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Problem Solving Levels Of Elementary School Students On Mathematical Word Problems And The Distribution of These Problems in Textbooks

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Abstract

This study aims to investigate primary school students' addition and subtraction based mathematical word problem solving levels and to identify the types of questions asked to students in mathematics course books. A form with problem types was administered to 158 third year students. Also, 6 mathematics course books and students' books were analyzed through document analysis. The results showed students had difficulties in initial unknown addition and subtraction problems and compare problems. In addition, it was found out that result unknown addition and subtraction based word problems were mostly used in the mathematics course books and students' books prepared by the Ministry of National Education. It was also observed that compare problems were very scarcely used.

İlkokul Öğrencilerinin Matematiksel Sözel Problemleri Çözme Düzeyleri ve Bu Problemlerin Ders Kitaplarındaki Dağılımları

Makale Bilgisi

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Anahtar Kelimeler:
Akademik başarı, Üniversite yaşamına katılım, Öğrenci kazanımları, Yapısal eşitlik modeli, Üniversite öğrencileri.

Öz

Bu araştırmada ilkokul öğrencilerinin toplama ve çıkarma işlemine dayalı matematiksel sözel problemleri çözme düzeylerinin belirlenmesi ve öğrencilere matematik ders kitaplarında sunulan problem türlerinin dağılımının belirlenmesi amaçlanmıştır. 158 üçüncü sınıf öğrencisine problem türlerinin yer aldığı bir form uygulanmıştır. Aynı zamanda 6 matematik ders kitabı ve öğrenci çalışma kitabı doküman analizi kullanılarak incelenmiştir. Araştırma öğrencilerin başlangıç bilinmeyenli toplama çıkarma problemlerinde ve karşılaştırma problemlerinde güçlükler yaşadıklarını ortaya koymuştur. Bunula birlikte MEB tarafından hazırlanan ilkokul matematik ders ve öğrenci çalışma kitaplarında toplama ve çıkarmaya dayalı sözel problem türlerinde çoğunlukla sonuç bilinmeyenli problemlere yer verildiği, karşılaştırma problemlerine neredeyse hiç yer verilmediği görülmüştür.

Introduction

In order to facilitate the students' improvement of their skills such as reasoning, representing, modelling and communication, word problems are set to work during their formal education. By this way, students can gain experience by using their mathematical knowledge and skills in daily life (Greer, 1997; Reusser & Stebler, 1997). In other words students benefit from mathematical word problems about building connection between conceptual and mathematical knowledge. Reusser and Stebler (1997) stated that these problems prepare suitable environment for students to provide language formation, reasoning and mutual interaction. According to the literature (Carpenter, Carey & Kouba,1990), Carpenter and Moser, 1981; Fuson, 1992;Van de Walle, Karp, and Williams, 2010), the

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word problems linked with addition and subtraction considering the relationship on which they were built. In word problems, children's performances on problem solving skills change in line with what the unknown is (Haylock & Cockburn, 2004; Sarama & Clements, 2009) .In an addition or in a sub traction, as the position of the unknown change(2+3=?; ?+3=5; 2+?=5; 5-2=?; 5-?=3…) the type of the word problem change accordingly. Van de Walle, Karpand Williams (2016) considered all word problems classification as a whole and evaluated them. Van De Walle et al. (2016) have grouped addition and subtraction problems as change (Join and separate), part-part whole problems, and compare problems. The problems were grouped into sub-categories when one of these elements was unknown. The descriptions of this classification and sub-categories were as follows:

Join/Add to problems: Three amounts can be seen in this kind of problems: the initial, the change (the part being added or joined) and the result (the amount that is obtained after the operation). It is generally preferred not to give one of these elements as the unknown in the problem.

Separate: In these problems, the change is that an amount is being physically removed or taken away from the start value.The sub-categories and related examples of Join and Separate problems are in Table 1.

Table 1.

Change (Join and Separate) problems (Adapted from Van De Walle et al. (2016) p.193)

	Result unknown	Change Unknown	Start Unknown
Join/Add to	Berke had 4 apples. Ege gave him 3 more. How many apples does Berke have altogether? 4+3=?	Berke had 3 apples. Ege gave him some more. Now Berke has 7 apples. How many did Ege give him? 3+?=7	Berke had some apples. Ege gave him 3 more. Now Berke has 8 apples. How many apples did Berke have to begin with? ?+3=8
Separate/ take from	Berke had 8 apples. He gave 4 apples to Ege. Now How many apples does Berke have now? 8-4=?	Berke had 9 apples. He gave some to Ege. Now Berke has 4apples. How many did he give to Ege? 9-?=4	Berke had some apples. He gave 4 to Ege. Now Berke has 3 apples left. How many apples did Berke have to begin with? ? - 4=3

Part-part-whole problems: These problems involve two parts that are conceptually or mentally combined into one collection or whole. The combining may be a physical action or a mental combination in which the parts are not physically combined.

