Examining The Problem Types In Middle School Mathematics Textbooks In The Context Of Presentation, Content And Solution

Cemalettin YILDIZ
Giresun University, Turkey
cemalyildiz61@gmail.com

Mihriban HACISALİHOĞLU KARADENİZ
Giresun University, Turkey
mihrideniz61@gmail.com

ABSTRACT
Considering the update of curricula and the importance of problem solving skills in mathematics education; the need for examining the problems in mathematics textbooks in the context of presentation, content, and solution becomes a current issue. In this study, it was aimed to designate the problem types used in middle school mathematics textbooks and to determine whether the problem types used are dependent on class levels or not. The study was conducted by using the document analysis method. Data were analyzed by using content analysis method. In terms of presentation, it was observed that textbooks involved the problems rather verbal, not including quantitative data, and short. When contents of the problems were considered, it was observed that the use of the problems routine, not involving missing and irrelevant data, being curriculum dependent, and not being far from daily life is quite high. On the other hand, in terms of solution, it was observed that textbooks included the problem types which are easy, not requiring much calculation, and not involving different strategies more. Types of problems used in the textbooks can be enriched in the context of presentation, content, and solution to improve achievements and problem solving skills of students in mathematics classrooms.
Keywords: Mathematics education, problem types, problem solving, mathematics textbooks.

INTRODUCTION

Problems are obstacles that we face in daily life and situations that we have difficulty dealing with (Huilt, 1992; Kneeland, 2001). In other words, a problem is a conflict situation in which individuals encounter obstacles when trying to achieve a goal (Morgan, 1999). For a mathematics teacher, a problem means an unconventional question for which the steps and paths that will take the student to a solution are not known (Schoenfeld, 1989). Problem solving in mathematics is defined as the process of solving non-routine problems, applying mathematics to real situations, suggesting and testing interpretations that may lead to creation of new fields (Charles, 1985). All experiences gained by the individual from childhood form the basis of the problem solving process (Kennedy, 1980). In this sense, problem solving can be seen as a process that may eliminate many obstacles to development of the individual.

National Council of Teachers of Mathematics (NCTM) published a document titled Curriculum and Evaluation Standards for School Mathematics in 1989 (NCTM, 1989). The document notes that the use of problem solving skills by students will only be possible by turning problems into mathematical equations, utilizing different strategies when solving problems, checking the accuracy of, and generalizing results (NCTM, 1989: p.209). This statement highlights how important problem solving is for mathematics teaching. For this reason, it can be said that problem solving is of vital importance (Yıldız, 2016). The importance of improving problem solving skills is emphasized in renewed and updated mathematics curricula in Turkey as well (Ministry of National Education [MoNE], 2009, 2013).

Middle school mathematics curriculum aims to provide students with basic concepts and skills, help them understand problem solving strategies, and allow them to see that mathematics can be applied to problems of daily life (MoNE, 2013). Students will learn to value mathematics by finding different ways to solution in the problem solving process, which will allow them to be successful, and successful students will develop positive attitudes toward mathematics (MoNE, 2009). Also, the use of different methods or strategies by teachers will motivate students and encourage them to become active in in-class applications (Silver, Ghousseini, Gosen, Charalambous, & Font Strawhun, 2005). In order to keep students active during the class, teachers may use

different problem types in their lectures. The use of different problem types during in-class applications is of great importance for the development of students' problem solving skills (Özmen, Taşkın, & Güven, 2012).

It is obvious that curricula and in-class applications of teachers alone will not be enough to help students reach the desired level in terms of problem solving skills. The importance of problem types used in mathematics textbooks cannot be denied, since "we cannot expect students to improve when they face with the same problem type all the time (Özmen et al., 2012)". For this reason, textbook authors need to "be careful when choosing problem types which teachers use in their in-class applications as well (Hembree, 1992)". Also, in order to attain goals of middle school mathematics curriculum specified above, it is necessary to introduce teachers to textbooks prepared with different problem types. Because teachers firstly refer to textbooks when making a decision on how to teach subjects and how to make use of the curriculum (Beaton, Mullis, Martin, Gonzalez, Kelly, & Smith, 1996). Moreover, as well as guiding teachers in facilitating the learning process, textbooks are the most important sources for students to study at home, develop projects or do homework (Duman, Karakaya, Çakmak, Eray, & Özkan, 2001). The use of different problem types in mathematics textbooks will allow for raising individuals who are able to understand and deal with problems and develop appropriate strategies to solve them. Since problem types play a significant role in improvement of problem solving skills of students and textbooks are of vital importance for both teachers and students, it is necessary to investigate whether mathematics textbooks are prepared in a way that they contain different problem types and whether problem types are selected based on students' level.

