IJETSAR (International Journal of Education Technology and Scientific Researches) (ISSN: 2587-0238)

Cilt / Vol: 4 Sayı / Issue: 10 Yıl / Year: 2019

Article Type: Research

ANALYSIS OF PRIMARY SCHOOL TEACHERS' METAPHORICAL PERCEPTIONS OF MATH TEXTBOOKS[1]

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Received: 25.08.2019 Accepted: 15.12.2019

ABSTRACT

In the process of education, different tools are used to reach the educational objectives. These tools provide students' interest and participation in the course, while providing different learning experiences that contribute to the realization of permanent learning. One of the materials commonly used in educational activities is textbooks. Textbooks are the most widely used materials for teachers and students as primary sources. In this context, the purpose of this research is to reveal primary school teachers' perceptions about the concept of math textbooks by means of metaphors. The working group of this research, executed with phenomenology method, consists of 120 primary school teachers working at the public schools of İscehisar in 2015-2016 school year. Research data was collected by completing the following form: "Math textbooks is like …… Because ……." According to research evidences, primary school teachers produced 90 metaphors and these metaphors were grouped under 9 categories. Stated metaphors were grouped under these 9 categories; complex-incomprehensive, deficient-insufficient, failure to meet expectations, valuable-rich, enjoyable-delighting, important-necessary, boring-monotonous, tiring-challenging, guide-directive. The most frequently repeated metaphors revealed by primary school teachers were arranged as; labyrinth, puzzle, hollow box, empty set, chaos, key, soup, life, story, nightmare, winless bird, deadwood, toy block, ladder, ocean, game, salad, creeper, loaded truck. In consequence of the research, it has been determined that 68.33% of primary school teachers had negative perceptions and 31.67% of them had positive perceptions related to math textbooks. According to this result, the majority of primary school teachers find the expressions in math textbooks complex, boring and tiring. It was also stated that there are not enough examples, activities and problems in the textbooks. Nevertheless, some teachers stated that math textbooks, which are the main source of information in conducting the lessons systematically, are important guiding materials.

Keywords: Primary school teacher, math textbooks, metaphor, perception.

[1] A part of this study was presented as an oral presentation at the '16th International Primary Teacher Education Symposium' between 8-11 May 2017.

INTRODUCTION

Various materials are used to enable the students to participate actively in the courses while the education activities are carried out. These materials can be listed as various documents, technological devices and programs, experimental tools and equipment, various games, geometric materials, mathematical tools and equipment which contribute to the meaningful learning of the students. In addition, taking advantage of different sources in the process of gaining knowledge raises students' interests in the course and increases students' curiosity about the course. One of the materials used to accomplish these goals is textbooks. Although the variety of materials used in technological developments has increased, textbooks are still one of the most commonly used materials in educational activities (Bulut, 2013; Seven, 2001). Textbooks are also valuable in terms of being a tool through which information can be directly accessed and followed up with the teacher and student front. Textbooks are materials designed to be prepared on the basis of the curriculum and to enable the students to learn on their own, in which the information about the subjects of the course is transferred in a sequential and accurate manner (Duman, Karakaya, Çakmak, Eray and Özkan 2001). The textbooks serve as an important bridge between the curriculum and educational activities in terms of being the material in which the abstract expressions of the curriculums are presented as concrete (Demirel and Kıroğlu, 2006; Kılıç and Seven, 2006; Haggarty and Pepin, 2002; Tünde and Gabriella, 2011).

Textbooks, which have changed according to updated programs despite the diversity of course materials with developing technology, have an important place for teachers and students. Today, textbooks are still the first resource that students apply for in order to do homework and teachers in order to prepare for teaching (Kajander and Lovric, 2009). For this reason, textbooks should be able to show the characteristics of facilitating learning and meeting the needs of the students rather than being an encyclopedia full of information (Duman et al., 2001; Tay, 2005). Textbooks, which have instructive features, should provide guidance to teachers while providing convenience to students and provide a framework for what, how and when to teach (Apple, 1992). On the other hand, the student should be able to repeat what the teacher tells at any time, anywhere and at any pace (Duman et al., 2001). As a matter of fact, Halis (2002) stated that an effective textbook should provide opportunities for the student to learn on his/her own. In addition, textbooks should be able to help individuals acquire the culture and universal values of the society in which they live, and unite around common values (Coşkun and Taş, 2008).

Math textbooks also play an important role in teaching mathematics worldwide (Schmidt, McKnight, Valverde, Houang and Wiley, 1997). Teachers make use of textbooks on what subject to talk about when and how, while students follow their in-class work and activities from math textbooks (Reys and Reys, 2006). Bulut (2013) revealed that an average of 75% of teachers and an average of 78% of students use maths textbooks. Therefore, it can be said that math textbooks have an important place in math teaching and learning (Stein, Remillard and Smith, 2007). A good math textbook should encourage students to explore new things, contain

real-life problems that need to be solved, and also make mathematics popular among children (Tünde and Gabriella, 2011).

The rapid change in science and technology, the endless needs of the individual and society, the innovations and developments in the approaches to learning and teaching affected the behaviors expected from individuals as well as the characteristics expected from the textbooks and brought the textbooks to the fore as a special topic. Changes in course programs in recent years and innovations in education have necessitated the consideration and reorganization of textbooks. Teachers' views on textbooks and their experiences have also gained importance regarding these recent changes. In the domestic studies related to math textbooks, the suitability of the questions in the textbooks to TIMSS and Pisa was investigated (Aydoğdu İskenderoğlu and Baki, 2011; Toptaş, Elkatmış and Karaca, 2012), the suitability of Math textbooks for the program was tried to identify (Arslan and Özpınar, 2009; Bulut, Boz-Yaman and Yavuz, 2016), their relationship with science and technology course subjects was tried to determine (Yeniterzi and Işıksal-Bostan, 2015), problems and activities in textbooks were examined (Ildırı, 2009; Tertemiz, Özkan, Çoban Süral and Ünlütürk Akçakın, 2015; Yıldız and Hacısalihoğlu Karadeniz, 2016), the functions and types of the pre-organisers in the book were examined (Gür and Kobak Demir, 2015), the history of mathematics and the usage of proof activities were studied (Mersin and Durmuş, 2018; Zeybek, Üstün and Birol, 2018) and studies involving the views of teachers about the use of math textbooks were conducted (Bulut, 2013; Tutak and Güder, 2012). Studies abroad have also similar content (Benoit, 2018; Gay, Barry, Rothrock and Pelkey, 2020; Sunday, 2014; Tünde and Gabriella, 2011). In addition, there is also research in which textbooks in different countries are examined and compared from certain points of view (Abdullah and Shin, 2019; Erbaş, Alacacı and Bulut, 2012; Hong and Choi, 2018; İncikabı and Ulusoy, 2019; Khalidova and Tapan-Broutin, 2017; Kul, Sevimli and Aksu, 2018; Mellor and Essien, 2018; Wang and Yang, 2016). However, there has been a limited number of studies that reveal primary school teachers' views on primary school math textbooks (Bulut, 2013; Çakır, 2006; Karakelleoğlu, 2007; Kaya, 2008).

Updated textbooks with updated programs are made available to teachers and students. Teachers also have some knowledge and experience about books by using textbooks in the educational process with their knowledge source and guidance feature. It is thought that using metaphor will be an effective method in revealing these experiences and opinions. Because metaphors allow people to understand nature and its environment, inferring meanings from objective situations that seem meaningless (Yıldırım and Şimşek, 2006). The metaphors often used in educational environments are that the individual expresses his or her characteristics in a concrete way in understanding and expressing an abstract, complex phenomenon (Ormell, 1996; Yob, 2003). The individual acts with the knowledge, skills, habits and attitudes involved in his/her vocabulary. Therefore, metaphors are also influenced by the experiences, pre-learning and social environment of the individual who created the metaphor. They help us better understand that phenomenon by creating a mental structure equivalent to thousands of words in describing a situation or environment (Clarken, 1997; Oğuz, 2009; Saban, Koçbeker and Saban, 2006).