Compare problems: Compare problems involve the comparison of two quantities. The third amount is not actually present but is the difference between the two amounts. However, the third amount is the difference between the two already-given amounts. The subcategories and the related examples of Part-part Whole problems and Compare problems are as follows (Table 2):

Table 2.

Part-Part Whole and Compare Problems (Adapted from Van De Walle et al. (2016) p.193)

	Whole unknown	One-part Unknown	
Part-part Whole	Ege has 3 apples and 5 oranges. How many fruits does he have? 3+5=?	Ege has 8 fruits. Three of his fruits are apples, and the rest are oranges. How many oranges does Ege have? 8=3+? or 8-3=?	
	Difference Unknown	Larger Unknown	Smaller Unknown
Compare	Ege has 7 apples and Berke has 4 apples. How many more apples does Ege have than Berke? 7-3=?	Egehas 4 more apples than Berke. Berke has 12 apples. How many apples does Ege have? 8+4=?	Ege has 3 more apples than Berke. Ege has 6 apples. How many apples does Berke have? ?+3=6

Researchers mention that children should be taught different types of structures to define the important characteristics of the problems and to determine in what context they should addorsubtract (Fagnant & Vlassis, 2013; Fuchs, Fuchs, Prentice, Hamlett, Finelli, & Courey, 2004; Xin, Jitendra, & Deatline-Buchman, 2005; Cited in Van De Walle et al. 2016). In otherwords; they say that these types should be presented to children, so that they solve word problems successfully (Sarıbaş & Arnas, 2017). The problems presented to children are mostly the ones in the text books and work books. The studies show that textbooks do not include some problem types or do not give equal importance to all (Parmjit & Teoh, 2010; Parmjit, 2006; Despina & Herikleia, 2014; Olkun & Toluk, 2002).

When the related literature was reviewed, it is seen that the researches on mathematical word problems were mostly carried out with the children in the pre-school period (Altun, Dönmez, İnan&Özdilek, 2001; Artut, 2015; Carpenter, Hiebert, & Moser, 1983; Carpenter, Franke, Ansell, Fennema, & Weisbeck, 1993; Davis & Pepper, 1992; Manches, O'Malley&Benford,2010; Monroe & Panchyshyn, 2005; Patel & Canobi, 2010; Tarım, 2009;Saribaş&AktaşArnas, 2016). Olkun and Toluk (2002) conducted a study at primary school level. They investigated the elementary school students' achievements on mathematical word problems and the distribution of these problems in the course books. It was revealed by their findings that the students' achievements in terms of problem types displayed similarities with the distribution of the problem types in the course books.

Textbooks are so central in teaching that using textbook strongly influences what teachers do. The teacher is much more likely to have math lessons that link important mathematics concepts to contexts that engage students (Van de Walle et al., 2010). Therefore, the contents of the word problems in textbooks, the numbers that are used in these problems and the problems types presented to the students in textbooks have significant effects on their establishment of contextual relationships between the operations.

The purpose of this study is twofold: One is to determine student success on the mathematical word problems based on addition and subtraction. The other is to examine whether elementary school mathematics textbooks adequately include the standard word problems representing different meanings of addition and subtraction.

Significance: The studies for making the 1st and 2nd grade elementary school students comprehend the addition and subtraction are presented intensively. The studies about multiplication and division are added in higher (the 3rd and 4th) grade. Therefore, it was found acceptable to work with 3rd grade elementary school students in order to determine at what level and at what types of word problems based on addition and subtraction the success is achieved. In Turkey, textbooks and workbooks at all levels of elementary education are designed by the committees which were assigned by the Ministry of National Education and they are distributed to all elementary schools (both private and state schools) free of charge. All schools are obliged to use these textbooks in their programs. Accordingly, it becomes important to identify the distribution of the problems in these textbooks which are compulsory to follow, to identify how much of these problems which were designated in the literature was used and to present the existing situation on this issue. The results obtained from this study can provide important contributions to the process of re-evaluation of the textbooks and to the studies which aim to determine the reasons of the failure of students on some problem categories.