Studies in the literature seem to classify problem types used in in-class applications in terms of presentation, content or solution and address one or several of these classifications (Özmen et al., 2012). Although there are numerous studies in the literature reviewing mathematics textbooks for different purposes (Altun, Arslan, & Yazgan, 2004; Arslan & Özpınar, 2009; Demir, Maskan, Çevik, & Baran, 2009; Erbaş, Alacacı, & Bulut, 2012; Gökçek & Hacısalihoğlu Karadeniz, 2013; Işık, 2008; Şahin & Turanlı, 2005; Ünsal & Güneş, 2004; Yan & Lianghuo, 2002; Yıldız, Hacısalihoğlu Karadeniz, & Göl, 2015), the lack of a study examining problem types in middle school mathematics textbooks in terms of presentation, content, and solution created a need for the present study. From this point, how problem types are handled in middle school mathematics textbooks published by MoNE in terms of presentation, content, and solution and whether problem types used are dependent on levels of students at different grades emerged as an important subject of research. Therefore, this study aims to determine the current situation of problem types in middle school mathematics textbooks in terms of presentation, content, and solution and whether problem types used are dependent on levels of students at different grades.

METHOD

The study utilizes the document analysis method. The document analysis method involves the analysis of written or visual materials containing information (books, journals, newspapers, letters, diaries, films, videos, etc.) (Cansız Aktaş, 2014). Considering the purpose of the research, the document analysis method was used in this study with the idea that it would allow for examining middle school mathematics textbooks.

Data Sources and Data Collection

Data sources of the research were randomly selected from middle school mathematics textbooks which were announced by MoNE on its official website to be used in 2015-2016 school year. The list of middle school mathematics textbooks used in the study is as follows:

Committee. (2015). *Middle school mathematics 5th grade 1st book* (3rd Edition). Ankara: MoNE Publishing.
Committee. (2015). *Middle school mathematics 5th grade 2nd book* (3rd Edition). Ankara: MoNE Publishing.
Bağcı, O. (2015). *Middle school mathematics 6th grade textbook.* Ankara: Dikey Publishing.
Bağcı, O. (2015). *Middle school mathematics 7th grade textbook.* Ankara: Tutku Publishing.
Baykal Yelli, B., & Kişi, E. (2015). *Primary education mathematics 8th grade textbook* (2nd Edition). Ankara: MoNE Publishing.

"Problem Types Data Collection Form" was developed by the researchers in order to examine middle school mathematics textbooks. When developing the data collection form, firstly the relevant literature was reviewed and it was checked whether there was a collection tool available to examine middle school mathematics textbooks in terms of presentation, content, and solution. Then, the researchers discussed what criteria could be used to examine mathematics textbooks in accordance with the purpose and the scope of the study and opinions of one Turkish language and three mathematics experts were taken. In this context, we decided to examine problems with solutions found in the textbooks under the titles of grade, unit, subject, and problem types. The grade title in the data collection form indicates the 5th, 6th, 7th, and 8th grades, the unit title and the subject title

indicate what units and subjects are addressed in the textbook, and the problem types title indicate categories and sub-categories in Table 1. Categories, sub-categories, and definitions related to sub-categories adapted from the study of Özmen et al. (2012) for problem types are shown in Table 1:

Table 1: Categories, sub-categories and definitions used for problem types

PRESENTATION	Verbal	Problems presented with written statements or figures.
	Visual	Problems presented with visual aids such as figures, tables or graphics.
	Including quantitative data	Problems presented with five or more quantitative data.
	Not including quantitative data	Problems presented with four or fewer quantitative data.
	Long	Problems presented using a large number of words or sentences (at least five sentences).
	Short	Short problems presented using a small number of words or sentences (four and fewer sentences).
CONTENT	Routine	Problems including concretized versions of events encountered by students in real life.
	Non-routine	Problems encouraging the use of flexible methods, in other words; the problems that require not using routine solutions to reach the answer.
	Involving irrelevant data	Problems including data that is not needed for the problem situation and solution.
	Not involving irrelevant data	Problems including all necessary information to find a solution and not involving irrelevant data.
	Far from daily life	Problems with content which students cannot associate with daily life and make adaptations.
	Not far from daily life	Problems with content which students can associate with daily life and make adaptations.
	Involving missing data	Problems for which some of the necessary information is not given.
	Not involving missing data	Problems for which all of the necessary information is given.
	Curriculum dependent	Problems containing attainments of the relevant grade.
	Curriculum independent	Problems containing attainments of the relevant grade and also addressing to different grades or levels.
SOLUTION	Requiring much calculation	Problems which take time to solve and require a lot of operations to solve.
	Not requiring much calculation	Problems with short solutions which require fewer operations to solve.
	Involving different strategies	Problems which can be solved with different solutions other than the linear solution (such as drawing a diagram, intelligent guessing and testing, organizing the data, working backwards strategies, etc.)
	Not involving different strategies	Problems which can only be solved using the linear solution (problems can be solved by direct calculation or construction equation).
	Difficult	Problems which cannot be solved by all students and can discriminate between students at different levels.
	Easy	Problems which can easily be solved by all students and have similar structures.

Data Analysis

The content analysis method was used for data analysis. The content analysis method was preferred for the study for reasons such as "it allows for associating properties of written sources with messages produced and it offers the opportunity to analyze informing techniques (Arıkan, 2004)". The data were tabulated under the titles of grade, unit, subject, and problem types after the content analysis. The types of problems in the textbooks were determined through a consensus between both researchers. In matters on which the researchers could not come to an agreement, opinions of two mathematics teaching experts were taken and the problem types were finalized in accordance with expert opinions. Problems with solutions were classified after being assessed under multiple categories. Also, the chi-square independence test was used in order to determine whether problem types used in the textbooks were independent from grades of students in terms of presentation, content, and solution. Since the number of frequencies smaller than five was more than 20% of the entire data, some arrangements were made to be able to perform the chi-square independence test. In this context, problems including quantitative data under the presentation category were combined with the problems under the long sub-category. Similarly, problems involving missing-irrelevant data under the content category were combined with curriculum independent and

non-routine problems. Lastly, all problem types were brought together and the chi-square independence test was used again in order to determine whether problem types were independent from grade.

FINDINGS

It was found that 5th, 6th, 7th, and 8th grade mathematics textbooks contained 133, 69, 50, and 49 problems with solutions respectively. Information related to which units and subjects contained these problems and the number of problems is summarized below:

In the 5th grade mathematics textbook, a total of 22 subjects under 5 units contained problems with solutions. In the "Natural Numbers and Operations (39)" unit, the following subjects contained problems with solutions: '*Patterns (3)', 'Operations with Natural Numbers (16)', 'Operations with Parenthesis (1)', 'Mental Operations (1)', 'Problems (8)', and 'Measuring Time (10)'*. In the "Data Processing (7)" unit, the following subjects contained problems with solutions: '*Creating a Research Question and Data Collection (4)', 'Data Organization and Interpretation (2)', and 'Tree Diagram (1)'*. In the "Geometry (1)" unit, only the *'States of Points According to Each Other (1)'* subject contained problems with solutions. In the "Fractions, Decimal Notation, and Percentage (34)" unit, the following subjects contained problems with solutions: '*Introduction to Fractions with Whole Numbers (3)', 'Equivalent Fractions (2)', 'Calculating The Desired Fraction of Quantities (3)', 'Addition and Subtraction with Fractions (11)', 'Decimal Notation (1)', 'Addition and Subtraction with Decimals (4)', and 'Percentages (10)'*. In the "Geometry and Measurement (52)" unit, the following subjects contained problems with solutions: '*Measuring Length (13)', 'Length of Circumference (15)', 'Angles in Triangles and Quadrilaterals (6)', 'Measuring Area (15)', and 'Geometric Solids (3)'*.