Metaphors are scientific studies used within the paradigm of qualitative research. They are often used in the field of educational sciences as a data collection tool to reveal the perceptions of participants providing data (Kılcan, 2019). They are also used as a way to explore in education by explaining the similarities between previous understanding and an unknown subject in a creative, innovative and interactive role (Botha, 2009). By expressing what is wanted to be said in fewer words, they encourage individuals to dream without limiting themselves, to think creatively. In this way they enable individuals to find themselves deep within the language (Tompkins and Lawley, 2002). In the literature there are metaphorical research on different concepts in the field of educational sciences. It is seen that these researches are mostly aimed at educational elements (education, teacher, school, principal, etc.), professional concepts (science, value, environment, art, music, mathematical literacy, etc.) and people in different groups (teacher, student, teacher candidate) (Adar Cömert, 2019; Akbaba-Altun and Apaydın, 2013; Aladağ and Kuzgun, 2015; Aydın, 2011; Cerit, 2008; Eren, 2018; Ertürk, 2017; Çırak, 2014; Kalaycı, 2018; Pilten, Divrik, Pilten and Ebret, 2018; Saban, 2008).

Metaphors offer researchers the opportunity to make comparisons by taking into account the similarities between two things or to explain something by replacing one thing with another (Marshall, 2010). For example, when we say “school is like a tree”, the image of “tree” is used to reveal the tree-like aspects of the school. Here the similar characteristics of the tree and the school are compared and the school, which is the subject of the metaphor, is explained by the characteristics of the tree. Therefore, in any metaphor relationship, the source of the metaphor acts as a mental filter in understanding and explaining the subject of the metaphor from a different perspective (Saban, 2008). In this context, it is thought that metaphors will be an effective tool in revealing the perceptions of primary school teachers about mathematics textbooks. In this context, the purpose of this research is to reveal primary school teachers’ perceptions of mathematics text books through metaphors. For this purpose, answers to the following questions have been sought:

1. What are the metaphors that primary school teachers develop for math textbooks?

2. What conceptual categories are the metaphors that teachers develop for math textbooks in terms of their common characteristics?

METHOD

Research Design

In this study, the phenomenon pattern (phenomenology), which is considered one of the qualitative research patterns, was used to obtain, analyze and interpret the data. Phenomenology is a preferred pattern by researchers because it focuses on cases we are aware of but we do not fully understand (Yıldırım and Şimşek, 2006). Compared to other qualitative research designs, phenomenon pattern is a research design that aims to emphasize the perception and experiences of individuals from their own point of view (Ersoy, 2017). It provides

researchers with a greater understanding of judgments, prejudices and assumptions, as well as allows participants to reveal their perspectives on the identified concepts in a deeper way (Finlay, 2008). According to this situation, the starting point of the research is to determine primary school teachers' perceptions of mathematics textbooks through metaphors. The research is seen valuable because the participants present their judgments and experiences about mathematics textbooks through metaphors; the focus is on the perceptions of primary school teachers about mathematics textbooks.

Study Group

The study group of the study consists of 120 primary school teachers working in public schools in Iscehisar district of Afyon in 2015-2016 academic year. Easily accessible situation sampling, which gives pace and practicality to the researches, was used to determine the teachers (Yıldırım and Şimşek, 2006). Therefore, it was decided to work with 120 primary school teachers working in Iscehisar District of Afyon province, where one of the researchers is currently teaching. The demographic data for the teachers in the study group is shown in Table 1.

Table 1. Information about Primary School Teachers in The Study Group

Characteristics of Participants		f	%
Gender	Female	60	50
	Male	60	50
Service period	1-5 years	11	9.16
	6-10 years	54	45
	11-15 years	32	26.6
	16-20 years	8	6.66
	21-25 years	6	5
	25 and above	9	7.5
Education level	Associate	6	5
	Bachelor's	102	85
	Master's	12	10
Class they taught	1th Grade	28	23.33
	2nd Grade	28	23.33
	3rd Grade	30	25
	4th Grade	34	28.34
TOTAL		**120**	**100**

When Table 1 is examined, it is observed that 60 female (50%) and 60 male (50%) primary school teachers participated in the study. There are 11 teachers who are between 1-5 years length of service period (9.16%), 54 teachers between 6-10 years (45%), 32 teachers between 11-15 years (26.6%), 8 teachers between 16-20 years (6.66%), 6 teachers between 21-25 years (5%), 9 teachers between 25 and more years(7.5%). 6 of the teachers graduated associate degree (5%), 102 graduated Bachelor's degree (85%), 12 graduated master's degree (10%). In addition, 28 of them are 1st grade teacher (23.33%), 28 of them are 2nd grade teacher (23.33%), 30 of them are 3rd grade teacher (25%) and 34 of them are 4th grade teacher (28.34%). According to

these data, the equal numbers of men and women participating in the study indicate that there is a balanced distribution in terms of gender. In terms of service time, most of the teachers are experienced teachers. In addition, most of the teachers are undergraduate graduates. The fact that teachers who have master's and associate's degrees are included in the research shows the diversity of teachers' education levels. Almost equal numbers of teachers have been involved in the research in the context of the class being taught. It can be said that the number of teachers who teach only in the 4th grade is slightly higher.

Data Collection Tool

In order to determine the mental perceptions of the primary school teachers participating in the research, they were asked to fill the forms including the sentence "Math textbooks is like…….. Because ……." Each metaphor in this form has been used as the main data source in this research. In addition, primary school teachers filled out the information on the form including gender, service period, education level and the class they taught.

Data Analysis

In the analysis of the research data, content analysis was used to gather the collected data within the framework of certain concepts and themes. The main purpose is to try to uncover the facts hidden in the data. The data is thus transformed into a format that the reader can understand (Yıldırım and Şimşek, 2006). The following five-step process was followed in analyzing the metaphors developed by primary school teachers (Saban, Koçbeker and Saban, 2006):

i. Coding and Sorting:

At this stage, all of the forms originally collected from teachers were read and an alphabetical list of the metaphors produced was created. In line with this list, it was observed that some of the forms obtained from teachers left the sample metaphor part blank or no logical metaphors could be put forward. Some forms have been identified that after the phrase "because……", no logical justifications were presented or did not match the generated metaphor and its justifications. So 10 forms were excluded from the evaluation.

ii. Sample Metaphor Image Compilation Stage:

A total of 90 valid metaphors were obtained by teachers after extracting forms that carry meaningless metaphorical images or that did not have justification for the metaphor. These obtained metaphors were re-arranged in alphabetical order. In addition, the teachers who produced these metaphors were given a number and the acronym "PST" was used for the teachers. For example, the abbreviation PST-6 represents the sixth primary school teacher who participated in the research. Then, a list of sample metaphors was created by

selecting one of the alphabetically sorted metaphors from the forms thought to best represent that metaphor. Interpretation of sample metaphors in this list was tried to ensure the validity of the research.

iii. Category Development Stage:

At this stage, metaphors produced mainly by teachers were grouped in terms of their common characteristics. The current 90 metaphorical images from the sample metaphor list were divided into categories in terms of the subject of the metaphor, the source of the metaphor, and the relationship between the source and subject of the metaphor. From here; 9 different conceptual categories were created: complex-incomprehensive, deficient-insufficient, failure to meet expectations, valuable-rich, enjoyable-delighting, important-necessary, boring-monotonous, tiring-challenging, guide-directive.

iv. Validity and Reliability Stage:

Validity and reliability are seen as the two most important criteria used to ensure the credibility of research results (Yıldırım and Şimşek, 2006). The reliability of the content analysis used in the analysis of qualitative data depends on the systematic execution of the coding process and category determination stages. For this reason, every stage from the acquisition of metaphors to the reporting of the work is described in detail to ensure validity. In addition, descriptions of metaphors in each category are included with direct quotations. In order to ensure reliability, data were sent to a faculty member who had previously worked on metaphors and asked to place the metaphors under the 9 conceptual categories identified. Then, the pairings were compared using Miles and Huberman's (1994) formula (Reliability=Reconciliation Number/Reconciliation+Non-Reconciliation Number). 70% and above results in qualitative research provide the desired level of reliability (Miles ve Huberman, 1994). In the reliability calculation, specific to this study, the result was 94%.

v. The Stage of Data Transfer to Computer:

After the determination of 90 metaphors and 9 conceptual categories formed by these metaphors by the researchers, all the data were transferred to the computer and the valid metaphors produced by the teachers were placed in the categories discussed and the frequency (f) and percentage (%) values were calculated.

