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Error Analysis of Class V Students in Resolving Decimal Fractional Division

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Abstract:- This study aims to determine: (1) the types of mistakes students make; and (2) the factors that caused the mistakes of fifth grade students of SD Manukan Wetan 1 Surabaya in solving the calculation operation problems in the division of decimal fractions . The subjects in this study were class V as many as 29 people, and the subjects interviewed consisted of 3 people. The results showed that the types of errors and the factors causing errors made by students in solving the problem of decimal fraction division are as follows: Types of conceptual errors, the causal factors namely Factors causing the errors are: (1) Subjects have not been able to apply the meaning of division to the fractions of 29 people student test takers, there are around 12 students or 41.38% who make mistakes. (2) Complete the completion operation. Of the 29 students who took the test, there were about 14 students or 48 , 97 % made mistakes. (3) Turn ordinary fractions into decimal fractions / Determine the final result. Of the 29 students who took the test, there were about 20 people or 69 , 66 % made mistakes.

Keywords:- *Error Analysis , Division of Decimal Fractions* .

I. INTRODUCTION

Mathematics has a role in practicing student reasoning. In addition, mathematics is a science that is always developing, both in terms of material and its benefits for the community. Therefore, mathematics is important to master early on. It is expected that if students can master mathematics well, students can also master other sciences as well.

Elementary School is an educational institution that functions to provide basic skills and skills to continue learning at the junior high school level and to provide other abilities higher. For basic materials taught in elementary schools students must really be able to master, especially the mastery of basic calculations in mathematics.

The mastery of basic arithmetic operations such as addition, subtraction, multiplication, and division must be truly possessed by elementary school students. This is due to the fact that mathematics is hierarchical, in order to understand a higher level concept, the lower level concept must first understand the basis or precondition of a higher concept. So without mastering the basic arithmetic operations students will experience many difficulties in solving math problems so that it will cause students to become lazy learning, and finally they do not like mathematics.

According to Kastolan (in Yenny Dian , 2015: 22) Conceptual errors are mistakes made by students in interpreting terms, concepts and principles. Indicators of conceptual errors according to Kastolan (in Yenny Dian, 2015: 22) are as follows: a) wrong in determining the formula or theorem or definition to answer a problem, b) the use of formulas, theorems, or definitions that are not in accordance with the conditions of the validity of the formula , the theorem, or the definition, c) does not write the formula, theorem or definition to answer a problem.

Procedural error is a mistake in compiling systematic hierarchical steps to answer a problem, Kastolan (1992). Indicators of procedural errors according to Kastolan are: a) inhale of the steps in resolving the problem, b) error or inability to manipulate rare steps to answer a problem. Soedjadi (2000: 13) states that, if an error is associated with a mathematical object, then the error in question is:

- Factual errors are errors in writing conventions that are expressed using mathematical symbols. For example, errors in changing problems into mathematical models, errors in interpreting the results obtained and errors in writing mathematical symbols;
- Concept errors are mistakes in classifying or classifying a group of objects. The concept referred to in mathematics can be in the form of a definition. Examples of errors in classifying a relation, whether it is a function or not;
- Operation errors are errors in arithmetic, algebraic work, and other mathematical work. For example errors in adding, subtracting, and errors in other mathematical operations.
- A mistake in principle is a mistake in associating some facts or concepts. For example, mistakes in using formulas or theorems and errors in using previous principles.

Distribution operation skills must be based on addition, subtraction, and multiplication skills. Multiplication includes arithmetic operations which must be mastered after understanding the concepts of addition and subtraction operations. Skills for multiplication operations are closely related to addition and division. Children who cannot add up also cannot multiply, and children who cannot multiply also cannot divide (Abdurrahman, 2012: 224).

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To find out students' difficulties in learning mathematics, clear information is needed in connection with the learning difficulties themselves. To overcome the mistakes students face, the problem needs to be found and ascertained the source, how to handle it, with the hope of solving the problem.

From the results of discussions with the Class V teacher and the head of SD Manukan Wetan I Surabaya, this math problem was also experienced by Class V students at the school. This can be seen based on data on the value of the Mid Semester I (PTS I) Academic Year 2019/2020 Class V SDN Manukan Wetan 1 Surabaya, the results of mathematics scores are still in the low category. Of the 116 students, 56 of them still obtained mastery of learning outcomes, while 60 students (51.72%) of their mathematics learning outcomes were incomplete. Because SDN Manukan Wetan 1 set the KKM for mathematics lessons to be 70.