In the 6th grade mathematics textbook, a total of 21 subjects under 5 units contained problems with solutions. In the "Natural Number (10)" unit, the following subjects contained problems with solutions: *'Operations with Natural Numbers (2)', 'Solving Problems with Natural Numbers (4)', 'Prime Numbers (2)', 'Adjacent, Complementary, Supplementary, and Alternate Angles (2)'*. In the "Fractions (26)" unit, the following subjects contained problems with solutions: '*Addition and Subtraction with Fractions (7)', 'Multiplication and Division with Fractions (7)', 'Solving Problems with Fractions (4)', 'Multiplication and Division with Decimal Fractions (1)', 'Estimating Results of Operations with Decimal Fractions (2)'*, and *'Solving Problems with Decimal Fractions (3)'*. In the "Geometry (11)" unit, only the *'Data Analysis (11)'* subject contained problems with solutions. In the "Whole Numbers (5)" unit, the following subjects contained problems with solutions: '*Whole Numbers (1)', 'Addition and Subtraction with Whole Numbers (4)'*. In the "Circumference, Area, and Volume (17)" unit, the following subjects contained problems with solutions: '*Area of Parallelogram (2)', 'Area of Triangle (1)', 'Area Measurement Units (3)', ''Solving Problems Related to Volume (2)'*. '*Volume Measurement Unites (2),* and *'Fluid Measurement Unites (2)'*.

In the 7th grade mathematics textbook, a total of 10 subjects under 5 units contained problems with solutions. In the "Operations with Whole Numbers and Rational Numbers (9)" unit, the following subjects contained problems with solutions: '*Problems Requiring Operations with Whole Numbers (5)'* and *'Multi-staged Operations and Problems with Rational Numbers (4)'*. In the "Equations (5)" unit, the following subjects contained problems with solutions: *'Protecting the Equality in Equations (4)'* and *'Coordinate System (1)'*. In the "Ratio-Proportion and Percentages (26)" unit, the following subjects contained problems with solutions: *'Quantities in Ratio (5)', 'Inverse Proportion (11)',* and *'Percentages (10)'*. In the "Lines, Circles, and Data Processing (3)" unit, the following subjects contained problems with solutions: *'Circle Graph (1)'* and *'Lines and Angles (2)'*. In the "Polygons and Rotation Geometry (7)" unit, only the *'Area of Rhombus and Trapezoid (7)'* subject contained problems with solutions.

In the 8th grade mathematics textbook, a total of 12 subjects under 6 units contained problems with solutions. In the "From Geometry to Probability (12)" unit, the following subjects contained problems with solutions: *'Exponential Numbers (2)',* and *'Probability and Combination (10)'*. In the "The World of Numbers (9)" unit, the following subjects contained problems with solutions: *'Real Numbers (5)',* and *'Identities, Factorizing, and Rational Expressions (4)'*. In the "The World of Triangles (7)" unit, the following subjects contained problems with solutions: *'Edges and Angles in Triangles (1)',* and *'Identity and Similarity in Triangles and Trigonometric Ratios (6)'*. In the "A Journey in Mathematics (6)" unit, the following subjects contained problems with solutions: *'Slope, Equation Systems, and Graphs (4)',* and *'Different Representation of Data and Statistics (2)'*. In the "Introduction to Geometric Solids (9)" unit, the following subjects contained problems with solutions: *'Prisms and Pyramids (3)', 'Cone and Sphere (3),* and *'Intersections of Geometric Solids (3)'*. In the "Volume of Geometric Solids and Illustrations (6)" unit, only the *'Volume Relations (6)'* subject contained problems with solutions.