FINDINGS (RESULTS)

In this section, the findings of the metaphors and conceptual categories developed by the primary school teachers about math textbooks are given.

Metaphors Developed By Primary School Teachers About Math Textbooks

The results of the study regarding the metaphors developed by the primary school teachers for the math textbooks are presented in Table 2.

Table 2. Distribution of Metaphors Developed by Primary School Teachers

Num.	Metaphor	f	Num.	Metaphor	f
1.	A ball of yarn	1	46.	Logic question	1
2.	Account book	1	47.	Machine	1
3.	Activity book	1	48.	Marketplace	1
4.	Ant nest	1	49.	Means of transport	1
5.	Ants leaving the nest	1	50.	Mill	1
6.	April rain	1	51.	Mixed pizza	1
7.	Astigmatic	1	52.	Monster	1
8.	Ball	1	53.	Movie	1
9.	Basic	1	54.	Navigation	1
10.	Bird	1	55.	Nightmare	2
11.	Black and white cartoon	1	56.	Non-trained footballer	1
12.	Blank slate	1	57.	Ocean	2
13.	Blizzard	1	58.	Play	2
14.	Board	1	59.	Plum	1
15.	Broken compass	1	60.	Potato	1
16.	Broken ladder	1	61.	Puzzle	5
17	Building	1	62.	Rainbow	1
18.	Chaos	1	63.	Riddle	1
19.	Child	1	64.	Rough road	1
20.	Class	1	65.	Salad	2
21.	Communication tool	1	66.	Saltless dish	1
22.	Complexity	3	67.	Seed	1
23.	Directive	1	68.	Semi-full glass	1
24.	Doğan looking şahin	1	69.	Sheep herd	1
25.	Dry tree	2	70.	Short rope	1
26.	Empty building	1	71.	Smoking stove	1
27.	Empty box	4	72.	Soup	2
28.	Empty garden	1	73.	Space	1
29.	Empty set	3	74.	Stew	1
30.	Endless sea	1	75.	Story	2
31.	Flower field	1	76.	Survey	1
32.	Foamless coffee	1	77.	Symmetry	1
33.	Ghost	1	78.	Tale	1
34.	Gold	1	79.	Tangle	1
35.	Guide	1	80.	Teacher	1
36.	Infertile field	1	81	Toy	1
37.	Insufficient student	1	82.	Toy blocks	2
38.	Ivy	2	83.	Treasure chest	1
39.	Key	2	84.	Tree branches	1
40.	Labyrinth	6	85.	Unenjoyable funfair	1
41.	Ladder	2	86.	Watermelon	1
42.	Lemon	1	87.	Weightlifting	1
43.	Life	2	88.	Well	1
44.	Lightbulb	1	89.	Wingless bird	2
45.	Loaded lorry	2	90.	Woman	1
TOTAL					**120**

Table 2 shows the alphabetical distribution of metaphors developed by primary school teachers for math textbooks. According to the table, 90 valid metaphors were produced by primary school teachers. 19 metaphors (puzzle, life, wingless bird, ladder, game, ivy, etc.) were produced by more than one teacher, while 71 metaphors (tangle, seed, mill, woman, bird, ball, smoking stove, etc.) were produced by only one teacher. In this context, it is observed that primary school teachers produced more metaphors on labyrinth (n=6), puzzle

(n=5), empty box (n=4), empty Set (n=3), complexity (n=3), key (n=2), soup (n=2), life (n=2), story (n=2), nightmare (n=2), the wingless bird (n=2) dry tree (n=2), toy blocks (n=2), ladder (n=2), ocean (n=2), play (n=2), salad (n=2), ivy (n=2) loaded lorry (n=2). The least produced metaphors are riddle, monster, weightlifting, woman, navigation, stew, space, a ball of yarn, etc. As can be seen, a large number and variety of metaphors were produced by primary school teachers. These metaphors produced consist of concrete objects, being, and various images that teachers often encounter in their own lives. The fact that many and varied metaphors are produced can be considered as an indication that teachers are trying to reflect their experiences on the subject in different ways.

Distribution Of Metaphors Developed By Primary School Teachers By Categories

According to the findings of the study, 90 metaphors developed by primary school teachers were collected under 9 different conceptual categories. The findings obtained from the metaphors and their categories are presented in Table 3.

Table 3. Distribution of Metaphors Developed by Primary School Teachers by Categories

Categories	f	%	Metaphors	f	%
Complex Incomprehensive	29	24.17	Tree branches 1, tangle 1, astigmatic 1, child 1, soup 2, herd of sheep passing through thorns 1, ghost 1, woman 1, complexity 3, chaos 1, ant nest 1, labyrinth 6, logic question 1, salad 2, ivy 2, blizzard 1, stew 1, a ball of yarn 1, ants leaving their nest 1	19	21.11
Deficient Insufficient	23	19.17	Non-trained footballer 1, empty garden 1, empty building 1, empty box 4, empty set 3, blank slate 1, wingless bird 2, short rope 1, dry tree 2, bird 1, april rain 1, board 1, ball 1, infertile field 1, semi-full glass 1, insufficient student 1	16	17.77
Failure to Meet Expectations	12	10	Broken compass 1, rough road 1, flower field 1, doğan looking şahin 1, unenjoyable funfair 1, plum 1, broken ladder 1, foamless coffee 1, well 1, toy 1, saltless dish 1, smoking stove 1	12	13.33
Valuable Rich	12	10	Gold 1, treasure chest 1, movie 1, life 2, mixed pizza 1, watermelon 1, ocean 2, marketplace 1, endless sea 1, space 1	10	11.11
Enjoyable Delighting	11	9.17	Puzzle 5, seed 1, rainbow 1, toy blocks 2, play 2	5	5.55
Important Necessary	10	8.33	Lightbulb 1, key 2, building 1, communication tool 1, lemon 1, machine 1, ladder 2, basic 1	8	8.88
Boring Monotonous	10	8.33	Mill 1, activity book 1, account book 1, story 2, tale 1, potato 1, class 1, symmetry 1, black-white cartoon 1	9	10
Tiring Challenging	8	6.66	Survey 1, riddle 1, monster 1, weightlifting 1, nightmare 2, loaded lorry 2	6	6.66
Guide Directive	5	4.17	Navigation 1, teacher 1, guide 1, means of transport 1, directive 1	5	5.55
TOTAL	**120**	**100**		**90**	**100**

When Table 3 is examined, it is observed that 90 metaphors produced by primary school teachers are grouped under 9 conceptual categories. When the categories were examined, the categories of complex-incomprehensive 24.17% (29), deficient-insufficient 19.17% (23) have the highest rate; while the categories of important-necessary 8.33% (10), boring-monotonous 8.33% (10), tiring-challenging 6.66% (8) have the lowest rate. The vast majority of metaphors (68.33%) contain negative connotations related to math textbooks. While 31.67% of metaphors have positive connotations. When the generated metaphors are examined in the terms of categories, it is seen that the resulting categories are intended to reveal the positive and negative aspects of mathematics textbooks. Although the percentage distribution of the categories shows that teachers emphasize the complex, deficient, unsatisfactory, boring and tiring aspects of mathematics textbooks; in contrast, it can be said that some teachers consider math textbooks as valuable, enjoyable, important and guiding material. The conceptual categories and the explanations about the math textbooks of the primary school teachers are presented below.

