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An Investigation of Elementary School Teachers' Sense of Number

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This research primarily investigates elementary school teachers' sense of number. This is a descriptive research with a survey model. The participants of the study were 155 primary school teachers teaching in state schools in Adana, in the South of Turkey. As a data collection tool, a test of sense of number was used. This test was composed of 50 items, prepared according to the five components of sense of number. The data was analysed through quantitative methods. The results show that the elementary school teachers' sense of number is at the mid-level. In line with the findings of the study, suggestions are given to develop primary school teachers' sense of number.

Keywords: sense of number, primary school teachers, mathematics education

Introductıon

A qualified teacher should be equipped with strong subject knowledge and pedagogic domain knowledge. Pedagogic domain knowledge implies teaching approaches used to make a concept or a topic more comprehensible for others; whereas, subject knowledge is the amount and organization of knowledge in a teacher's mind (Shulman, 1986).

Even (1990) claimed that a teacher with strong mathematics knowledge can help his students get meaningful learnings. He added that subject knowledge is an important component in teacher training. This component has a significant place in understanding, planning, and teaching mathematics.

Sense of number is vital in terms of the subject knowledge types that a teacher should have, so it is needed to explain the position and importance of this concept in mathematics. One of the best ways of achieving this is to focus on the skills of a student with a good sense of number. Making mathematical operaions, a student with a good sense of number can find out his own methods, can express a number in a way that fits into the situation and can make transitions between quantities in the real world and the numbers in the world of mathematics (Case, 1998, as cited in Şengül & Dede, 2014). While busy with operations in their mind, students with sense of number can make planning and control, can be flexible and can decide if the results are reasonable or not (Mohamed & Johnny, 2010). In short, a student equipped with a good sense of number can use daily life and school mathematics in a flexible way and in a way that makes his/her life easy.

It is possible for students to acquire sense of number through mathematics courses. In line with this, teachers responsible for giving these courses should put forward their skills which are related to this concept.

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Teachers can contribute into the acquisition of this concept by means of the classroom atmosphere they organize, teaching methods they use, and activities they implement (Tsao & Lin, 2011), so teachers' schemata about sense of number are important.

Literature Review

In a general perspective, sense of number means making logical calculations about various uses, realizing mathematical faults and number patterns and making decision on the most effective calculation way (Hope, 1989, as cited in Altay, 2010). According to Altay (2010), sense of number is defined as:

> Using numbers flexibly, practical thinking in operations with numbers, choosing the most effective and practical solution, in some situations creating non-standard ways that do not go in line with the situation, using comparison (reference) point in facilitating problems, and using conceptual thinking and different ways of showing in fractions.

As sense of number is a difficult concept to define, it has caused controversies among mathematical trainers (teachers, programme developers, and researchers) and cognitive psychologists (McIntosh, Reys, & Reys, 1992). These arguments have also been observed in revealing the components of sense of number.

In their study on the classifications of sense of number components, Şengül and Dede (2013), mentioned that there was no common classification regarding the components of sense of number in the related literature. They concluded that the most comprehensive classification was done by McIntosh et al. (1992). They thought that it derived from the fact that there were no certain borders of the concept of sense of number.

Following the classification by McIntosh et al. (1992), Sighn (2009) grouped the components of sense of number as understanding number concept, using multiple representations, understanding the effect of the operation, using equivalent presentations and calculation, and using counting strategies. In this present research, the components that Sighn (2009) formulated were used. In line with the explanations in the related literature, these components were considered as in the following manner:

Understanding Number Concepts

This component is about understanding the value that the number represented and the size that the number indicated. They understand and use the numbers and relationships completely (Harç, 2010). For example, the skill of knowing that there are indefinite decimal number between 0.5 and 0.6 is a sign of this component.

Using Multiple Representations

This is related to knowing different representations of the number or the value the number represented. For example, finding the number which best represents a dredged area in a whole is a sign of this component.