In student observation, it was found that students had difficulty in calculating the division of decimal fractions. Dividing arithmetic operations skills have been introduced to students since Class III, but in reality Class V students still have difficulties in division operations. The more so the division involving decimal fractions, for example for the division 0,75 : 0.125 children are still thinking and there is no effort to find the results of the solution. So with difficulty learning to count operations, hampering in the process of further mathematical learning activities. Therefore, researchers conducted research to find out what errors in solving division problems involving decimal fractions, so that accurate data is obtained so that later will be given appropriate learning.

To uncover the difficulties and errors made by students in calculating the division of decimal fractions, and reveal the factors that influence these difficulties, as well as providing input solutions to minimize the difficulties and errors experienced by students in calculating the division of decimal fractions. So a study was conducted on the types of errors and the factors causing the errors of operations to calculate the division of decimal fractions in Class V students at SDN Manukan 1 Wetan Surabaya. By knowing the learning difficulties faced by students, it is expected to find the right way or learning, so as to minimize errors that might occur again in the future.

For this reason, the writer in this study took the title "Analysis of Class V Students' Error in Solving Decimal Fraction Distribution".

II. METHOD

Based on the research objectives that have been stated previously, namely to identify the types of errors and their causal factors, this type of research can be classified in qualitative descriptive research , namely research that reveals, analyzes and provides a description of the results of research subject activities. Quantitative methods are used as a basis for determining research subjects , in other words the qualitative method is a facilitator to conduct a deeper search of student errors in solving problems. In the initial part, this study involved 29 fifth grade students of SD Manukan Wetan I Surabaya in 2019/2020 academic year. Then three students will be selected to be the research subjects. Criteria for selecting research subjects refers to:

- The most mistakes made by students, if there is the same number of mistakes, then only one subject is taken, while the next subject takes the second highest number of errors and the third highest number of mistakes.
- Variation in the form of errors made by students in completing test questions
- Openness and fluency in communicating fluency.

In qualitative research, researchers are key instruments that determine the selection and analysis of data. The research supporting instruments in the form of diagnostic tests and interview guidelines. Triangulation conducted in this research is triangulation of methods and data, namely by conducting interview methods which are supported by diagnostic test document data. This is done by comparing data obtained from test results with data obtained from interviews with subjects, with the aim of obtaining the validity of the data. In this study, data analysis activities used stages including Data Reduction, Data Presentation, and Drawing Conclusions.

This research was carried out by following the following procedures:

- Field Orientation

  In early October 2019, researchers gave preliminary confirmation to the Principal of SD Manukan Wetan I Surabaya and the fifth grade teacher regarding the research plan in class V of SD Manukan Wetan I Surabaya. The researcher also told the plan to class V.
- Preparation of Test Kits.

  The test kits are arranged by the researcher themselves, then ask for advice from the supervisor and validation by the validator for use in the field.
- Test implementation

  The test was conducted at SDN Manukan Wetan I Surabaya.
- Examination of test results and determination of research subjects.

  Examination of test results is carried out immediately after the implementation of the test, then the results are used as the main criteria in determining the research subjects.
- Interview as well as triangulation together with the relevant test results.
- Data analysis
- Writing the report

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III. RESULTS AND DISCUSSION

➢ *Summary of Data Analysis Results for Subjects- 1*

Based on data analysis , the results can be summarized as presented in the following table:

No. Question	Error Type	Factors that Cause Errors
1	1. Conceptual	a. The low level of understanding of the subject towards applying the meaning of division to fractions. b. Subject cannot change ordinary fractions to decimal fractions.
2.	1. Conceptual	a. The low level of understanding of the subject towards applying the meaning of division to fractions. b. The subject has not been able to simplify fractions
	2. Procedural	a. The subject hasn't mastered the division.
3.	1. Conceptual	a. The low level of understanding of the subject towards applying the meaning of division to fractions. b. The subject has not been able to simplify fractions c. Subject cannot change ordinary fractions to decimal fractions.
	2. Procedural	a. The subject hasn't mastered the division.
4.	1. Conceptual	a. The low level of understanding of the subject towards applying the meaning of division to fractions. b. Subject cannot change ordinary fractions to decimal fractions.
	2. Procedural	a. The subject cannot / does not master the multiplication of numbers.
5.	1. Conceptual	a. The low level of understanding of the subject towards applying the meaning of division to fractions. b. Subject cannot change ordinary fractions to decimal fractions.
	2. Prosedural	a. Subject cannot multiply numbers.