Table 4. Math Textbooks with Complex–Incomprehensive Aspects

Categories	f	%	Metaphors	f	%
Complex Incomprehensive	29	24.17	Tree branches 1, tangle 1, astigmatic 1, child 1, soup 2, herd of sheep passing through thorns 1, ghost 1, woman 1, complexity 3, chaos 1, ant nest 1, labyrinth 6, logic question 1, salad 2, ivy 2, blizzard 1, stew 1, a ball of yarn 1, ants leaving their nest 1	19	21.11

According to Table 4, 29 teachers (24.17%) and 19 metaphors (21.11%) represent this category. Metaphors such as labyrinth (6), complexity (3), soup (2), salad (2), ivy (2) are the prominent metaphors showing that teachers find math textbooks complex and incomprehensible. With this category of metaphors, the highest proportion of the complex-incomprehensive category led teachers to evaluate that a complex structure prevails in math textbooks. Because when the metaphors are examined, it is seen that the concepts that evoke imbalance, complexity and disorganization are gathered in this category. The views of teachers supporting this category are as follows:

> *(PST-34): The activities are complicated and insufficient. There's no layout in the book content. Rather than making learning easier, it's very confusing.*

> *(PST-37): It is very difficult to clean the spines from the wool of sheep, to make rope from their wool and add them end to end. The fact that there are unnecessary activities in the books makes it very difficult to have integrity among the subjects.*

> *(PST-74): There are three topics on one page. The pages on which the subject is being processed are not fully understood.*

(PST-81): At first you try to understand, you have difficulty, you think you understand but you don't. Then you force yourself to understand again but you can't understand again and it goes on and on.

(PST-108): The activities are complicated, the subjects are insufficient, there is no order within the events with the subjects. It makes learning difficult. This is not efficient.

Table 5. Math Textbooks with Deficient–Insufficient Aspects

Categories	f	%	Metaphors	f	%
Deficient Insufficient	23	19.17	Non-trained footballer 1, empty garden 1, empty building 1, empty box 4, empty set 3, blank slate 1, wingless bird 2, short rope 1, dry tree 2, bird 1, april rain 1, board 1, ball 1, infertile field 1, semi-full glass 1, insufficient student 1	16	17.77

According to Table 5, 23 teachers in this category (19.17%) find math textbooks deficient-insufficient with 16 metaphors (17.77%). According to this category, which has the second most rates, teachers find math textbooks incomplete because they are not able to conduct math activities in a qualified manner. Although the mathematics textbooks were prepared by experts in accordance with the curriculum, the evaluation of some deficiencies was taken negatively by the teachers. Especially, the fact that the activities, applications and solutions are carried out in mathematics courses keeps the expectations in the mathematics textbooks at a high level. It would be useful to include a large number of examples, activities and problems in math textbooks to meet these expectations. Teachers use the metaphors of empty box (4), empty set (3), wingless bird (2), dry tree (2), non-trained footballer (1), insufficient student (1) to express that math textbooks are insufficient:

(PST-17): From the outside, it looks full, but it's empty. The content, the scope, the samples are very weak and insufficient.

(PST-19): Books do not meet student needs in content.

(PST-56): The subject has been told but the activities are insufficient.

(PST-67): Activities are insufficient and scarce. The subject is passed with two examples.

(PST-113): Activities are carried out very quickly and a resource is needed for reinforcement.

Table 6. Math Textbooks in Terms of Failure to Meet Expectations

Categories	f	%	Metaphors	f	%
Failure to Meet Expectations	12	10	Broken compass 1, rough road 1, flower field 1, doğan looking şahin 1, unenjoyable funfair 1, plum 1, broken ladder 1, foamless coffee 1, well 1, toy 1, saltless dish 1, smoking stove 1	12	13.33

According to Table 6, 12 teachers in this category (10%) stated that math textbooks failed to meet their expectations with 12 metaphors (13.33%). Broken compass (1), doğan looking şahin (1), unenjoyable funfair (1), foamless fair (1) are the metaphors that support this category. According to the metaphors of this category, teachers can be said to have a positive perception of mathematics textbooks. However, the fact that teachers have produced metaphors for the fact that useful and usable features are not available in textbooks has led to the emergence of this category. Teachers' views on this category are as follows:

(PST-31): While the content of some subjects is concretized very well, in some subjects wrong information is given. It is similar to a field of flowers with live and dead flowers.

(PST-39): Although it looks impressive in color, it is not very useful in content and is full of unnecessary boring activities.

(PST-66): There is a narrative but few reinforcements.

(PST-107):There is narration but not enough activity. Insufficient.

(PST-109): It smothers with its smoke, and it doesn't heat up around because it can't burn.

Table 7. Math Textbooks with Valuable–Rich Aspects

Categories	f	%	Metaphors	f	%
Valuable Rich	12	10	Gold 1, treasure chest 1, movie 1, life 2, mixed pizza 1, watermelon 1, ocean 2, marketplace 1, endless sea 1, space 1	10	11.11

According to Table 7, 12 teachers (10%) and 10 metaphors (11.11%) represent this category. In this category, teachers expressed positive views on math textbooks with metaphors such as life (2), ocean (2), gold (1), treasure chest (1), marketplace (1), space (1). It is observed that teachers who report positive views are most commonly in this category. Because the metaphors that teachers think textbooks are the main source of information are in this category. Teachers thought that math textbooks were useful, usable, and helpful materials, making this category the most likely. Teachers' views in this category are as follows:

(PST-47): If the gold in the soil has no value without processing, it has no value if the book is not used. If the book is used it gains value like processed gold. So are math textbooks.

(PST-2): It has pros and cons just like life. It combines, seperates, folds, divides. Math textbooks also offer this.

(PST-63): The outside of the watermelon is hard, but when you open the shell, a great flavor awaits you. So is math, so are math books. If you break down your negative perception (shell), there are great flavors in it that the brain will encounter.

(PST-110): There is a lot of information. Every knowledge is a pebble. If you know how to get to the pebbles, you'll be able to get to the farthest parts of the sea. The important thing is to know where to get into the sea and achieve it.

(PST-112): There are so many unknown objects in space and lots of information to be learned. There is also a lot of information to be learned in Math textbooks.

Table 8. Math Textbooks with Enjoyable–Delighting Aspects

Categories	f	%	Metaphors	f	%
Enjoyable Delighting	11	9.17	Puzzle 5, seed 1, rainbow 1, toy blocks 2, play 2	5	5.55

According to Table 8, 11 teachers (9.17%) and 5 metaphors (5.55%) represent this category. Teachers, who expressed the enjoyable aspect of Math textbooks, had positive views towards Math textbooks with the metaphors like puzzle (5), toy blocks (2), play (2), seed (1), rainbow (1). According to these statements that express positive views; the emphasis on the enjoyable nature of mathematics shows that mathematics textbooks are an important source for the discovery of this feature. Because mathematics textbooks are an important material for conducting mathematical activities systematically. When the activities are carried out in a systematic way, the enjoyment of the work begins to be taken. The teacher's views on metaphors that indicate that this pleasure is taken are as follows:

(PST-24): Students, who can solve, enjoy it as they do.

(PST-25): Even a student at lower level tries to understand and find a solution.

(PST-30): The more you solve, the more you solve.

(PST-78): As the information in the textbook overlaps, it becomes meaningful.

(PST-90): It both teaches and entertains.