Understanding the Effect of Operations

This is related to realise how the result can be affected when a number or the value of the operation is changed in an operation. In short, a person who is capable of understanding the effect of the operation can know how four operations can affect the numbers (Yang, Reys, & Reys, 2009). In other words, it means to know that the multiplication does not always make the numbers higher and the division does not always make the numbers lower (Graeber & Tirosh, 1990; Greer, 1987; McIntosh et al., 1992). For example, realising that when 30 is multiplied by 0.09, the result will be lower than 30 is a sign of this component.

Using Equivalent Expression

This is related to knowing the numbers in different expressions, that is, their equivalences. For example,

understanding that two out of five can also be represented by an equivalence or understanding that 70 x 0.5 and 70:2 are equivalent symbolize this component (İymen, 2012).

Using Counting and Computation Strategies

This is related to knowing the result of the operation without using pen and pencil. In the related literature, it has been seen that there are studies about sense of number with elementary school students (Altay, 2010; Altay & Umay, 2011; Aunio, Lim, Hautamaki, & Van Luit, 2004; İymen, 2012; Markovits & Pang, 2007; Markovits & Sowder, 1994; Pike & Forrester, 1997; Reys, Kim, & Bay, 1999; Sengul & Gulbagci, 2012; Zaslavsky, 2001) and with teacher candidates (Altay & Umay, 2011; Clarke, 2012; Şengül, 2013; Şengül & Dede, 2014; Yaman, 2014; Yaman, 2015; Yang, 2007; Yang, Reys, & Reys, 2009). No studies have been found with elementary school teachers

These examples given above reveal that strong content knowledge is a must for an effective mathematics education. Also, it has been thought that it is important to investigate the teachers' skills related to sense of number as it is one of the skills that elementary school students should be equipped with. In addition, following the idea that sense of number can be developed (Olkun, 2012; Şengül & Dede, 2014; Tsao, 2012), it has been aimed to investigate whether teachers' experience with numbers during their teaching career is influential on the development of their sense of number. Considering all these explanations, it has been thought that this study contributes into the related literature and it is possible to make recommendations for the training of elementary school teachers. The research questions of the study are as below:

1. Is there a difference in elementary school teachers' sense of number performances in terms of gender?
2. How is elementary school teachers' sense of number performances?
3. Is there a difference in elementary school teachers' sense of number performances in terms of teaching experience period?
4. What is elementary school teachers' performances about the components of sense of humor in terms of teaching experience period?
5. Is there a difference in elementary school teachers' performances about the components of sense of number in terms of teaching experience period?

Method

This is a descriptive research with a survey model, investigating elementary school teachers' sense of number.

Participants

The participants of the study were chosen through convenience sampling. One hundred and fifty-five elementary school teachers working in state schools in Adana, a city in the South of Turkey participated in the study. Table 1 gives information about the participants' gender and teaching experience period.

As seen in Table 1, ouf ot 155 elementary school teachers, 97 of them are female and 58 of them are male. It has been seen that nearly 13.5 % of the participants have the teaching experience period of 1-5, 16.1 % of them have been teaching for 6-10 year, 18.7 % of them have been teaching for 11-15 year, 38.7 % have been teaching for 16-20 year, and 12.9 % of them have been teaching for 21 year and more.

Table 1

Elementary School Teachers in Terms of Teaching Experience Period and Gender

Gender	1-5 year	6-10 year	11-15 year	16-20 year	21-25 year	Total
Female	13	21	18	36	9	97(62.6%)
Male	8	4	11	24	11	58(34.4%)
Total	21(13.5%)	25(16.1%)	29(18.7%)	60(38.7%)	20(12.9%)	155

Data Collection Tool

As a data collection tool, the test of sense of number (SNT) adapted by Sing (2009) by following McIntosh, Reys, Reys, Bana, and Farrell (1997) was translated into Turkish by the researchers. The translated form was presented to three English language teachers and two mathematics teachers, specialized in teaching mathematics. The form was revised in line with feedback received. Then, the test was administered to piloted with three elementary school teachers in order to see whether the SNT items were clear enough or not. The reliability coefficient was found as 0.812.

