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Student Difficulties in Addition and Subtraction of Two Digit Numbers

Rohma Mauhibah✉1, Karso2

1,2, Pendidikan Dasar, Universitas Pendikan Indonesia, Bandung, Indonesia
✉ rohmamauhibah@upi.edu

Abstract. Two digits addition and subtraction are important ability that must be mastered by all of student in elementary school. Because this skill will be the pre condition for further activities in mathematics. But, there are some student still have difficulties on it. This study describes about the student difficulties in solving addition and subtraction problem. The respondent are 28 student of second grade in SDN 033 Asmi Bandung. Research instrument is written test. There are three purpose of question (1) To know student ability on solving direct addition and subtraction problem, (2) To know student understanding on the meaning of operation. and (3) To know student understanding on relationship between addition and subtraction. There are three part of question. According to the findings obtained from the test, the students had some difficulties. The most difficulties is 78% of participant fail to answer 46 – 28= … . They can not do subtraction which is need to borrow. It is indicate that they just do the procedure without understanding the consept of operation. And then in question (… - 7 = 9 + 15 = …) there was 50% of student can not solve the problem. It indicate that they dodn't understand on relationship between addition and subtraction.

Keywords: Student Difficulties, Subtraction and addition, elementary school mathematics

INTRODUCTION ~ Addition and subtraction were essential ability in mathematics. It was given in first class of elementary school (Kemendikbud, 2016). Because of the importance of this competence, student have to master it. Student could do calculation only if they had understood number. Before they understood the concept of number, the instructions in mathematics class have no strong foundation (Pakasi, 1969).

The counting process cannot be forced, so for children to have an understanding of counting, they must construct this idea. Only the counting sequence of number words is a rote procedure. The meaning attached to counting is the key conceptual idea on which all other number concepts are developed. Counting is a complex task with typical developmental progressions found in a path called a learning trajectory (van de Walle, 2013).

Addition and subtraction given to student in bare notation. There was direct with formal notation such as: 2 + 3 = … (Kemendikbud, 2017). But several students didn't understand yet what the meaning of this operation. It was one problem that could be the cause of difficulty in doing subtraction and addition (van den Brink, 1991).

Piaget in Copeland (1973) classified children cognitive development into 5 steps. Student of lower-class elementary school was on operational concrete according Piaget's theory. In this phase, the main of instruction was the design. For designing a better instruction, student difficulties had to identified by teacher.

Arnidha (2015) analyzed student error on whole number calculation. In this study,

student error classified into two categories, misunderstanding the fact of calculation concept and random error. Misunderstanding calculation concept was when student can follow the procedure of calculation but they failed to find the correct result. Random error was when student doing short column addition, write the wrong result without reason. The finding of this research was 35% of respondent had type 1 error and 10,02% of respondent had type 2 error.

Sitorus (2014) explored student error on whole number operation. In this descriptive study, he analyzed student difficulties from the observation. According to this study many students failed to understand place value so they could not do the short column calculation.

There were three levels of calculation (Treffers, 2001). Calculation by counting, calculation by structuring and formal calculation. Student calculating at level 1 try to solve problem by counting one by one. For example: to solve $4 + 5 = \ldots$ they counting from four to nine one by one until five with their fingers. In level 2, student calculate by structuring. One characteristic feature of calculation at this level was the use of the empty number line as a drawing scheme. In the last level, formal calculation student no longer needed to use other kind of visual counting.

In Curriculum 2013 (K13) there was one of basic competence for first class elementary school that student have to doing addition and subtraction of two digits number. The indicator of this competence i.e: (a) student able do addition and subtraction in two digits number; (b) student able solve addition and subtraction in daily problem (c) student able to understand relationship between addition and subtraction in two digits number.

This study aims to describes student difficulties according three indicators above. Finding from this study are expected to be the base to construct the better instruction in the future.

METHOD

This descriptive quantitative study aims to investigated student difficulties in two digits subtraction and addition. There were four steps: First, we designed an instrument test. We construct three types question-based indicator we have to deserve. This instrument test had theoretical validation from the professional.

Second, we held written test I n 60 minutes. There were 28 respondents from second degree of SD Asmi 033 Bandung. We used purposive sampling technique. We chose the second degree because the skill of basic calculation in two digits had to mastered by student in first class of elementary school.

Third, we interviewed teacher in this class. These interviews aim to know what the strategies calculation or the procedure of addition and subtraction had given to

student. We also interviewed chosen student to ask the reason of their answer.

At last we had analyzed the students answer. The data analyzed in three steps. First, we checked the wrong-right of their answer and then classified the same error type. And at last but not least, we analyzed the difficulties we found. The analysis result will be described as below.