Method

In this research, quantitative data was obtained by descriptive survey model in order to find at which mathematical word problems the students are successful and qualitative data was obtained by document analysis method in order to determine the distribution of the types of word problems which are presented to the students in mathematics textbooks and workbooks. For this reason, mixed methods (convergent parallel design) was used in the study. The convergent parallel design gives equal importance to qualitative and quantitative methods and analyses them separately, then combines the results in the phase of the interpretation (Creswell, 2014).

Participants

The study was conducted with the 3rd grade students attending to 3 elementary schools which represent low, middle and high socio-economic levels in Adana, which is a metropolis in the south of Turkey. 158 students participated in the research. It was specified that 45 of them were from low socio-economic level, 62 of them were from middle socio-economic level and 51 of them were from high socio-economic level.

The textbooks and the workbooks which were being used in elementary school mathematics lessons were used as the second data source. The mathematics textbooks in Turkey are designed in forms of a textbook and a workbook. In this study, these two books were included in the research in all grade levels. In other words, totally 6 books were investigated as the textbooks and the workbooks for the first, second and third grade levels.

Instrument

In the research, the quantitative data consisted of 13 problems about each category and their sub-categories on word problems with addition and subtraction. The problems were prepared and formed by the researcher and they are constituted from word problems about addition and subtraction the classification of which was made by Van De Walle et al. (2010). The reliability of the test was found as 0.77 from KR-20 measurement. As this value was higher than 0.70, the test was accepted as reliable (Büyüköztürk, 2015. p.183).

So as to obtain qualitative data, the textbooks which were distributed by Ministry of National Education (MoNE) and were being used in the 1st, 2nd and 3rd grades of elementary schools were acquired. These books were investigated at all grade levels one by one by considering the categories which were expressed in the literature (Van De Walle et al., 2010). The number of the problems in each category was recorded by writing the number of the pages they exist next to them. After that, the number of the problems in each category was found.

Join/Add to Problems for Grade 2

Result unknown	page28→ 40+46=? Page49→19+25=? …
Change unknown	Page64 → 16+?=30 Page64 → 17+?=29

Figure1. Example of record form

Data Analysis

The quantitative data obtained from the students in this study was analyzed by specifying frequency and percentage values. The document analysis method was used in the analysis of mathematics textbooks and workbooks. For this purpose, the word problem categorization which was formed by Van De Walle et al. (2010) was taken as a basis and a "Record Form" was created. The kinds of word problems in the books were examined by the researcher and they were recorded to this form. Then, the frequencies and percentages were calculated.

Findings and Comments

While presenting the findings obtained from the study, the descriptive statistics of the students' answers given to the word problems about addition and subtraction (Table 3) were given and commented. After that, the data and comments on how the distribution of the word problem types in mathematics textbooks and workbooks is (Table 4) were presented.

Table3.

Descriptive statistics of the students' answers given to the word problems (n=158)

		Correct	
		f	%
PROBLEMS			
Problem1: Join: Result Unknown	8+7=?	150	94.9
Problem2: Join: Change Unknown	17+?=25	107	67.7
Problem3: Join: Initial Unknown	?+16=25	104	65.8
Problem4: Part-Part-Whole: Whole Unknown	26+34=?	148	93.7
Problem5: Part-Part-Whole: Part Unknown	19+?=46	102	64.6
Problem6: Separate: Result Unknown:	72-45=?	112	70.9
Problem7: Separate: Change Unknown:	14-?=9	119	75.3
Problem8: Separate: Initial Unknown	?-22=79	102	65.2
Problem9: Compare: Difference Unknown	44-29=?	94	59.5
Problem10: Compare: Difference Unknown	56-34=?	118	74.7
Problem11: Compare: Smaller Unknown	27-7=?	99	62.7
Problem12: Compare: Larger Unknown	12+9=?	129	81.6
Problem13: Compare: Larger Unknown	18+5=?	67	42.4

When the students' answers given to the questions were analyzed (Table 3), it was seen that 94.9 % of the students gave correct answers to the problem 1 and 93.7 % of the students answered the problem 4 correctly. The students were able to solve both types of problems. These problems were Join: result unknown (Problem 1) and Part-Part-Whole: Whole Unknown (Problem 4) which require the

operation of addition. These types of problems especially Join: Result Unknown problems appear in the textbooks the most (28.77 %) (see Table 4).