Findings Related to Distribution of Problems with Solutions In Terms of Presentation

Problems with solutions found in the middle school mathematics textbooks were examined in terms of presentation and the number of problems under each sub-category was tabulated as follows according to grade:

Table 2: Distribution of problems with solutions in terms of presentation

Grades	Unit Names	Verbal	Visual	Including Quantitative Data	Not Including Quantitative Data	Long	Short
5th Grade	Natural Numbers and Operations	36	3	2	37	9	30
	Data Processing	5	2	3	4	1	6
	Geometry	0	1	1	0	0	1
	Fractions, Decimal Notation, and Percentage	31	3	0	34	0	34
	Geometry and Measurement	18	34	5	47	3	49
6th Grade	Natural Numbers	10	0	3	7	4	6
	Fractions	25	1	2	24	5	21
	Data, Tables, and Graphics	10	1	8	3	4	7
	Whole Numbers	5	0	1	4	2	3
	Circumference, Area, and Volume	15	2	2	15	5	12
7th Grade	Operations with Whole Numbers and Rational Numbers	2	7	1	8	1	8
	Equations	1	4	1	4	1	4
	Ratio-Proportion and Percentages	18	8	0	26	1	25
	Lines, Circles, and Data Processing	1	2	0	3	0	3
	Polygons and Rotation Geometry	4	3	2	5	0	7
8th Grade	From Geometry to Probability	12	0	1	11	4	8
	The World of Numbers	8	1	0	9	3	6
	The World of Triangles	2	5	1	6	5	2
	A Journey in Mathematics	4	2	3	3	6	0
	Introduction to Geometric Solids	2	7	1	8	5	4
	Volume of Geometric Solids and Illustrations	2	4	2	4	5	1
Total		211	90	39	262	64	237

The table shows that the middle school mathematics textbooks mostly use verbal and short problems which do not include quantitative data. The result of the analysis performed in order to determine whether the presentation structure of problems were independent of grade was found to be χ^2(sd=12, n=903)=90.836 and p=0,000<0.05. It is understood that there is a significant relationship between the presentation structure of problems used in the textbooks and grade.

Findings Related to Distribution of Problems with Solutions In Terms of Content

Problems with solutions found in the middle school mathematics textbooks were examined in terms of content and the number of problems under each sub-category was tabulated as follows according to grade:

Table 3: Distribution of problems with solutions in terms of content

Grades	Unit Names	Routine	Non-routine	Involving Irrelevant Data	Not Involving Irrelevant Data	Far from Daily Life	Not far from Daily Life	Involving Missing Data	Not Involving Missing Data	Curriculum Dependent	Curriculum Independent
5th Grade	Natural Numbers and Operations	34	5	0	39	1	38	0	39	39	0
	Data Processing	7	0	0	7	0	7	0	7	7	0
	Geometry	1	0	0	1	0	1	0	1	1	0
	Fractions, Decimal Notation, and Percentage	34	0	0	34	0	34	0	34	34	0
	Geometry and Measurement	42	10	0	52	18	34	0	52	52	0
6th Grade	Natural Numbers	10	0	0	10	3	7	0	10	10	0
	Fractions	25	1	2	24	1	25	0	26	26	0
	Data, Tables, and Graphics	11	0	0	11	5	6	0	11	11	0
	Whole Numbers	5	0	0	5	0	5	0	5	5	0
	Circumference, Area, and Volume	17	0	0	17	5	12	0	17	17	0
7th Grade	Operations with Whole Numbers and Rational Numbers	9	0	0	9	0	9	0	9	0	9
	Equations	5	0	0	5	1	4	0	5	5	0
	Ratio-Proportion and Percentages	26	0	0	26	0	26	0	26	26	0
	Lines, Circles, and Data Processing	3	0	0	3	0	3	0	3	3	0
	Polygons and Rotation Geometry	7	0	0	7	2	5	0	7	7	0
8th Grade	From Geometry to Probability	12	0	1	11	0	12	0	12	12	0
	The World of Numbers	9	0	0	9	3	6	0	9	9	0
	The World of Triangles	7	0	0	7	0	7	0	7	7	0
	A Journey in Mathematics	6	0	0	6	0	6	0	6	6	0
	Introduction to Geometric Solids	8	1	0	9	1	8	0	9	9	0
	Volume of Geometric Solids and Illustrations	5	1	0	6	1	5	0	6	6	0
Total		283	18	3	298	41	260	0	301	292	9

The table shows that the middle school mathematics textbooks mostly use routine, curriculum dependent problems which are not far from daily life and do not involve missing and irrelevant data. The result of the analysis performed in order to determine whether the content structure of problems were independent of grade was found to be χ^2(sd=21, n=1505)=23.666 and p=0.310>0.05. It is understood that there is an insignificant relationship between the content structure of problems used in the textbooks and grade.