Table 9. Math Textbooks with Important–Necessary Aspects

Categories	f	%	Metaphors	f	%
Important Necessary	10	8.33	Lightbulb 1, key 2, building 1, communication tool 1, lemon 1, machine 1, ladder 2, basic 1	8	8.88

According to Table 9, 10 teachers (8.33%) and 8 metaphors (8.88%) represent this category. They emphasized the importance of Math textbooks with the metaphors like key (2), ladder (2), lightbulb (1), building (1), communication tool (1), lemon (1), machine (1), basic (1). It can be said that teachers who know how important mathematics is in everyday life according to the emphasized characteristics, demonstrate their awareness that textbooks have an important role in revealing this importance. Because mathematics is an important discipline and is used in all aspects of life. The most important source for teachers in teaching this discipline is mathematics textbooks. This is why the importance of math textbooks has been highlighted by teachers. The views that emphasize this importance are as follows:

(PST-3): As it turns on, it heats up and illuminates more and as it is used it brightens the mind, widens the horizon.

(PST-4): Encrypted information or number unlocks your puzzles.

(PST-11): As the second floor of the building can not be reached without reaching the first floor, the second page of the math book can not be learned without learning the first page.

(PST-80): Machines do more than one job part by part, and math books help us do part by part, just like machines.

(PST-104): As textbooks are the source of the teaching in the courses, Math textbooks are fundamental.

Table 10. Math Textbooks with Boring–Monotonous Aspects

Categories	f	%	Metaphors	f	%
Boring Monotonous	10	8.33	Mill 1, activity book 1, account book 1, story 2, tale 1, potato 1, class 1, symmetry 1, black-white cartoon 1	9	10

According to Table 10, 10 teachers (8.33%) and 9 metaphors (10%) represent this category. These are the metaphors showing teachers get bored while using Mathematic textbooks; story (2), mill (1), activity book (1), account book (1), tale (1), potato (1), class (1), symmetry (1), black-white cartoon (1). According to these metaphors, mathematics textbooks are seen as a material that does not arouse curiosity in teachers, and that the same things are repeated all the time. Teachers also find it boring and do not want to use it because it does not arouse excitement. The teachers' view that they find math textbooks boring is as follows:

(PST-35): There is no creativity. They are not regenerating. You can't see anything different. Same activities.

(PST-93): They are tasteless. Maths textbooks bore students.

(PST-100): It is seen that the textbook does not serve a purpose like the aimlessness of the students.

(PST-101): Subjects are told in certain patterns.

(PST-102): Colorless and boring. It doesn't appeal to the children's world.

Table 11. Math Textbooks with Tiring–Challenging Aspects

Categories	f	%	Metaphors	f	%
Tiring Challenging	8	6.66	Survey 1, riddle 1, monster 1, weightlifting 1, nightmare 2, loaded lorry 2	6	6.66

According to Table 11, 8 teachers (6.66%) and 6 metaphors (6.66%) represent this category. It is known to teachers that regular follow-up of textbooks and the conduct of courses requires expertise, according to the metaphors that represent, and the necessity of solving the subjects in mathematics, which is a difficult course, in textbooks. Therefore, it is seen that both teachers and students have difficulty in following mathematics subjects. Teachers trying to explain this difficulty have produced metaphors that evoke tiredness and fatigue in the person. With the metaphors of nightmare (2), a loaded lorry (2), survey (1), riddle (1), monster (1), weightlifting (1), teachers expressed their fatigue when using math textbooks with the following views:

(PST-6): Every time we think about how to answer.

(PST-10): There are many issues that need to be solved. They tire the student.

(PST-44): Not everyone can handle it.

(PST-53): I think they are far above students' perception levels

(PST-119): It is very heavy for students' levels. That's why it tires students.

Table 12. Math Textbooks with Guide–Directive Aspects

Categories	f	%	Metaphors	f	%
Guide Directive	5	4.17	Navigation 1, teacher 1, guide 1, means of transport 1, directive 1	5	5.55

According to Table 12, 5 teachers (4.17%) and 5 metaphors (5.55%) represent this category. With the metaphors produced in this category, it has been revealed that mathematics textbooks are a guiding material for teachers and students. In fact, with the guide category, mathematics textbooks provide a framework and enable teachers and students to take a systematic path. It provides guidance on when, how and with what subjects to be told and guides the teaching activities. The importance of mathematics textbooks has been revealed by gathering metaphors that enable these positive views to emerge in this category. The positive views of teachers who think textbooks as navigation (1), teacher (1), guide (1), means of transportation (1), directive (1) when using math textbooks are as follows:

(PST-85): It is a guiding, lane-determining feature for the later times and parts of our lives.

(PST-92): When the student looks at the book, he definitely needs a teacher. The book should be able to teach math to the student without any means. Because it's kind of a teacher.

(PST-95): It is prepared with a method aimed at guiding the student's self-learning.

(PST-111): Thanks to the basic knowledge and books we have learned, we reach the desired destination and goals. Math textbooks enable students to access and learn information.

(PST-116): Math is not like every lesson, so you need a guiding tool. That's what math textbooks provide.

CONCLUSION and DISCUSSION

According to the findings of the study, primary school teachers produced a total of 90 valid metaphors for math textbooks. The most repeated of these metaphors are; labyrinth (6), puzzle (5), empty box (4), empty set (3), complexity (3), key (2), soup (2), life (2), story (2), nightmare (2), wingless bird (2), dry tree (2), toy blocks (2), ladder (2), ocean (2), play (2), salad (2), ivy (2) and a loaded lorry (2). 71 metaphors were expressed by only one participant (gold, seed, tale, weightlifting, woman, blizzard, etc.). The fact that a large number of metaphors have been produced and 68.33% of these metaphors contain negative expressions and 31.67% have positive expressions indicate that primary school teachers generally have a negative perception towards math textbooks.

A total of 90 metaphors produced by primary school teachers were collected under 9 conceptual categories. These were; Complex–Incomprehensible (24.17%), Deficient–Insufficient (19.17%), Don't meet expectation (10%), Valuable–Rich (10%), Enjoyable–Delighting (9.17%), Important–Necessary (8.33%), Boring–Monotonous (8.33%), Tiring–Challenging (6.66%), Guide–Directive (4.17%).

When the categories were examined, most of the primary school teachers (68.33%) had a negative perception of math textbooks. The reason for this can be shown that teachers find the subject narration in math textbooks too much. They find the textbooks complex and do not want to use them because of the excessive lecturing. Yapıcı (2004), in his study, stated that by the combination of content density and abstract concepts in textbooks, textbooks are transformed into objects that are difficult to read and understand, which supports the findings of the study. It was also revealed that teachers would be worried about not being able to train the curriculum on the grounds that subjects could not be kept up, so it would be appropriate to plan the time allocated for the activities and how that time would be used (Bozkurt and Kuran, 2016). Erbaş et al. (2012) compared Turkish, Singapore and American textbooks in their study and stated that the texts in Singapore textbooks were presented with a simpler internal organization. It was also stated that American books were designed as reference books. Turkish books were stated to present ideas in visual design and presentation of some subjects. In this respect, it is considered that it is more appropriate to present the subjects in mathematics textbooks at a simpler level.

They also find it inadequate because they do not find too many sample questions in textbooks. They want to have plenty of examples and lots of activities like in test books. In the study of Yüksel (2010), the fact that 62.1% of the students stated that more questions should be included in mathematics textbooks supports this finding. Bozkurt and Kuran (2016) stated that the activities in the textbooks prepared according to the

mathematics curriculum should be implemented by the teachers. However, the results of the research show that teachers find the activities in textbooks inadequate and are above the student level. The fact that the activities in the mathematics textbooks Keleş (2014) examined were very superficial, that the mathematical relations were ignored and that the activities were not placed in real life problems shows that there were similar deficiencies in the secondary education mathematics textbooks he studied. According to Altun, Yazgan and Arslan (2004), the use of mathematics textbooks had decreased and were replaced by test and resource books, in other words they lost their validity. Kul et al. (2018) noted that in the study they compared Turkish and Canadian mathematics textbooks, the types of open-ended questions that require cognitive skill are more likely to be featured in Canadian textbooks. They also suggested that the content of the textbooks should include questions that require metacognitive skills compatible with international exams. Özer (2012) also stated that there are much fewer questions in Turkish textbooks compared to the USA and Singapore, so students are turning to supplementary resources to meet different types and plenty of questions. In the textbooks examined according to PISA and TIMSS, it has been revealed that textbook contents should be rearranged in order to develop high level skills (Aydoğdu İskenderoğlu and Baki, 2011; Toptaş et al., 2012). Based on these results, the preparation of the activities in mathematics textbooks in qualified, adequate, appropriate to the student level and in international standards can prevent such negativity.