RESULTS

From the interviews with class teacher, we found information that the material of addition and subtraction of two digits had been given. The difficulty of students on this material, generally students have not been able to answer correctly the subtraction in numbers by borrowing. Addition and subtraction material are taught by long stacking counting strategies. Like the example below:

$$
\begin{array}{r}
10 \\
54 = 5\cancel{0} + 4 \\
40 \quad 14 \\
\ldots + \ldots \\
\underline{37 = 30 + 7} \ - \\
= 10 + 7 \ = 17
\end{array}
$$

There were 28 participants asked to do the test. From their answer, we interviewed 3 students to confirm their answer. The recapitulation of student answer can be seen in table bellow

Table 1. Recapitulation of student Answer

No.	Soal	Benar	Salah
1.	a. $12 + 45 =$	26	2
	b. $17 + 12 =$	23	5
	c. $46 - 28 =$	6	22
	d. $79 - 32 =$	26	2
	e. $15 + 7 - 9 =$	16	12
2.	Sebuah angkot jurusan Kalapa-Ledeng mula-mula berisi 7 penumpang ketika berangkat dari terminal kebon kalapa. Di Jl. Dewi Sartika, ada 5 penumpang naik. Kemudian 6 orang turun di depan Universitas Langlangbuana. Angkot tersebut ngetem di Jl. Belitung. Setelah ada 8 orang naik, angkot kembali berjalan. Sesampainya di depan Gramedia Merdeka ada 5 orang turun. Berapakah sisa penumpang angkot sekarang?	19	9

3.

$$\boxed{12} \xrightarrow{+4} \boxed{...} \xrightarrow{+5} \boxed{...}$$

$$\boxed{15} \xrightarrow{-7} \boxed{...} \xrightarrow{+6} \boxed{...}$$

$$\boxed{...} \xrightarrow{-7} \boxed{9} \xrightarrow{+15} \boxed{...}$$

27	1
21	7
14	14

In item (1a) 26 students answered correctly that 12 + 45 = 57. There were two children answered 12 + 45 = 66. It seems that the error was due to a mistake in counting, they added 1 by 5 and 2 by 4. So, they got 66 for the answer.

In item (1b) 23 students answered correctly that 17 + 12 = 29. There were three students who answered 17 + 12 = 28. One person answered 17 + 12 = 19 and another person answered 17 + 12 = 34

In item (1c) only 6 students were able to answer 46 – 28 = 18. From the six student who answered correctly, there was one student who wrote down the response strategy by counting backwards. There were 12 people answered 46 – 28 = 22. The error seems to be due to the student's habit of memorizing calculation procedures in a short column subtraction. However, students still think that the subtraction operation is subtracting numbers that have greater value with numbers that have smaller values. So, students subtract 8 by 2 and 4 by two. So, they get the answer 22. The rest students answer with varied answers. This is interesting to be explored further,

considering that more than 78% of students in the class failed to answer correctly.

In item (1d) almost all students answered 79 - 32 = 47. Unless there were two students who answered 67 and 48. In item (1e) there were 16 children who managed to answer 15 + 7 9 = 13. The rest students had various answer. Generally, the type of error in item (1e) is similar to error in item (1c).

In item (2) 19 students answered correctly. Before working on these questions, the teacher reads the questions aloud in front of the class. There were 14 students answered 9 by looking up and writing directly on the answer sheet without writing down the calculations. Five students write down the arithmetic flow with an arrow, so that an answer is obtained 9. Six out of 9 students who answer incorrectly, write down answer 3. From how to do it, the student's error lies in horizontal mathematical. They write 7 + 5 + 6 - 8 - 5 = 3.

Item 3 (a) and 3 (b) are the same type of problem. Almost of student able to solve correctly. Only one of them, failed in 3(a). student who have the wrong answer wrote

that 12 + 4 = 16 then 16 + 5 =22. it seems just an error counting. In 3(b) 25% of student have the same error type like in item 1(c). they difficult to answer how many 15 – 7 is. Because five the unit of five ten less than seven. So, they difficult to count it in short column subtraction. In item 3(c) only 50% of student can answer correctly. The problem in this item is little bit different. Student were asked to find … – 7 = 9. They just had to consider that addition and subtraction have inverse relationship so they can solve it easily.

DISCUSSION

From the observations described above, for the first indicator that students are able to do the addition and subtraction in two digits well. It appears that most students are able to do addition in two digits. Whereas for the subtraction, the students still have difficulty doing it by borrowing. It seems that students only memorize procedures without understanding the meaning of subtraction. In student understanding, subtracting is finding the difference between larger numbers and smaller ones. But in subtracting two digits, a number has a place value. The value of two digits number is not determined by the value of the unit digit.

For the second indicator, students understand the meaning of addition and subtraction operations, given in realistic contextual questions. From the observations it appears that the results are quite good. Most students are able to do the horizontal and vertical mathematical processes correctly. In the horizontal mathematical process, students must translate stories into mathematical operations. This, requires a correct understanding of the concepts of adding and subtracting. However, further observation is needed regarding this matter. Because the questions given using numbers less than 10.

For the third indicator that students know the relationship between addition and subtraction, the most mistake is when students are asked to find an unknown number if subtracted by another number by the known result. Students should only have to count down to find the number. But apparently, 50% of students whose answers are wrong guess without meaning.

CONCLUSION

From result described in the previous section, we conclude that even if student could find the result of addition and subtraction problem, they only followed the procedure without understanding the meaning of operation. 78% of them didn't understand the value place concept. 50% of them didn't know that the relationship between addition and subtraction. So they had difficulty in doing addition and subtraction problem. In the contextual problem, they perform better than the problem in formal notation.

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