Findings Related to Distribution of Problems with Solutions In Terms of Solution

Problems with solutions found in the middle school mathematics textbooks were examined in terms of solution and the number of problems under each sub-category was tabulated as follows according to grade:

Table 4: Distribution of problems with solutions in terms of solution

Grades	Unit Names	Much Requiring Calculation	Not Much Requiring Calculation	Different Involving Strategies	Involving Not Different Strategies	Difficult	Easy
5th Grade	Natural Numbers and Operations	12	27	1	38	2	37
	Data Processing	5	2	2	5	0	7
	Geometry	0	1	0	1	0	1
	Fractions, Decimal Notation, and Percentage	6	28	2	32	3	31
	Geometry and Measurement	19	33	14	38	13	39
6th Grade	Natural Numbers	4	6	4	6	4	6
	Fractions	5	21	6	20	1	25
	Data, Tables, and Graphics	6	5	0	11	2	9
	Whole Numbers	0	5	0	5	0	5
	Circumference, Area, and Volume	8	9	0	17	1	16
7th Grade	Operations with Whole Numbers and Rational Numbers	0	9	0	9	1	8
	Equations	4	1	5	0	5	0
	Ratio-Proportion and Percentages	6	20	8	18	6	20
	Lines, Circles, and Data Processing	0	3	0	3	0	3
	Polygons and Rotation Geometry	0	7	0	7	0	7
8th Grade	From Geometry to Probability	8	4	3	9	4	8
	The World of Numbers	2	7	1	8	2	7
	The World of Triangles	3	4	1	6	2	5
	A Journey in Mathematics	4	2	2	4	1	5
	Introduction to Geometric Solids	2	7	0	9	2	7
	Volume of Geometric Solids and Illustrations	3	3	0	6	1	5
Total		97	204	49	252	50	251

The table shows that the middle school mathematics textbooks mostly use easy problems which do not require much calculation and different strategies. The result of the analysis performed in order to determine whether solution of problems were independent of grade was found to be χ^2(sd=15, n=903)=17.577 and p=0.286>0.05. It is understood that there is an insignificant relationship between the solution structure of problems used in the textbooks and grade. The result of the analysis performed in order to determine whether the problems types used in textbooks were independent of grade was found to be χ^2(sd=54, n=3311)=132.079 and p=0,000<0.05. It is understood that there is a significant relationship between the problem types used in the textbooks and grade.

DISCUSSION and CONCLUSION

The following results were found as a result of the discussion made based on findings of the study, which was conducted in order to investigate whether mathematics textbooks are prepared in a way that they contain different problem types and whether problem types are selected based on students' level:

It was determined that there was a significant relationship between the presentation structure of problems used in the textbooks and grade. Also, it was found that the middle school mathematics textbooks mostly used verbal and short problems which do not include quantitative data. This result may be related to the fact that the nature of units and subjects in the textbooks are more appropriate for verbal problems. However, considering that visually presented problems increase student success (Hembree, 1992), we believe that adding visual problems to textbooks will be useful. This may allow students to improve their problem solving skills. In addition, it seems that short problems which do not include quantitative data are preferred frequently. The authors may have preferred to use short problems which do not include quantitative data in textbooks with the idea that long problems which include quantitative data may be too difficult for and misunderstood by students. However, short problems which include quantitative data may be added to textbooks in order to allow students to improve their problem solving skills.