It was also concluded that the textbooks did not meet the desired expectations and the teachers were disappointed. They find it boring because there are no different kinds of activities, questions, or lecturing, and they find it exhausting because there are too many lecturing. It is stated that using material during activities achieves meaningful learning. However, it has been stated that mathematics textbooks taught in Hungarian schools in Romania do not adequately support the use of materials (Tünde and Gabriella, 2011). The fact that the lack of supplementary tools to support the activities in the programs and books (Çakır, 2007; Karakelleoğlu, 2007; Kaya, 2008) emphasizes the importance of using materials. The fact that the activities in the textbooks are partly related to daily life and partly related to the level of activities that slow learner students can learn also supports the views of the teacher in the tiring category of our research (Kaya, 2008). In this sense, teachers' use of different kinds of material during lecture, activities and question solving will save both teachers and students from boredom (Bozkurt and Kuran, 2016). In addition, making mathematics textbooks more colorful and fun in terms of visual design principles can be presented as a solution for teachers finding textbooks boring (Kayıkçı, 2006; Kurtulmuş, 2010; Örnek, 2013; Uluışık, 2008; Sunday, 2014; Yüksel, 2010; Zeybek et al., 2018).

31.67% of teachers have positive perception about math textbooks. These teachers find mathematics textbooks valuable, enjoyable, important and directive. As Güzel and Adıbelli (2011) point out, a good textbook and student workbook should have the ability to guide teachers and students in teaching activities and help students learn subjects. Mathematics textbooks are the main source of information for teachers and students. They provide significant guidance to teachers and students in the implementation of planned education

practices, ensuring that education activities are carried out without disruption. They are important assistants for teachers to be a guide on which subject to teach when, how and with what. They are instructional materials in which students follow their courses and find the opportunity to do regular repetition (Apple, 1992; Duman et al., 2001; Kajander and Lovric, 2009; Reys and Reys, 2006; Tünde and Gabriella, 2011). Kolaç (2003) emphasizes that although many modern course materials are used today, textbooks still have an important place in the learning and teaching process because they contain regular and systematic information. Considering all these features, mathematics textbooks are also still seen as the most important educational material in the world (Schmidt et al., 1997).

RECOMMENDATIONS

- Subject narratives to eliminate complexity in mathematics textbooks can be simplified. In addition, a simple and systematic presentation of the subjects can be provided. These narratives should also be supported by entertaining activities.
- In mathematics textbooks, a large number of examples, activities and problems should be included, as in test books. These activities and questions need to be in the number and quality that students at different levels can solve. It would be more appropriate for all of these to be included in mathematics textbooks at increasing rates when students pass to a higher class.
- The inclusion of guiding instructions to guide and assist teachers in the mathematics textbooks will make it easier for them to benefit from the mathematics textbooks. Therefore, it will be useful for teachers to include clear application instructions in mathematics textbooks describing course subjects, activities and solution stages.
- The questions included in math textbooks must be of international standards and enable students to have both cognitive and metacognitive skills. It would be more appropriate for these questions in math textbooks systematically from easy to difficult.
- A large number of activities, problems and activities should be included in mathematics textbooks in order to support the use of materials.
- Examples, activities and questions in mathematics textbooks must be made up of problems involving daily life situations.
- Considering the visual design principles of mathematics textbooks, it should be taken into consideration that they should be designed to attract the attention of both teachers and students.

REFERENCES

Abdullah, A. H., & Shin, B. (2019). "A Comparative Study of Quadrilaterals Topic Content in Mathematics Textbooks between Malaysia and South Korea." *Journal on Mathematics Education,* 10(3): 315-340. Retrieved from http://doi.org/10.22342/jme.10.3.7572.315-340

Adar Cömert, S. (2019). "Investigation of Perceptions of Social Studies Teacher Candidates on Art Concept with Metaphors." *International Journal of Education Technology and Scientific Researches*, 4(9): 269-281.

Akbaba-Altun, S., & Apaydın, Ç. (2013). "Kız ve Erkek Öğretmen Adaylarının "Eğitim" Kavramına İlişkin Metaforik Algıları." *Kuram ve Uygulamada Eğitim Yönetimi [Educational Administration: Theory and Practice]*, 19(3): 329-354.

Aladağ, S. and Kuzgun, M. P. (2015). "Sınıf Öğretmeni Adaylarının "Değer" Kavramına İlişkin Metaforik Algıları." *Sakarya Üniversitesi Eğitim Fakültesi Dergisi*, 29: 163-193. Retrieved from https://dergipark.org.tr/tr/pub/sakaefd/issue/11234/134227

Altun, M., Yazgan, Y., Arslan, Ç. (2004). "Lise Matematik Ders Kitaplarının Kullanım Şekli ve Sıklığı." *Eğitim Fakültesi Dergisi,* 17(2): 131-147.

Apple, M. (1992). "The Text and Cultural Politics." *Educational Researcher,* 21(7): 4-11.

Arslan, S., Özpınar, İ. (2009). "İlköğretim 6. Sınıf Matematik Ders Kitaplarının Öğretmen Görüşleri Doğrultusunda Değerlendirilmesi." *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, 12: 97-113.

Aydın, F. (2011). "Üniversite Öğrencilerinin "Çevre" Kavramına İlişkin Metaforik Algıları." *Doğu Coğrafya Dergisi*, 26: 25-44.

Aydoğdu İskenderoğlu, T., Baki, A. (2011). "İlköğretim 8. Sınıf Matematik Ders Kitabındaki Soruların PISA Matematik Yeterlik Düzeylerine Göre Sınıflandırılması." *Eğitim ve Bilim,* 36(161): 288-301.

Benoit, A. M. (2018). "Textbook Affordability and Student Acceptance of eTextbooks: An Institutional Case-study." *The Canadian Journal for the Scholarship of Teaching and Learning,* 9(2). Retrieved from https://ir.lib.uwo.ca/cjsotl_rcacea/vol9/iss2/3

Botha, E. (2009). "Why Metaphor Matters in Education." *South African Journal of Education*, 29: 431-444.

Bozkurt, A. and Kuran, K. (2016). "Öğretmenlerin Matematik Ders Kitaplarındaki Etkinlikleri Uygulamaya ve Etkinlik Tasarlamaya İlişkin Görüşleri." *Ege Eğitim Dergisi,* 17(2): 377-398.

Bulut, A. (2013). *İlkokul Matematik Kitaplarının Kullanımına İlişkin Sınıf Öğretmeni ve Öğrenci Görüşlerinin Bazı Değişkenler Açısından İncelenmesi.* Yayınlanmamış Yüksek Lisans Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Bulut, S., Boz-Yaman, B. and Yavuz, F. D. (2016). "7. Sınıf Matematik Ders Kitaplarında Dönüşüm Geometrisi İşlenişinin Öğretim Programları Açısından Değerlendirilmesi." *İlköğretim Online,* 15(4): 1164-1190.

Cerit, Y. (2008). "Öğrenci, Öğretmen ve Yöneticilerin Müdür Kavramı İle İlgili Metaforlara İlişkin Görüşleri." *Eğitim ve Bilim*, 33(147): 3-13.

