Circles
Fractions	Fractions, Length Measurements
Mathematics in our Life	Operations with Fractions, Rate-Way-Measurement
Area and Volume measurements	The Areas of Geometrical Shapes, Geometric Objects
The World of Numbers	Numbers in Our Lives, Mind Operations and Results Prediction
Multiply and Divide Operations	Multiply and Divide Operations, Mind Operations and Results Prediction



Content analyses is interpretation by bringing together the data similar to each other in a particular framework of contents and themes and understandably streamlining them (Yıldırım and Şimşek, 2005). Coding is the first and fundamental process for the analysis of discovering the contents of data in qualitative resolving (Punch, 2005: 193). In addition, data should be revised many times in a good analysis (Punch, 2005). In content analysis, the studies were carried out according to the following process steps. First of all, significant findings, taken from math tests and numbered beginning from the first, were processed to the table where the findings had been written one by one. Then, data processed to the tables were subjected to content analysis. In the analysis, the coding and decoding were carried out based on respectively the data and the coding. In the final stage of the analysis, the validity and reliability were performed by making inferences, descriptions, comments and discussions from given codes and reached themes . In qualitative researches, it's been applied for a field expert for expertise and consistency analysis with the aim of ensuring the credibility and consistency which is one of the various strategies used to ensure the validity and reliability (Yıldırım and Şimşek, 2008). As a result of the expert's opinion and suggestion, the study has been finalized.

### Findings

The findings gathered from the questions, supported visually in math tests of State Boarding and Scholarship Examination in accordance with rates of each year, variety and the content are shown in the following tables.

Table 2. The rate of the questions presented with visuals according to each year

The Rate of Visual Themed Questions/Years of the Exams	2007	2008	2009	2010	2011	2012
Total Number of Math Questions	25	25	25	25	25	25
Visual Themed Questions	10	17	16	12	14	14
The Percentage of the Visual Themed Questions in Math Test	% 40	% 68	% 64	% 48	% 56	% 56

When examined table 2 including the rate of the questions presented visually each year; 10 in 2007, 17 in 2008, 16 in 2009, 12 in 2010, 14 in 2011, and 14 questions in 2012 consist of visual themes. In the last 6 years, the most visual contented questions were in 2008 with 17 visual themed questions. In 2007, the minimum number of visual themed questions which was 10 were asked.

Table 3. The classification of the questions presented with visuals according to their types

The Types of Visual Themes	2007	2008	2009	2010	2011	2012
Shape	6	10	8	4	7	4
Symbol	1	1	-	1	1	1
Picture	-	2	4	4	5	7
Graph	2	1	1	1	-	-
Table	1	3	3	2	1	2
Total	10	17	16	12	14	14

When the visual themed questions were classified according to their types, the following information was obtained: In 2007, 6 questions consist of shapes, 1 from the table and 2 consist of graph. It is seen that there is no picture contented question. In 2008, 10 questions from shapes, 1 from symbol, 2 from picture, 1 from graph and 3 questions consist of tables. In 2009, while 8 questions from shapes, 4 from pictures, 1 from graph, 3 questions consist of tables, there is no question containing symbol. In 2010, 4 from shapes, 1 from symbol, 4 from pictures, 1 from graph and 2 questions consist of tables. In 2011, while 7 from shapes, 1 from symbol, 5 from pictures, 1 question consists of table, there is no question consisting of graph. In 2012, while 4 from shapes, 1 from symbol, 7 from pictures, 2 questions consist of tables, there is no question consisting of graph.



Table 4. The classification of the questions presented with visuals according to the content

The Content of Visual Themes	2007	2008	2009	2010	2011	2012
Geometrical Shapes	1	5	4	3	4	2
Fractions	2	5	3	3	5	1
Mathematics in our Life	-	2	6	2	2	2
Area and Volume Measurements	4	2	2	2	1	3
The World of Numbers	2	2	1	2	1	3
Multiply and Divide Operations	1	1	-	-	1	3
Total	10	17	16	12	14	14

When the visual themed questions were classified according to the content, the following information was obtained: In 2007, 1 from geometrical shapes, 2 from fractions, 4 from area and volume measurements, 2 from the world of numbers and 1 question consists of multiply and divide operations. In 2008, 5 from geometrical shapes, 5 from fractions, 2 from area and volume, 2 from the world of numbers and 1 question consists of multiply and divide operations. In 2009, 4 from geometrical shapes, 3 from fractions, 6 from the mathematics in our life, 2 from area and volume, and 1 question consists of the world of numbers. In 2010, 3 from geometrical shapes, 3 from fractions, 2 from the mathematics in our life, 2 from area and volume, and 2 questions consist of the world of numbers. In 2011, 4 from geometrical shapes, 5 from fractions, 2 from the mathematics in our life, 1 from area and volume, 1 from the world of numbers, and 1 question consists of multiply and divide operations. In 2012, 2 from geometrical shapes, 1 from fraction, 2 from the mathematics in our life, 3 from area and volume, 3 from the world of numbers, and 3 questions consist of multiply and divide operations.

### Discussion and Implications

The reflections of visual themed expressions in education are different. "The teachers' thinking that visuals help the students in expressing their knowledge, emotion and opinions easier may cause them to prefer the visuals often in fill in the blanks questions. The reasons why the teachers often use these questions in true-false and short answer types of questions maybe not taking too much time to prepare those questions and its facilitating assessment compared with the process and product assessment" (Kuru, 2008). In measurement and evaluation process, visual themes have gained more importance in recent years. This forces the students to spend more effort in understanding the questions containing visuals. In fact, Considine (1994) has stated that our children need to learn how to analyze and interpret the visuals they encounter. Visual contented questions are not often used by the teachers due to their taking too much time to prepare and evaluate. Güneş also (2007) determined that classroom teachers' usage rate of alternative assessment tools is in the middle level but not high level in comparison with traditional assessment tools. In addition, Tabak (2007) determined in his study that teachers cannot make an efficient and effective assessment because the measurement and evaluation process takes too much time. However, with the revised curriculum, as well as in the course books visual themes are used frequently in the exams. Because visual contented questions take place in the exams made by the Ministry of National Education, the teachers' using visual themes will be beneficial especially in assessment process. Giving descriptive information about the issue of assessment and evaluation studies related to visual reading and presentation skills will facilitate the teachers' studies on evaluating these skills (Kuru, 2008).

Teachers' using visual themes also in teaching process will facilitate the learning. The students' gaining their knowledge and thought presentation skills with graphs and tables, are quite important in development in visual presentation skills and reading correctly the graphs and tables that they encounter in daily life. For this reason, the teachers should be encouraged to apply more often graph and table creating activity in teacher's guide book in accordance with the text and the theme in each text-handling process with the aim of improving the students' visual presentation skills (Kuru, 2008). According to the research results, the following recommendations are made:



- It is seen that the number of visual themed questions differentiate according to the exam analyzed. Instead of this, the number of questions must be within a certain criteria.
- The number of visual themed questions should be increased and should be distributed in a balanced way depending on the type and content.
- By giving more importance to visual themes in revised curriculum, they should be frequently used in the unit assessment process.
- It is seen that visual themed questions including the whole content has not been asked in some years. Eliminating this situation, equal distribution of the presented questions with visuals should be made according to their contents.

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