When problem types in textbooks were examined in terms of content, it was found that routine, curriculum dependent problems which are not far from daily life, and do not involve missing and irrelevant data were

preferred more frequently. Also, problems involving missing data were not seen in any of the textbooks. It was found that authors used routine problems more frequently compared to non-routine problems. The reason behind authors' reluctance to use non-standard problems may be the curriculum dependent and exam-centric nature of the Turkish educational system or that they do not possess the necessary experience and knowledge to prepare different types of problems. Considering that non-routine problems will have positive effects on students' learning of problem solving strategies (Dönmez, 2002) and development of different strategies (Follmer, 2000), we believe that non-routine question should be added to textbooks as well.

When problem types in textbooks were examined in terms of solution, it was observed easy problems which do not require much calculation and different strategies were preferred more frequently. It is noted in the literature (Özmen et al., 2012) that mathematics teachers use very easy problems which do not require much calculation in their lectures. It seems that authors prefer problem types which will allow students to solve a high number of problems and practice. We believe that the exam-centric educational system in Turkey is effective in this case. Considering that it is necessary to provide students with different solutions for a problem in order to motivate them and increase their participation to class (Silver et al., 2005), we recommend that problems with different difficulty levels which require using different strategies are added to textbooks.

In summary, it is understood that there is a significant relationship between the problem types used in the textbooks and grade. Also, it seems that authors of textbooks prefer to use verbal, short, routine, easy, curriculum dependent problems which are no far from daily life and do not include quantitative data, do not require much calculation and strategies, do not involve missing and irrelevant data. In order to visualize problems for students and allow them to gain more concrete experiences, we recommend that visual and long problems which include quantitative data are added to textbooks in terms of presentation. We also recommend that non-routine, curriculum independent problems which are far from daily life and involve missing and irrelevant data are added to textbooks in order to increase mathematical thinking skills of students and allow them to develop different solutions for problems which they encounter. In order to ensure students become good problem solvers in future and allow them to develop different strategies, we believe that difficult problems which require much calculation and different strategies should be added to textbooks. Thus, teachers who use textbooks containing different problem types will raise students who can think mathematically, have improved reasoning ability and high associating ability. Lastly, we recommend that future researchers examine problems without solutions in middle school mathematics textbooks in terms of presentation and content and conduct similar studies for problems with and without solutions in high school mathematics textbooks.

REFERENCES

Altun, M., Arslan, Ç., & Yazgan, Y. (2004). Lise matematik ders kitaplarının kullanım şekli ve sıklığı üzerine bir çalışma. *Uludağ Üniversitesi Eğitim Fakültesi Dergisi, XVII*(2), 131- 147.

Arıkan, R. (2004). *Araştırma teknikleri ve rapor hazırlama*. Ankara: Asil Yayın Dağıtım.

Arslan, S., & Özpınar, İ. (2009). Evaluation of 6th grade mathematics textbooks along with the teacher opinions. *Dicle University Journal of Ziya Gökalp Faculty of Education, 12,* 97-113.

Beaton, A. E., Mullis, I. V. S., Martin, M. O., Gonzalez, E. J., Kelly, D. L., & Smith, T. A. (1996). *Mathematics achievement in the middle school years: IEA's third international mathematics and science study.* Chestnut Hill, MA, USA: TIMSS International Study Center.

Cansız Aktaş, M. (2014). Nitel veri toplama araçları. In M. Metin (Ed.), *Kuramdan uygulamaya eğitimde bilimsel araştırma yöntemleri* (ss. 337-371). Ankara: Pegem Akademi Yayıncılık.

Charles, R. T. (1985). The role of problem solving. *Arithmetic Teacher, 32,* 48-50.

Demir, C., Maskan, A., Çevik, Ş., & Baran, M. (2009). The investigation of the secondary school 9th class physics textbook by the evaluative criteria. *Dicle University Journal of Ziya Gökalp Faculty of Education, 13,* 125-140.

Duman, T., Karakaya, N., Çakmak, M., Eray, M., & Özkan, M. (2001). *Konu alanı ders kitabı incelemesi.* (Editör: Küçükahmet, L.). Ankara: Nobel Yayın Dağıtım.