Clarken, R. H. (1997). "Five Metaphors for Educators". Paper Presented at the Annual Meeting of The American Educational Research Association, Chicago.

Coşkun, E., Taş, S. (2008). "Ders Kitaplarına Metin Seçimi Açısından Türkçe Öğretim Programlarının Değerlendirilmesi." *Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi,* 5(10): 59-74.

Çakır, A. (2006). *İlköğretim Dördüncü Sınıf Matematik Ders Kitapları İle İlgili Öğretmen Görüşleri*. Yayınlanmamış Yüksek Lisans Tezi, Eskişehir Osmangazi Üniversitesi Sosyal Bilimler Enstitüsü, Eskişehir.

Çırak, S. (2014). "Ortaokul Öğretmenlerinin "Öğrenci" Kavramına İlişkin Metaforik Algıları." *Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 11(27): 221-236.

Demirel, Ö. and Kıroğlu, K. (Ed.) (2006). *Konu Alanı Ders Kitabı İncelemesi,* (2. Baskı). Ankara: Pegem A Yayıncılık.

Duman, T., Karakaya, N., Çakmak, M., Eray, M., Özkan, M. (2001). *Matematik 1-8, Konu Alanı Ders Kitabı İnceleme Kılavuzu*, (1. basım). (Editör: L. Küçükahmet). Ankara: Nobel Yayın Dağıtım.

Erbaş, A. K., Alacacı, C. and Bulut, M. (2012). "A Comparison of Mathematics Textbooks from Turkey, Singapore, and the United States of America." *Educational Sciences: Theory & Practice*, 12(3), Summer: 2324-2330.

Eren, B. (2018). "Özel Eğitim Öğretmeni Adaylarının "Müzik" Kavramına İlişkin Metaforik Algıları." *Turkish Studies Educational Sciences*, 13/19(Summer 2018): 697-716.

Ertürk, R. (2017). "İlkokul Öğrencilerinin Öğretmen Kavramına İlişkin Metaforik Algıları." *E-Uluslararası Eğitim Araştırmaları Dergisi*, 8(3): 1-15. DOI: 10.19160/ijer.285232

Finlay, L. (2008). "A Dance Between the Reduction and Reflexivity: Explicating the "Phenomenological Psychological Attitude." *Journal of Phenomenological Psychology*, 39(2008): 1-32.

Gay, A. S., Barry, A. L., Rothrock, K. S., & Pelkey, M. M. (2020). "Mathematics Student Teachers' Views and Choices About Teaching and Textbooks in Middle and High School Classrooms." *International Journal of Research in Educational and Science (IJRES)*, 6(1): 120-132.

Gür, H., Kobak Demir, M. (2015). "7. Sınıf Matematik Ders Kitapları Cebir Kazanımlarının Ön Örgütleyiciler Açısından İncelenmesi." *Bartın Üniversitesi Eğitim Fakültesi Dergisi,* 4(1): 83-100.

Güzel, H. & Adıbelli, S. (2011). "9. Sınıf Fizik Ders Kitabının Eğitsel, Görsel, Dil ve Anlatım Yönünden İncelenmesi." *Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi,* 26: 200-216.

Haggarty, L. & Pepin, S. (2002). "An Investigation of Mathematics Textbooks and Their Use in English, French and German Classrooms: Who Gets an Opportunity to Learn What?" *British Educational Research Journal,* 28(4): 567-590.

Halis, İ. (2002). *Öğretim Teknolojileri ve Materyal Geliştirme*. Ankara: Nobel Yayınları.

Hong. D. S. & Choi, K. M. (2018). "Reasoning and Proving Opportunities in Textbooks: A Comparative Analysis." *International Journal of Research in Education and Science (IJRES)*, 4(1): 82-97. DOI: 10.21890/ijres.382937

Ildırı, A. (2009). *İlköğretim Beşinci Sınıf Matematik Ders Kitabında ve Öğrenci Çalışma Kitabında Yer Alan Problemlerin İncelenmesi ve Bu Problemlere İlişkin Öğretmen Görüşlerinin Belirlenmesi.* Yayınlanmamış Yüksek Lisans Tezi, Çukurova Üniversitesi Sosyal Bilimler Enstitüsü, Adana.

İncikabı, L., & Ulusoy, F. (2019). "Gender Bias and Stereotypes in Australian, Singaporean and Turkish Mathmatics Textbooks." Turkish Journal of Education, 8(4): 298-317. DOI: 10.19128/turje.581802

Kajander, A., & Lovric, M. (2009). "Math Text Books and Their Potential Role in Supporting Misconceptions." *International Journal of Mathematical Education in Science and Technology,* 40(2): 173-181.

Kalaycı, S. (2018). "İlkokul Öğrencilerinin "Bilim" ve "Fen Bilimleri Dersi" Kavramlarına Yönelik Algılarının Metafor Yoluyla Belirlenmesi." *International Journal of Social and Educational Sciences*, 5(9): 1-21.

Karakelleoğlu, S. (2007). *İlköğretim 4. Sınıf Matematik Ders Kitaplarına İlişkin Öğretmen, Öğrenci ve Uzman Görüşleri*. Yayınlanmamış Yüksek Lisans Tezi, Balıkesir Üniversitesi Fen Bilimleri Enstitüsü, Balıkesir.

Kaya, A. (2008). *MEB Tarafından Hazırlatılan İlköğretim 4. ve 5. Sınıf Matematik Ders Kitaplarındaki Etkinliklere İlişkin Öğretmen ve Öğrenci Görüşleri*. Yayınlanmamış Yüksek Lisans Tezi, Zonguldak Karaelmas Üniversitesi Sosyal Bilimler Enstitüsü, Zonguldak.

Kayıkçı, M. (2006). *İlköğretim Türkçe, Sosyal Bilgiler, Fen Bilgisi ve Matematik Ders Kitaplarında Görsel Tasarım Sorunları*. Yayınlanmamış Yüksek Lisans Tezi, Karadeniz Teknik Üniversitesi Sosyal Bilimler Enstitüsü, Trabzon.

Keleş, T. (2016). "MEB 2005 Öğretim Programına Göre Hazırlanan 9. Sınıf Matematik Ders Kitaplarının Öğretmen Görüşüyle Değerlendirilmesi." *Buca Eğitim Dergisi*, 38: 57-78.

Khalidova E. S., Tapan-Broutin M. S. (2017). "Türkiye-Kazakistan İlköğretim Matematik Ders Kitapları Üzerinde Karşılaştırmalı Bir Çalışma." *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi,* 17(4): 1957-1973.

Kılıç, A. and Seven, S. (Ed.) (2006). *Konu Alanı Ders Kitabı İncelemesi*, (6. Baskı). Ankara: Pegem A Yayıncılık.

Kılcan, B. (2019). Using Metaphors in Educational Sciences as Data Collection Tools, Sample Application. In B. Kılcan (Ed.), *Metaphor and an Application Guide for Metaphoric Studies in Education (2nd ed.)* (pp. 89-108). Ankara: Pegem Academy.

Kolaç, E. (2003). "İlköğretim Dördüncü Sınıf Türkçe Ders Kitaplarının Öğretmen Görüşlerine Dayalı Olarak Değerlendirmesi." *Uludağ Üniversitesi Eğitim Fakültesi Dergisi,* 17(1): 105-137.

Kul, Ü., Sevimli, E., & Aksu, Z. (2018). "A Comparison of Mathmatics Questions in Turkish and Canadian School Textbooks in Terms of Synthesized Taxonomy." *Turkish Journal of Education*, 7(3): 136-155. DOI: 10.19128/turje.395162

Kurtulmuş, Y. (2010). *İlköğretim 8. Sınıf Matematik Ders Kitapları İle İlgili Öğretmen Görüşleri*. Yayınlanmamış Yüksek Lisans Tezi, Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü, Hatay.