It can be said that Part-Part-Whole: Whole Unknown problems (Problem 4) are found easy by students as they show similarities with Join: Result Unknown problems and they require the operation of addition.

When Part-Part-Whole problems are considered, the students showed less success in the problem in which part was unknown (19+?=46) than in the problem in which whole was unknown. Here, the students had more difficulty in solving the question which requires the operation of subtraction than the other question. The reason of this difference may derive from the fact that the unknown is in the middle and the student is searching for an answer for 19+x=46. No matter what type the problems were, the students displayed similar distribution in initial unknown problems (?+16=25; ?-22=79) (Join: Initial Unknown: 65.8 %; separate: Initial unknown: 65.2 %). According to Van de Walle et al. (2010, p.148), the join or separate problems with initial unknown are considered as one of the most difficult ones. They said that the children modelling the problems exactly are not aware of the number of counters to begin with. Also, problems in which the change amounts are unknown are difficult. The document analysis revealed that these types of problems were encountered merely in the textbooks and workbooks (Join: Initial Unknown: 0.71%; Separate: Initial Unknown: 5.75 %).The relatively low success which was observed here can be considered natural as these types of problems exhibit difficult structure and they are the ones which the students encounter. Van de Walle (2001, p.148) mentioned that in most books, there was simply more emphasis on join and separate problems with result-unknown structure. One of the reasons why the children failed in the other problem categories may stem from their infrequent exposure to these other problems.

Compare: When difference unknown problems (Problems 9 and 10) were analyzed, it was seen that the success which was showed in these problems was quite different although they were the same type. When the reason of this difference was questioned, it drew attention that there were key words in their explanations such as “more” and “fewer”. To explain better these two problems, they were given below:

PROBLEM9: Ayla has got 29 candies whereas her sister Elif has got 44 candies. How many more candies has Elif got than Ayla? (Compare: Difference Unknown 44-29=?)
PROBLEM10: Cemre has got 56 stick crackers whereas Selim has got 34 stick crackers. How many fewer stick crackers has Selim got than Cemre? (Compare: Difference Unknown 56-34=?)

As it can be seen, although the key word “more” which associates with the operation of addition was used in problem 9, the operation of subtraction is required for the solution of the problem as opposite. Therefore, the students might have had more difficulties in solving this problem than the other one (59.5 % vs. 74.7 %).

Similarly, the students showed different achievement level even though the problems 12 and 13 were the same type; Compare: Larger Unknown (for problem 12:81.6 %; for problem 13: 42.4 %). Consequently, it was thought that the key words “more” and “fewer” which were used in the explanation of the problems were effective in this difference. These problems are as follows:

PROBLEM12: Meryem has got 12 pullovers. As Ela has got 9 ***more*** *pullovers than Ela, how many pullovers has Ela got? (Compare: Larger Unknown: 12+9=?)*

PROBLEM13: Nurcan has bought 18 bananas at the greengrocer's. Nurcan has got 5 ***fewer*** *bananas than Duygu. How many bananas has Duygu got? (Compare: Larger Unknown 18+5=?)*

As it can be seen, the key word "fewer" misled the students in the solution of Problem 13. In this problem; the word "fewer" was associated with subtraction. However, it was necessary to add 18 and 5 to solve the problem. In other words, the word "fewer' misguided the students. In this study, document analysis was conducted to see to what extent each type of problems was presented to students in textbooks and workbooks. Analysis of the distribution of word problems in Mathematics textbooks and workbooks according to the categories is given in Table4.

Table 4.
The distribution of word problems in Mathematics textbooks and workbooks according to the categories

Categories	Sub-categories	1st grade		2nd grade		3rd grade		Total	
		f	%	f	%	f	%	f	%
Join Problems	Result unknown	17	15.47	18	50	5	41.66	40	28.77
	Change unknown	13	14.28	2	5,55	-		15	10.79
	Initial unknown	-	-	1	2.77	-		1	0.71
Separate Problems	Result unknown	26	28.57	10	27.77	2	16.66	38	27.33
	Change unknown	4	4.39	-		2	16.66	6	4.31
	Initial unknown	5	5.49	3	8.3	-		8	5.75
Part-part Whole Problems	Whole unknown	15	16.48	-		1	8.33	16	11.51
	Part unknown	6	6.59	-		-		6	4.31
Compare Problems	Difference unknown	5	5.49	2	5.55	2	16.66	9	6.47
	Larger unknown	-		-		-		-	
	Smaller unknown	-		-		-		-	
	Total	91	100	36	100	12	100	139	100

