Representation of completion of fraction calculations for class V students

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Abstract. This study aims to: (1) To determine the extent to which students understand and solve fractions, (2) Errors that students often do in solving fractions. The method in this study is through direct qualitative research by observing the object of research on understanding the problem solving fractions. While the object in this study is how to represent the completion of count operations on fractions. The results obtained in this study are: (1) the value of problem solving ability in fraction count operations ranges from 0 to 100 with an average of 48.42 students understand how the process of completing the fraction count operation. (2) types of errors made by students in completing fraction counting operations include students not yet understanding the concepts of addition, subtraction, multiplication, and division of compute operations on fractions, underprivileged students in systematic steps to complete counting operations on fractions, and students inaccurate in doing calculations. So that from this research should be designed a form of teaching that facilitates students in understanding the solution to fraction material.

1. Introduction
Mathematics is a very complex science that can be applied to everyday life. Mathematical material includes various kinds, one of which is fractions. Fractions are studied by children from the age of 9 years. At that age the child starts completing fraction counting operations. Many problems are faced by both teachers and students who have difficulty in teaching and understanding the settlement process in fractions. The obstacle faced in mathematics learning is the low understanding of students about the concepts learned. This is a result of students' lack of knowledge and understanding of the basic concepts of the material to be studied. The lack of understanding of students is marked by the mistakes made by students in solving math problems. Errors made by students are generally encountered during the execution of tests, tests, or from assignments given by the teacher. Mathematical concepts are arranged hierarchically, structured, logical and systematic from the simplest concepts to the most complex concepts. Various kinds of student errors in solving fractions are one of the reasons students may not understand the initial concept of performing operations on fractions. This is also in accordance with the results of the study entitled Analysis of Errors in Resolving Fraction Counting Operating Questions in Class VII Students of SMP Negeri 10 Kendari [1], and Analysis of Errors in Working on Mathematics Questions for Grade VII Students of Paci 1 Baciro Middle School, Yogyakarta City [2]. states that many students do not understand the concept and use the wrong settlement process. The lack of understanding of the concept has also been investigated, among others, which are in accordance with the above
research, namely entitled Increasing Understanding of the Concept of Fractions in Mathematics Subjects with Class IV Role Playing Methods at MI Ma’arif NU Assa’adah Bungah Gresik [3].

One mathematical material that is difficult for most students to master is counting operations on fractions. Fractional number is a number consisting of two parts, namely numbers as numerators (numerator) and numbers as dividers (denominator) where the two parts of this number are separated by the symbol.

Errors are deviations from the right things which are systematic, consistent, and incidental in certain areas. The causes of mistakes that are often made by students in solving math problems can be seen from several things, among others due to a lack of understanding of the prerequisite material and subject matter studied, lack of mastery of mathematical language, misinterpreting or applying formulas, miscalculations, inaccuracies, forgetting concepts. From the teacher's side it can be stated that the method of teaching does not support a thorough understanding of the material being taught [4].

This was also reinforced from the results of Untari's research in 2013 entitled Diagnosis of Learning Difficulties in Fractional Subjects in Class V Elementary School Students. In this study states the description of the causes of student errors in completing fraction operations. Many types of errors made by students in operating fractions include: (1) not changing the numerator or denominator in the addition and subtraction operations, (2) not simplifying the numbers in mixed fractions, (3) equating the first denominator multiplied in operation multiplication, and (4) do not reverse the number divided in division operation [5]. Three types of errors occur when students learn mathematics. These errors include (a) structural errors; (b) calculation errors; and (c) executive errors. Errors in the concept of operational breakdown have also been investigated in a study entitled Misconceptions of the Concept of Algebraic Prerequisites Students of Madrasah Ibtidaiyah Teacher Education state that the results of research and discussion concluded that PGMI students experienced misconceptions in the concepts of fractions, prime numbers, integers, mixed operations, and operations on fractions [6].