Marshall, J. (2010). "Five Ways to Integrate: Using Strategies from Contemporary Art." *Art Education*, 63(3): 13-19.

Mellor, K., Clark, R., & Essien, A. A. (2018). "Affordances for Learning Linear Functions: A Comparative Study of Two Textbooks from South Africa and Germany." *Pythagoras*, 39(1): a378. Retrieved from https://doi. org/10.4102/pythagoras. v39i1.378

Mersin, N. and Durmuş, S. (2018). "Matematik Tarihinin Ortaokul Matematik Ders Kitaplarındaki Yeri." *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi,* 18(2): 997-1019.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis*: *An Expanded Sourcebook* (2nd ed.). USA: SAGE.

Oğuz, A. (2009). "Öğretmen Adaylarına Göre Ortaöğretim Öğretmenlerini Temsil Eden Metaforlar." *Milli Eğitim Dergisi,* 182: 36-56.

Ormell, C. (1996). "Eight Metaphors of Education." *Education Research*, 38(1): 67-75.

Örnek, T. (2013). *Matematik Öğretiminde Kullanılabilecek Resimler*. Yayınlanmamış Yüksek Lisans Tezi, Atatürk Üniversitesi Eğitim Bilimleri Enstitüsü, Erzurum.

Özer, E. (2012). *Türkiye 8. Sınıf Matematik Konularına Göre Türkiye, Singapur ve ABD Kitaplarındaki Soruların Karşılaştırılmalı Analizi*. Yayınlanmamış Yüksek Lisans Tezi, Ankara Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Pilten, P., Divrik, R., Pilten, G., Ebret, A. (2018). "Sınıf Öğretmeni Adaylarının Matematiksel Okuryazarlık Kavramına İlişkin Metaforik Algıları." *Trakya Üniversitesi Eğitim Fakültesi Dergisi*, 8(1): 47-67. DOI: 10.24315/trkefd.364025

Reys, B. J., & Reys, R. E. (2006). "The Development and Publication of Elementary Mathematics Textbooks: Let the Buyer Beware!" *Phi Delta Kappan*, 87(5): 377-384.

Saban, A. (2008). "Okula İlişkin Metaforlar." *Kuram ve Uygulamada Eğitim Yönetimi*, Sayı 55: 459-496.

Saban, A., Koçbeker, B. N. and Saban, A. (2006). "Öğretmen Adaylarının Öğretmen Kavramına İlişkin Algılarının Metafor Analizi Yoluyla İncelenmesi." *Kuram ve Uygulamada Eğitim Bilimleri,* 6(2): 461-522.

Schmidt, W. H., McKnight, C. C., Valverde, G. A., Houang, R. I., & Wiley, D. E. (1997). *Many Visions, Many Aims. Volume I: A Cross-national Investigation of Curricular Intentions in School Mathematics.* London: Kluwer.

Sezgin, F., Koşar, D., Koşar, S. and Er, E. (2017). "Öğretmenlerin Öğrenciye Yönelik Metaforlarının Belirlenmesine İlişkin Nitel Bir Araştırma." *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi (H. U. Journal of Education),* 32(3): 600-611. doi: 10.16986/HUJE.2016018864

Seven, S. (2001). *İlköğretim Sosyal Bilgiler Ders Kitapları Hakkında Öğretmen ve Öğrenci Görüşleri.* Yayınlanmamış Yüksek Lisans Tezi, Celal Bayar Üniversitesi Sosyal Bilimler Enstitüsü, Manisa.

Stein, M. K., Remillard, J., & Smith, M. S. (2007). How Curriculum Influences Student Learning. In F. K. Lester, Jr. (Ed.), *Second Handbook of Research on Mathematics Teaching and Learning* (pp. 319-369). Charlotte, NC: Information Age.

Sunday, A. S. (2014). "Math Textbook Analysis: A Study on Recommended Math Textbooks in School Use in Southwestern States Of Nigeria." *European Scientific Jounal,* 1: 140-151.

Tay, B. (2005). "Sosyal Bilgiler Ders Kitaplarında Öğrenme Stratejileri." *Gazi Üniversitesi Kırşehir Eğitim Fakültesi Dergisi,* 6(1): 209-225.

Tertemiz, N., Özkan, T., Çoban Sural, Ü., Ünlütürk Akçakın, H. (2015). "İlkokul (1-4) Matematik Ders Kitaplarında Yer Alan Dört İşlem Becerisine Dayalı Problem Yapılarının İncelenmesi." *Uluslararası Türk Eğitim Bilimleri Dergisi,* 119-137.

Tompkins, P., & Lawley, J. (2002). "The Magic of Metaphor." *The Caroline Newsletter*, March.

Toptaş, V., Elkatmış, M. and Karaca, E. T. (2012). "İlköğretim 4. Sınıf Matematik Programının Öğrenme Alanları İle Matematik Öğrenci Çalışma Kitabındaki Soruların Zihinsel Alanlarının TIMSS'e Göre İncelenmesi." *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, 13(1): 17-29.

Tutak, T., Güder, Y. (2012). "İlköğretim 5. Sınıf Öğretmenlerinin Matematik Ders Kitabı Hakkındaki Görüş ve Düşünceleri." *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi,* 19: 16-28.

Tünde, B. and Gabriella, S. (2011). "Examination of Mathematics Textbooks in Use in Hungarian Primary Schools in Romania." *Acta Didactica Napocensia*, 4(2-3): 47-58.

Uluışık, M. (2008*). İlköğretim Beşinci Sınıf Matematik Ders Kitaplarının Görsel Tasarım İlkeleri Açısından Değerlendirilmesi*. Yayınlanmamış Yüksek Lisans Tezi, Afyon Kocatepe Üniversitesi Sosyal Bilimler Enstitüsü, Afyonkarahisar.

Wang, T. L. and Yang, D. C. (2016). "A Comparative Study of Geometry in Elementary School Mathematics Textbooks from Five Countries." *European Journal of STEM Education*, 1(3): 58.

Yapıcı, M. (2004). "İlköğretim 1. Kademe Ders Kitaplarının Öğrenci Düzeyine Uygunluğu." *Afyon Kocatepe Üniversitesi Sosyal Bilimler Dergisi*, 121-130.

Yeniterzi, B., Işıksal-Bostan, M. (2015). "7. Sınıf Matematik Öğretmen Kılavuz Kitabının Matematik ve Fen Derslerinin İlişkilendirilmesi Açısından İncelenmesi." *İlköğretim Online,* 14(2): 407-420.

Yıldırım, A. and Şimşek, H. (2006). *Sosyal Bilimlerde Nitel Araştırma Yöntemleri.* Ankara: Seçkin Yayınevi.

Yıldız, C. and Hacısalihoğlu Karadeniz, M. (2016). "Examining the Problem Types in Middle School Mathematics Textbooks in the Context of Presentation, Content and Solution." *TOJET: The Turkish Online Journal of Educational Technology*, November 2016, Special Issue for INTE 2016: 980-988.

Yob, I. M. (2003). "Thinking Constructively with Metaphors." *Studies in Philosoph and Education*, 22: 127-138.

Yüksel, E. (2010). *İlköğretim 6. Sınıf Matematik Ders Kitaplarının Öğretmen ve Öğrenci Görüşleri Doğrultusunda Değerlendirilmesi.* Yayınlanmamış Yüksek Lisans Tezi, Çukurova Üniversitesi Sosyal Bilimler Enstitüsü, Adana.

Yeniterzi, B. and Işıksal-Bostan, M. (2015). "An Examination of the 7th Grade Mathematics Teacher's Guidebook in Terms of the Relationship Between Mathematics and Science." *Elementary Education Online,* 14(2)*:* 407-420.

Zeybek, Z., Üstün, A. and Birol, A. (2018). "Matematiksel İspatların Ortaokul Matematik Ders Kitaplarındaki Yeri." *İlköğretim Online,* 17(3): 1317-1335.