As it can be seen in Table 4, result unknown problems appeared in the textbooks more (28.77 % + 27.33% = 56.10%). There were scarcely any initial unknown problems. Similarly, it was observed that all sub-categories of compare problems were scarcely used in the first three years of elementary education, especially larger unknown and smaller unknown problems. Similar to this, in a study by Olkun and Toluk in Turkey (2002) found out that all types of word problems were not included in the primary

school textbooks. This shows that the situation has not changed at all. It can still be said that there are lacking points in the course books in our country. In another similar study by Peterson, Fennema and Carpenter (1989), it was seen that children were mostly presented results-unknown problems. As the course books include more results-unknown problems, these problems are mostly presented to children. Though this is the case, according to Greer (1997), carefully chosen word problems can provide a rich context for learning addition and subtraction concepts. The learning environment needs to be enriched especially by different types of problems (For example; enriching the textbooks with this perspective, increasing the teachers' awareness on this issue etc.).

To conclude, the results of these studies are compatible with the studies by Saribaş & Aktaş Arnas, 2017; Olkun and Toluk, 2002; Peterson, Fennema and Carpenter, 1989; Despina & Harikleia, 2014; Pramjit and Teoh, 2010; Jeong and Lee; 2016) on the findings that all problems are not equally given importance in course books (change unknown problems, comparative problems) and this influence schildren's problem solving skills negatively.

Conclusion & Recommendations

In this research, at what level the students solve word problems based on addition and subtraction and the types of word problems which the students encounter in mathematics textbooks were investigated. The study showed that students had difficulties with initial-unknown addition and subtraction problems and comparative problems in comparison to other types. In addition to this, it was seen that word problems based on addition and subtraction mostly with result unknown were used whereas comparison problems were scarcely used in elementary school mathematics textbooks and workbooks that were designed by MoNE.

When these results are considered, it is believed that presenting all types of problems in a balanced distribution in textbooks and workbooks will be beneficial. Besides, it is also important for teachers to use all types of problems in their classes so as to enable the students to experience and learn these problem situations. Furthermore, the recommendations for further studies about this issue can be organised as:

-This study was conducted with 3rd grade elementary school students. It can be replicated by involving all grades and comparative analysis can be made.

-In this study, only the textbooks and workbooks which were assigned by MoNE were dealt with. As some of the teachers use different reference/source books, source books from different publishing companies can be included in future study.

-In this study, the teachers' perspectives and the data about whether they use these types of word problems were not collected. In order to reveal the awareness levels of the teachers on this issue, a similar study can be carried out with elementary school teachers.

References

Altun, M., Dönmez, N., İnan, H., Taner, M., &Özdilek, Z. (2001). Altı yaş grubu çocukların problem çözme stratejileri ve bunlarla ilgili öğretmen ve müfettiş algıları [Problem solving strategies of six age group children and school teacher's and inspector's perception of them]. Uludağ *Üniversitesi Eğitim Fakültesi Dergisi*, 14(1), 211-230.

Artut, P. D. (2015). Preschool Children's Skills in Solving Mathematical Word Problems. *Educational Research and Reviews*, *10*(18), 2539-2549.

Büyüköztürk, Ş. (2015). *Sosyalbilimler için very analizi el kitabı* (21.Baskı). Ankara: Pegem Yayınları.

Carpenter, T. P., Franke, M.L., Ansell, E., Fennema, E., & Weisbeck, L. (1993). Models of problem solvıng: a study of kındergarten chıldren's problem-solvıng processes. *Educ. Res. J. Res. Math. Educ.* 24 (5),428-441.

Carpenter, T.P., & Moser, J.M. (1981). The development of addition and subtraction problem solving skills, In T. P. Carpenter, J. M. Moser and T. Romberg (Eds.), *Addition and Subtraction*, Lawrence Erlbaum Associates, HiUsdale, NJ.

Carpenter, T.P., Carey, D.A., & Kouba, V.L. (1990).A Problem–Solving Approach to the Operations. In Mathematics for the Young Child, J.N. Payne (Eds.), *National Council of Teachers of Mathematics,* Reston, VA.