In the SNT test, there are five components with 50 items. They are understanding the number concept, using the multiple representations, understanding the effect of the operation, using equivalences and calculations, and using counting strategies. Table 2 shows the components of the SNT test and the distribution of the questions in line with these components.

Table 2

Components of the Sense of Number Test and the Disribution of These Questions in Line With the Components and Sample Items

Components	Items	Example item
Understanding number concepts	Number of items: 14 Item no: 1, 3, 4, 6, 9, 10, 15, 18, 19, 22, 25, 29, 36, 39	Item 3: How many different decimal are there between 1.52 and 1.53? Circle your answer and then fill in the blank. A. None. Why? B. One. What is it? C. A few. Give two examples. D. Many. Give two examples.
Using multiple representations	Number of items: 7 Item no: 7, 8, 13,14, 30, 31, 40	Item 8:  Circle the decimal which best represents the amount of the box shaded. (A) 0.018 (B) 0.15 (C) 0.4 (D) 0.801 (E) 0.52
Understanding the effect of the operation	Number of items: 10 Item no: 16,17, 20, 21, 24, 27, 28, 38, 48, 49	Item 16: Without calculating the exact answer, circle the best estimate for: 9 x 0.98 A. More than 9 B. Less than 9 C. Impossible to tell without working it out
Using equivalent expression	Number of items: 8 Item no: 11, 23, 26, 32, 33, 34,37, 45	Item 11: 0.5 x 840 is the same as: A. 840 ÷ 2 B. 840 + 2 C. 5 x 8400 E. 0.50 x 84 D. 5 x 840
Using calculation and counting strategies	Number of items: 11 Item no: 2, 5, 12, 35, 41, 42, 43, 44, 46, 47, 50	Item 2: Ten bottles of orange juice cost a total of Turkish Lira (TL) 7.95 at K shop. I can get 5 bottles of the same juice for a total of TL 4.15 at L shop. Where is a bottle of orange juice cheaper? A. At K shop B. At L shop Tell how you decided:
Total	50 items	

Data Collection

The SNT test was administered to the teachers individually. They were instructed to leave 30-45 seconds to each item in the test, so they were guided to make use of their sense of number but not calculating.

Data Analysis

Before the data was analysed, all items in the test were checked if they were answered in line with the instructios and if there were any items left unaswered.

The data analysis was done through the Statistical Package for the Social Sciences (SPPS) 15.0 programme. Following the aim of the research, the frequency analysis (*f*), the percentage (%), and the mean (*X*) were calculated regarding the components of sense of number. The correct answers were evaluated as "1" and incorrect answers "0." The independent *t*-test was computed in order to test the significance of the participants' SNT scores regarding gender. Next, one-way ANOVA was computed to see if there were significant differences in the participants' sense of number test scores for irrelevant measures with respect to teaching experience period. Also, MANOVA was used to test if the participants' scores in the test differed significantly regarding sense of number test.

Findings

In this section, the findings were given and they were interpreted in line with the research questions.

Findings and Interpretations of the Elementary School Teachers' Sense of Number Scores in Terms of Gender

The indepedendent groups *t*-test was used to test the significance of the elementary school teachers' SNT scores regarding gender. The results were given in Table 3.

Table 3

Elementary School Teachers' t-Test Results Based on the Test of Sense of Number in Terms of Gender

Gender	*N*	$\bar{x}$	*SS*	*Sd*	*t*	*P*
Female	97	36.22	6.64			
Male	58	38.01	4.36	153	1.82	0.69
Total	155					

As seen in Table 3, the mean of the female participants' sense of number test scores was 36.22 and that of male participants was 38.01. Also, the standard deviation of the male participants has found to be higher than that of female participants. It implied that the male teachers had a more homogen structure; whereas, the female teachers were heterogenous. Independent groups *t*-test was computed to see if the differences was significant or not in terms of gender and no significant difference was found ($t(153) = 1.82$ $p > 0.01$).