Dönmez, N. (2002). *The level of problem solving strategies at the second and third grades students.* Unpublished Master's Thesis, Uludağ University, Social Sciences Institue, Bursa.

Erbaş, A. K., Alacacı, C., & Bulut, M. (2012). A comparison of mathematics textbooks from Turkey, Singapore, and the United States of America. *Educational Sciences: Theory & Practice, 12*(3), 2311-2330.

Follmer, R. (2000). *Reading, mathematics and problem solving: The effects of direct instruction in the development of fourth grade students' strategic reading and problem solving approaches to text based, nonroutine mathematics problems.* Unpublished Doctoral Thesis, University of Widener, Chester PA.

Gökçek, T., & Hacısalihoğlu Karadeniz, M. (2013). Reasons for choosing alternative sources instead of textbook at secondary education. *Turkish Journal of Computer and Mathematics Education, 4*(1), 20-31.

Hembree, R. (1992). Experiments and relational studies in problem solving: A meta-analysis. *Journal for Research in Mathematics Education, 23*(3), 242-274.
Huilt, W. G. (1992). Problem solving and decision making: Consideration of individual differences using the myers-briggs type indicator. *Journal of Psychological Type, 24,* 33-44.
Işık, C. (2008). The factors affecting the use of mathematics textbook of mathematics teachers at primary education (grades 6-8) and their expectations. *Kastamonu Education Journal, 16*(1), 163-176.
Kennedy, L. M. V. (1980). *Educational psychology: In theory and practice.* New York: Random House.
Kneeland, S. (2001). *Problem çözme* (Çev. N. Kalaycı). Ankara: Gazi Kitabevi.
Ministry of National Education [MoNE]. (2009). *Primary schools mathematics curriculum (6, 7, and 8th grades).* Ankara: MoNE Board of Education.
Ministry of National Education [MoNE]. (2013). *Middle school mathematics curriculum (5, 6, 7, and 8th grades).* Ankara: MoNE Board of Education.
Morgan, C. T. (1999). *Psikolojiye giriş* (Çev. Hüsnü Arıcı ve ark.). Ankara: Meteksan Yayınları.
National Council of Teachers of Mathematics [NCTM]. (1989). *Curriculum and evaluation standards for school mathematics.* Reston, Va: NCTM.
Özmen, Z. M., Taşkın, D., & Güven, B. (2012). Determining the types of problems used by 7th grade math teachers. *Education and Science, 37*(165), 246-261.
Schoenfeld, A. H. (1989). Explorations of students' mathematical beliefs and behavior. *Journal for Research in Mathematics Education, 20*(4), 338-355.
Silver, E. A., Ghousseini, H., Gosen, D., Charalambous, C. Y., & Font Strawhun, B. T. (2005). Moving from rhetoric to praxis: Issues faced by teachers in having students consider multiple solutions for problems in the mathematics classroom. *Mathematical Behavior, 24*(3-4), 287-301.
Şahin, S., & Turanlı, N. (2005). The evaluation of mathematics textbooks used for first year high school students. *Gazi University Journal of Gazi Educational Faculty, 25*(2), 327-341.
Ünsal, Y., & Güneş, B. (2004). Bir kitap inceleme çalışması örneği olarak MEB lise 1. sınıf fizik ders kitabının eleştirel olarak incelenmesi. *Türk Eğitim Bilimleri Dergisi, 2*(3), 305-321.
Yan, Z., & Lianghuo, F. (2002). Textbook use by Singaporean mathematics teachers at lower secondary school level. *Mathematics Education for a Knowledge-Based Era, 2,* 38-47.
Yıldız, C. (2016, May). *Investigation of mathematics teachers' views about improving problem solving skills*. International Conference on Education in Mathematics, Science, & Technology (ICEMST-2016), Ersan Resort & Spa, Muğla.
Yıldız, C., Hacısalihoğlu Karadeniz, M., & Göl, R. (2015). Contemporary approaches in education. Norley, K., Icbay, M. A., & Arslan, H. (Eds). *The usage of the biographies of mathematicians in elementary and secondary mathematics textbooks* (pp.193-207), Frankfurt am Main: PL Academic Research.