2. Method
This research was conducted on students of V-B class at SDN Gadang 01 Malang in the 2015/2016 school year which amounted to 38 people. The school's choice is because students in these schools have heterogeneous abilities. The object in this study is how students can represent count operations on fraction material. This is because between the characteristics possessed by research subjects in accordance with the object to be studied. Determination of students selected as subjects that were observed and given tests in this study, carried out steps: (1) pay attention to students who make a lot of mistakes in answering each item, and (2) pay attention to variations in errors made by students (concepts, principles procedural and facts). Based on these criteria and pay attention to the test results, the students selected as the research subjects observed were 3 people.

In qualitative research, the instruments or tools of research are the researchers themselves. Therefore, in this study the instruments (data collectors) were the researchers themselves. In this study, data collection techniques were carried out by collecting data from observations and giving tests. The techniques for collecting data through observations are carried out by collecting information or data by conducting systematic observations and recording of the phenomena that are being targeted for observation. Observations in this study were carried out in V-B class Gadang 01 SDN Malang which was adjusted to the mathematics learning schedule in the class. The observation in this study aims to determine the ability to solve count operations on fractions and the factors that are the cause of student errors in solving fractions. While data collection through the provision of tests that is done by means of the form of tests carried out in this study is a form of written test in the form of a description. The test was made by the researchers themselves and consulted with the supervisor and mathematics teacher. The test aims to find out the description of student errors in completing the count operation on fractions. Giving the test is done after the presentation of the counting operation material on fractions.
3. Results and discussion

3.1. Result

Students' ability data is collected and analyzed to find out students' ability in completing counting operations on fractions. This data was obtained from the results of the students' ability in the fractional counting operation which was tested on the V-B class students of SDN Gadang 01 Malang which are presented in full in Table 1.

Table 1. Student Ability Results.

|          |       |
|----------|-------|
| MEAN     | 48.42 |
| MEDIAN   | 42.5  |
| MODE     | 90    |
| STANDART DEVIASI | 30.86 |
| MINIMUM  | 0     |
| MAKSIMUM | 100   |
| COUNT    | 38    |

Based on the table data above it can be seen that the average value of the ability to complete the operation of the fraction break is 48.421 with a median value of 42.5 and mode of 90. While the standard deviation value reaches a value of 30.868, and a minimum value of 0 and a maximum value of 100. This shows that the ability to complete fraction count operations in class V students is still relatively low. The following is the answer of students in the completion of the fraction addition operation.

Figure 1. Student answers to problem 1 for FSP students.

The results of the answers above are known in the first step students do not form fractions of mixture first into simpler fractions. The student immediately performs the addition operation. So that it can be concluded that the remainder does not understand the principle of addition operations.

From this case we need to know that the addition operation on fractions has the so-called numerator and denominator. To be able to perform the addition operation we need to equalize the denominator first to facilitate the attention. This is because we have the following principles:

Figure 2. The principles of addition operations.

So from the figure 2, it is obtained a summing principle that is 10/27 + 6/27 with the same denominator value, so that the sum operation can be done in 16/27.

In Figure 3 it can be seen that the results of the students' answers that show the student actually has changed the form of mixed fractions into a simpler form and equated the denominator. But in the next step he does not divide the number with the previous denominator and multiplies the numerator number.
Figure 3. Student answers about number 1 DFKS students.

In this second case the student should do that

\[
\frac{10}{3} + \frac{2}{9} = \frac{90}{27} + \frac{6}{27} = \frac{96}{27}
\]

Based on these stages, it is known the definition of addition in fractions through equivalent fractions. Fractions of a value are fractions that the numerator and denominator are multiplied or divided by the same number.

Figure 4. Students' answers to the number 2 student DFKS.

From Figure 4 shows the DFKS students have been able to change decimal numbers into fractions and say the denominator. But again the student forgot not to do multiplication and division operations on the denominator and numerator.