Findings Related to the Elementary School Teachers' Sense of Number Performances Regarding Teaching Experience Period

Table 4 points out the mean and the standard deviation of the elementary school teachers' sense of number performances in terms of teaching experience period.

According to Table 4, the teachers with 11-15 teaching experience period had the highest mean (37.96) and the teachers with the teaching experience of 21 year had the lowest mean (34.90). Keeping in mind that the highest score to be taken from the SNT was 50, it was possible to say that the elementary school teachers' sense

of number performances was low. Referring to all information given above, then, one-way ANOVA was computed to see if there was a significant difference in the elementary school teachers' sense of number test for irrelevant sampling regarding teaching experience period. Table 5 illustrates the ANOVA results.

Table 4

Elementary School Teachers' Sense of Number Performances Regarding Teaching Experience Period

Teaching experience	$\bar{x}$ (Max. 50)	*SS*
1-5 year	36.33	7.65
6-10 year	37.64	5.00
11-15 year	37.96	5.82
16-20 year	36.93	5.04
21 and more	34.90	7.53
Mean	36.89	5.94

Tablo 5

ANOVA Results of Elementary School Teachers' Sense of Number Test Scores Regarding Teaching Experience Period

Source of variation	The sum of squares	*Sd*	The mean of squares	*F*	*P*
Between group	133.423	4	33.356		
Within group	5,304.926	150	35.366	0.943	0.441
Total	5,438.348	154			

No significant difference was observed in the elementary school teachers' sense of number test scores with respect to their teaching experience period ($F(4,150) = 0.943$, $p > 0.01$).

Findings and Interpretations Related to the Elementary School Teachers' Components of the Sense of Number in Terms of Teaching Experience Period

Findings and interpretations about understanding the concept of number compoent. Table 6 points out the frequency of correct answers regarding this component.

Table 6

Elementary School Teacher' Percentage Distribution Related to the Component of Understanding the Number Concept in Terms of Teaching Experience Period

Item no	1-5 year	6-10 year	11-15 year	16-20 year	21-25 year	Mean
1	90.5	88.0	89.7	86.7	90.0	88.4
3	66.7	60.0	69.0	55.0	60.0	60.6
4	95.2	100.	100	98.3	85.0	96.0
6	71.4	56.0	62.1	48.3	40.0	54.2
9	61.9	40.0	20.7	46.7	40.0	41.9
10	90.5	92.0	89.7	85.0	75.0	86.5
15	85.7	76.0	93.1	83.3	80.0	83.9
18	47.6	64.0	69.0	61.7	50.0	60.0
19	47.6	60.0	58.6	48.3	30.0	49.7
22	76.2	80	89.7	88.3	85.0	85.2
25	90.5	80.0	79.8	83.3	80.0	81.9
29	85.7	92.0	79.3	78.3	90.0	83.2
36	85.7	96.0	93.1	80.0	80.0	85.8
39	38.1	52.0	31.0	35.0	55.0	40.0
Mean	73.80	62.85	73.2	69.87	67.14	71.23

According to Table 6, the percentage mean of the correct answer of the elementary school teachers' understanding of the concept of number component was 71.23%. The highest score belonged to the teachers with 1-2 teaching experience period as seen in Table 6. It was seen that the teachers with the teaching experience of 6-10 year had the lowest score. Regarding all teaching experience period category, the lowest score was observed in the 9th item (41.9 %) and in the 39th item (40%). In the 39th item, it was expected that the integer part consisted of a number with four digits and the comma would be in the appropriate place. However, the research findings showed that the teachers did not realise this point.