Carpenter, T.P., Hiebert, J., & Moser, J.M. (1983).The effect of instruction on children's solutions of addition and subtraction word problems.*Educ. Stud. Math.* 14(1), 55-72.

Creswell, J. W. (2014). *A concise introduction to mixed methods research*.Sage Publications.

Davis, G., & Pepper, K. (1992).Mathematical problem solving by preschool children.*Educ. Stud. Math.* 23, 397-415.

Despina, D. & Harikleia, L. (2014). Addition and subtraction word problems in greek grade a and grade b mathematics textbooks: distribution and children's understanding. *International Journal for Mathematics Teachingand Learning,*8, 340.

Fuson, K.C. (1992). Research on whole number addition and substruction. D.A. Grouws (Eds.), *Handbook of Research on Mathematics: Teaching and Learning.* Newyork: Macmillan.

Greer, B. (1997). Modelling reality in mathematics classrooms: The case of word problems.*Learning and Instruction*, 7 (4), 293-307.

Haylock, D. &Cockburn, A. (2004). *Understanding mathematics in the lower primary years*. London: Paul Chapman Publishing.

Jeong, S. Y.,& Lee, D. H. (2016). An Analysis on the Elementary 2 nd· 3 rd Students' Problem Solving Ability in Addition and Subtraction Problems with Natural Numbers. *Education of Primary School Mathematics*, *19*(2), 127-142.

Manches, A., O'Malley, C., & Benford, S. (2010). The role of physical representations in solving number problems: A comparison of young children's use of physical and virtual materials. *Comput. Educ.* 54(3), 622-640.

Monroe, E., & Panchyshyn, R. (2005). Helping children with words in word problems.*Australian Primary Mathematics Classroom,* 10(4), 27-29.

Olkun S, & Toluk, Z. (2002) .Textbooks, word problems, and student success on addition and subtraction.*International Journal of Mathematics Teaching and Learning.* Retrieved October 21, 2016, from http://www.cimt.plymouth.ac.uk/journal/olkuntoluk.pdf

Parmjit, S. &Teoh, S. H. (2010). An analysis of addition and subtraction word problems in mathematics textbooks used in Malaysian primary school classrooms. *BruneiInt.J.ofSci. & Math. Edu.*, 2(1), 68-85.

Parmjit, S. (2006). An analysis of word problems in school mathematics texts: operation of addition and subtraction. *Journal Of Scıence And Mathematics EducationIn S.E. Asia,* 29(1), 41-61.

Patel, P., &Canobi, K.H. (2010). The role of number words in preschoolers' addition concepts and problem solving procedures. *Educ. Psychol,* 30(2),107-124

Peterson, P. L., Fennema, E. & Carpenter, T. (1989). Using knowledge of how students think about mathematics. *Educational Leadership*, 46(4), 42-46.

Reusser, K., & Stebler, R. (1997). Every word problem has solutions: The suspension of reality and sense-making in the culture of school mathematics. *Learn. Instruction,* 7,309–328.

Sarama, J. ve Clements, H.D. (2009). *Early childhood mathematics education research*. New York and London: Routledge.

Sarıbaş, Ş. & Aktaş Arnas, Y. (2017). Whichtype of verbal problems do the teachers and education materials present to children in preschool period? *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education 11(1)*, p. 81-100.

Saribaş, Ş. & Aktaş Arnas, Y.(2016). Okul öncesi dönem çocuklarının sözel problemleri çözme becerileri ve öğretmenlerin çocuklara sundukları sözel problem türleri, *Pegem Eğitim ve Öğretim Dergisi*, 6(4), 2016, 549-568.

Tarım, K. (2009).The effects of cooperative learning on preschoolers' mathematics problem-solving ability. *Educ. Stud. Math.,* 72(3), 325- 340.

Van de Walle, J. A. (2001). *Elementary School Mathematics, Teaching Developmentally*.Addison-Wesley/Longman, Route 128, Reading, MA 01867.

Van de Walle, J. A., Karp, K. S., & Williams, J. M. B. (2010). (7th ed.)Elementary and middle school mathematics.Teaching developmentally. Boston: Pearson.

Van de Walle, J. A., Karp, K. S., & Williams, J. M. B. (2016). (9th ed.) Elementary and middle school mathematics. Teaching developmentally. Boston: Pearson.

Yıldırım, A., &Şimşek, H. (2008). *Sosyal Bilimlerde Nitel Araştırma Yöntemleri* (7. Baskı) Ankara: Seçkin Yay.

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