Figure 5. Student answers to number 4 NS students.

\[
\frac{a}{b} : \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}
\]

Example:

\[
\frac{2}{3} : \frac{4}{5} = \frac{2}{3} \times \frac{5}{4} = \frac{2 \times 5}{3 \times 4} = \frac{10}{12} = \frac{5}{6}
\]

3.2. Discussion

From the results of data analysis in completing the calculation operation material on fractions are as follows. The concept error in solving the count operation in fractions related to the sum of fractions with integers is that many students make mistakes in converting integer shapes into the form of a / b. In addition, there are students who directly add fractions with the denominator not the same without equating the denominator first. This can be seen from the results of student work in question number 1. This is similar to the statement that fractions are rational numbers [7]. Rational numbers are numbers whose members can be expressed as p / q where p and q are arbitrary numbers and q ≠ 0. So from here students must be able to rationalize these ordinary numbers into fractions.

Based on the results of student observations, it was found that some students already knew the concept of converting mixed fragments into ordinary fractions. However, students are wrong in multiplying and summing integers. Some of the other students did not know the concept of turning mixed pieces into ordinary fractions. Students only write down what is in their minds or copy the work of their friends. The same thing happens when students solve problems related to the reduction of fractions.
The most misconceptions made by students in solving fraction reduction problems is to convert mixed fragments into ordinary fractions or in changing integers in the form of \( a / b \). As shown in the work of students in questions number 1 and 4. In addition to the explanation above, students' mistakes in performing fraction multiplication and division operations are that students make mistakes in converting integers into \( a / b \) forms or errors in converting mixed fragments into ordinary fractions. So it can be concluded that in general the conceptual errors made by students in solving count operations on fractions are errors in converting integers into \( a / b \) forms and errors in converting mixed fragments into ordinary fractions. This is in accordance with the statement that knowing the mistakes in solving a math problem will be traced to difficulties in learning mathematics. The number of mistakes made by students in working on the problem can be a clue to the extent of students' mastery of the material. From the mistakes made by students can be examined further about the causes of student errors. The cause of mistakes made by students must immediately get a complete solution. This solution is taken by analyzing the root of the problem that is the cause of mistakes made by students [8].

4. Conclusion and Suggestions

4.1. Conclusion
Based on the results of the research and discussion, conclusions can be drawn based on the data obtained. It is known that the average results of the fractional count operation test in students of class V-B Gadang 01 Malang SDN are 48.421; median 42.5; mode 90; minimum value of 0; and a maximum value of 100. The types of mistakes students make in completing count operations questions in fractions include (a) Concept Errors namely (1) students do not understand the concept of addition and subtraction fractions by summing or subtracting the two fractions without equating the denominator first, (2) students do not understand the concept of converting mixed fractions into ordinary fractions, (3) students do not understand the concept of fraction multiplication by looking for the KPK then multiplying the numerator while the denominator remains, (4) students make a mistake in understanding the fraction division concept by reversing the second position fractions or flips both fractions, and (5) students are wrong in translating sentences in story problems into mathematical sentences. (b) Error The principle is that students do not understand the principle in equating the denominator of the two fractions. (c) Procedural errors, namely (1) students cannot determine the procedure or steps in completing the items so that students cannot find the final results, and (2) students miss a number of completion steps. As for the causal factors so that students make mistakes in solving the problem of calculating operations on fractions, namely a) Students do not master the prerequisite concepts related to counting operations on fractions; b) Students do not yet understand the concept of addition, subtraction, multiplication, and division in arithmetic operations on fractions; c) Students are less able to compile systematic steps to complete count operations on fractions; and d) Students are too hasty and not concentrated in completing count operations on fractions.

4.2. Suggestion
Based on the above conclusions, researchers suggest several alternative solutions to overcome errors made by students in completing the count operation on fractions.
- This research should be designed in a form of teaching that facilitates students in understanding the solution to fraction material.
- Students are strived to learn more and practice about basic math material or prerequisite material at home or outside of mathematics lessons.

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