Item 39

715.347 + 589.200 + 4.553

The answer to the problem consists of the number 13,091. where it (,) should be to be correct answer?

Answer : .....

Findings related to the component of using multiple representations. Table 7 illustrates the percentage distribution of the correct answers related to the component of using multiple representations.

Table 7

The Percentage Distribution of the Component of Using Multiple Representations Regarding the Teachers' Teaching Experience Period

Item no	1-5 year	6-10 year	11-15 year	16-20 year	21-25 year	Mean
7	85.7	76.0	93.1	88.3	65.0	83.9
8	76.2	68.0	89.7	76.7	75	77.4
13	28.6	44.0	48.3	40.0	35.0	40.0
14	28.6	32.0	41.4	28.3	30.0	31.6
30	76.2	84.0	89.7	86.7	90.0	85.8
31	76.2	88.0	79.3	86.7	80.0	83.2
40	81.0	80.0	86.2	85.0	90.0	84.5
Mean	64.64	67.42	75.38	70.24	66.42	69.48

As seen in Table 7, the percentage of correct answers of the elementary school teachers' using multiple representations was 69.48%. The highest percentage belonged the the participants with 11-15 year of teaching experience and the lowest percentage belonged to the participants with 21-25 year of teaching experience. Regarding all teaching experience periods, the lowest achievement was observed in the 14th item (31.6%) and 13th item (40.0%). It was seen that the elementary school teachers had difficulty in finding the value that the number represented on the number line and in expressing the number in a fraction where the numerator was nearly twice the denominator.

Item 14

Which letter in the number line above shows a fraction where the numerator is nearly twice the denominator?

Answer: ……

Findings and ınterpretations about the component of understanding the effect of operation. This component is related to the abiliy of realising how the results changes when a number or the value of the operation changes in calculations. Table 8 illustrates the the percentage distribution of correct answers that the elementary teachers give to this component.

Table 8
The Frequency Distribution of the Elementary School Teachers' Correct Answers About Understanding the Effect of the Operation in Terms of Teaching Experience Period

Item no	1-5 year	6-10 year	11-15 year	16-20 year	21-25 year	Mean
16	85.7	96.0	96.6	93.3	75.0	91.0
17	76.2	92.0	96.6	93.3	75.0	89.0
20	9.50	8.00	17.2	15.0	10.0	12.9
21	61.9	68.0	62.1	68.3	50.0	63.9
24	23.8	24.0	17.2	21.7	35.0	23.2
27	71.4	72.0	86.2	76.7	75.0	76.8
28	81.0	84.0	89.7	71.7	65.0	77.4
38	95.2	100	100	98.3	90.0	97.4
48	85.7	88.0	96.6	91.7	95.0	91.6
49	71.4	72.0	72.4	83.3	60.0	74.8
Mean	66.18	70.4	73.46	71.33	63.0	69.8

According to Table 8, it was seen that the mean of correct answers about the component of understanding the effect of the operation was 69.8%. The highest score was observed with the teachers who had 11-15 teaching experience period and the lowest score belonged to the teachers with 21-25 year of teachnig experience. With respect to all teaching experience periods, the lowest score was seen in the 20th item (12.9%).

Item 20
Without calculating the exact answer circle the best estimate for:
87 x 0.09
A. Very much less than 87 B. A little less than 87
C. A little more than 87 D. Very much more than 87

When the 20th item was considered, it was seen that some elementary school teachers who gave incorrect answer perceived the operation as a multiplication of two numbers. They thought that the answer would be more than 87 and chose the wornd answer. It was thought that they did not consider that the value of the multiplication decreased as one of the numbers was a decimal number.

Findings and interpretations about the component of using equivalences. In using equivalences, the elementary school teachers were expected to find the equivalence of the results of the operation and to use the appropriate symbol, such as equal sign, greater or lesser signs. The percentage distribution of correct answers the elementary school teacher give is shown in Table 9.

According to Table 9, the percentage mean of correct answer about using the equivalences is 79.2%. The elementary school teachers with the teaching experience of 11-12 year had the highest achievement percentage and the teachers with the teaching experience of 21-25 year had the lowest achievement percentage. Regarding all teaching experience periods, the lowest achievement was observed in the 23th item (49%).

Table 9
The Percentage Distribution of the Correct Answers of the Elementary School Teachers' Using Equivalences in Terms of Teaching Experience Period

Item no	1-5 year	6-10 year	11-15 year	16-20 year	21-25 year	Mean
11	81.0	88.0	89.7	88.3	85.0	87.1
23	42.9	60.0	55.2	45.0	45.0	49.0
26	66.7	84.0	75.9	81.7	55.0	75.5
32	100	92.0	96.6	91.7	95.0	94.2
33	61.9	72.0	72.4	48.3	45.0	58.1
34	71.4	76.0	86.2	75.0	70.0	76.1
37	100	96	100	95.0	95.0	96.8
45	100	100	96.6	96.7	90.0	96.8
Mean	77.98	83.5	84.07	77.71	72.5	79.2

Item 23

Write " is greater than," "is equal to," or " is less than" to make this a true statement:

$$5\ x\ 7\frac{1}{2}\ \ldots\ldots 35 \div \frac{1}{2}$$

In this item, the teachers were expected to use the symbol of "<". But, the teachers thought that the results was equal and they used the symbol of "=", instead of "<".

Findings and interpretations about the component of calculating and using counting strategies. Table 10 shows the percentage distribution of correct asnwers about the component of the elementary school teachers' use of calculating and counting strategies.

Table 10
The Percentage Distribution of Correct Answers Given to Using Calculation and Counting Strategies by the Elementary School Teachers in Terms of Teaching Experience Period

Item no	1-5 year	6-10 year	11-15 year	16-20 year	21-25 year	Mean
2	85.7	96.0	89.7	96.7	90.0	92.9
5	76.2	80.0	79.3	73.3	85.0	77.4
12	76.2	76.0	75.9	85.0	65.0	78.1
35	81.0	92.0	69.0	86.7	70.0	81.3
41	90.5	96.0	96.6	93.3	100	94.8
42	95.2	92.0	96.6	93.3	100	94.8
43	4.80	4.00	3.40	10.0	15.0	7.7
44	90.5	84.0	93.1	78.3	95.0	85.8
46	90.5	96.0	96.6	90.0	100	93.5
47	81.0	72.0	55.2	86.7	75.0	76.1
50	90.5	96.0	86.2	95.0	80.0	91.0
Mean	78.3	80.36	67.72	80.75	79.54	79.4

According to Table 10, the mean of correct answers about using calculating and counting strategies by the elementary school teachers is 79.4%. For this component, the highest achievement score belonged to the teachers with the teaching experience period of 6-10 year; whereas, the lowest score was by the elementary school teachers with the teaching experience period of 11-15 year. With respect to all teaching experience periods, the lowest achievement was observed in the 43th item (7.7%).

Then, MANOVA was calculated to see whether the SNT sense of number components score significantly changed regarding teaching experience period. Table 11 points out he MANOVA results. It was seen that the sense of number components had no effect on teachers' experience period (Wilks Lambda (Λ) = 0.795, $F(1.734) = , p > 0.01$).

Table 11

The SNT Components Mean, Standard Deviations and One-Way Variance Analysis Results in Terms of Teaching Experience Peripd

Components of sense of number	Teaching experience	$\bar{x}$	*SS*	*Sd*	*F*	*P*
Understanding the concept of number	1-5	10.33	2.61	4-150	0.901	0.465
	6-10	10.36	1.62			
	11-15	10.20	2.09			
	16-20	9.78	1.96			
	21-25	9.40	2.77			
	Total	9.98	2.15			
Using multiple Representations	1-5	4.52	1.74	4-150	0.924	0.452
	6-10	4.72	1.67			
	11-15	5.27	1.19			
	16-20	4.91	1.44			
	21-25	4.65	1.95			
	Total	4.86	1.55			
Understanding the effect of the operation	1-5	6.61	1.46	4-150	2.565	0.41
	6-10	7.04	1.27			
	11-15	7.34	1.26			
	16-20	7.13	1.19			
	21-25	6.30	1.49			
	Total	6.98	1.32			
Using equivalences	1-5-	6.23	1.37	4-150	2.186	0.73
	6-10	6.68	1.14			
	11-15	6.72	1.25			
	16-20	6.21	1.30			
	21-25	5.80	1.23			
	Total	6.33	1.29			
Calculating aplama and using sayma stra counting strategies	1-5	8.61	1.93	4-150	0.492	0.741
	6-10	8.84	1.31			
	11-15	8.41	1.63			
	16-20	8.88	1.43			
	21-25	8.75	1.74			
	Total	8.73	1.56			

Discussion, Result, and Suggestions

Investigating elementary school teachers' sense of number skills, this study was based on the data collected with 155 elementary school teachers.

In this study, the sense of number was analysed in terms of gender and teaching experience period. It was seen that the elementary school teachers' sense of number performances were low and this profile did not change with regard to gender and teaching experience period. Also, the sense of number component on which

the elementary school teachers gave the most correct answers were calculating and using counting strategies. The percentage of correct answers in this component was 79.4% and the percentage mean of correct answers in the component of using equivalences was 79.2%.

In their study, Altay and Umar (2011) investigated the elementary school teachers' calculating skills and the relationship between this and sense of number regarding grades. They found out that the elementary school teachers' sense of number was low. Similarly, Yang (2007) carried out a study focusing on elementary school candidate teachers' strategies use in the sense of number problems. Yang concluded that most of the elementary school candidae teachers preferred written calculation ways in solving problems. According to Yang (2007), this results was an evidence of teacher candidates' low performance of sense of number skills. In addition to this, Yang, Reys, and Reys (2009) did a study on Taiwanese elementary school candidate teachers' use of strategies in solving the real life problems. In their study, they found that the teacher candidates mostly used rule-based strategies. They added that this derived from the fact that their sense of number was low. Yaman (2014) also presented similar findings from her study focusing on the elementary school candidate teachers' sense of number skills with respect to grade, so the results of this present research can be said to be compatible with the findings in the related literature (Altay & Umay, 2011; Yang, 2007; Yang, Reys, & Reys, 2009; Yaman, 2014).

In different studies with a focus on the sense of number at the level of elementary school. Parallel findings were observed (Harç, 2010; Altay, 2010; Şengül & Gülbağcı, 2012). Considering both the studies in Turkey and abroad, it was seen that the skill of sense of number was not high with both students and teachers. Şengün (2013) claimed that this profile is a good support and example in Turkey for a perspective proposed by Alamı and Reys (2007), and Reys, Kim, and Bay (1999) in the related literature. Alamı and Reys (2007), and Reys et al. (1999) said that the children and teachers in the countries shared the same problems.

This study showed that teaching experience period had no effect on the sense of number performances. In liene with this, Yaman (2014) presented parallel findings to this study, emphasizing the low sense of number skills at teacher candidates.

All in all, it was concluded that the elementary school teachers' sense of number performances were found to be low and this was not changed regarding gender and teaching experience period. Moreover, it was found that the sense of number component that the the most correct answers were observed was calculating and use of of counting strategies.

As a suggestion, it can be proposed that the teacher should be trained in a way that they realize the importance of sense of number. Also, elementary school teachers should be aware of their students' sense of number and they should attend training programmes about how they can improve their students' sense of number skills and what kind of activities can be implemented and what kind of lesson plans should be prepared for this. Furthermore, training should be given to elementary school teachers to develop their mental calculation skills and prediction skills, so students' sense of number are developed.

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