Table 1:- Summary of Data Analysis Results for Subject 1

Types and factors causing errors in Research Subject - 1 in solving 5 decimal division division problems are as follows:

- Conceptual error

Factors causing the error are:

1) Subjects have not been able to apply the meaning of the division of fractions, which they should

This can be seen in the question no. 1 sd question no. 5 examples on student work results no. 1: $\frac{2}{10} : \frac{5}{10} = \frac{2}{10} \times \frac{5}{10}$

2) Subject cannot simplify fractions. This can be seen in the question no. 2 and no . 3, examples on student work no. 2:$\frac{16}{100} = \frac{5}{20}$

3) Subjects cannot change ordinary fractions to decimal fractions. This can seen in question no. 1,3,4 and 5 examples on student work no. 3: $\frac{50}{250} = 1{,}5$

- Procedural Error

1) The subject does not master multiplication, especially those involving multiplication of numbers above 10. This can be seen in the question no. 4 and 5 examples on student work no. 4:$\frac{125}{1000} \times \frac{4}{10} = \frac{300}{2000}$.

2) Subjects have not mastered the division. This can be seen in the question no. 2 and 3, for example on student work no. 3:$\frac{8}{10} \times \frac{24}{100} = \frac{5}{5} \times \frac{10}{50}$;

➢ *Summary of Data Analysis Results for Research Projects - 2*

Based on data analysis , the results can be summarized as presented in the following table:

No. Question	Error Type	Factors that Cause Errors
1.	1. Conceptual	a. The low level of understanding of the subject of how to change ordinary fractions into decimal fractions.
2.	1. Conceptual	a. The subject can't change ordinary fractions to decimal fractions.
3.	1. Conceptual	a. The subject has not been able to simplify fractions
	2. Procedural	a. The subject is less precise / cannot divide the numbers correctly.
4.	1. Conceptual	a. The subject has not been able to simplify fractions, and b. change ordinary fractions to decimal fractions
	2. Procedural	a. The subject is less precise / cannot divide the numbers correctly
5	1. Conceptual	a. The subject did not understand the concept of turning ordinary fractions into decimal fractions
	2. Procedural	a. The subject did not understand the concept of turning ordinary fractions into decimal fractions

Table 2:- Summary of Data Analysis Results for Research Projects- 2

- The types of errors and the factors causing the S-subjects error in solving algebraic fraction counting problems are as follows:

1) Conceptual Error

Subject cannot simplify fractions. This can be seen in the question no. 2 and no. 4, examples of student work no. 4: $\frac{40}{125} = \frac{20}{25}$

2) Subject cannot change ordinary fraction to decimal fraction. This can be seen in question no. 1,2,4 and 5 examples on student work no. 4: $\frac{20}{25} = 0{,}20$

- Procedure Error

1) The subject does not master / is not careful in dividing numbers, especially in larger numbers. This can be seen in the question no. 3,4 and 5, example in student work no.5: $\frac{15}{100} \times \frac{1000}{375} = \frac{15}{1} \times \frac{100}{375}$, here it appears that 1000 : 100 = 100

➢ *Summary of Data Analysis Results for Research Projects - 3*

Based on data analysis , the results can be summarized as presented in the following table:

No. Question	Error Type	Factors that Cause Errors
1.	1. Conceptual	a. Subjects have not been able to understand the concept of changing ordinary fractions into decimal fractions.
2.	1. Conceptual	a. Subjects have not been able to understand the concept of changing ordinary fractions into decimal fractions
4.	1. Conceptual	a. Subjects have not been able to understand the concept of changing ordinary fractions into decimal fractions.
5.	1. Conceptual	a. Subjects have not been able to understand the concept of changing ordinary fractions into decimal fractions.

Table 3:- Summary of Data Analysis Results for Research Projects – 3

The types of errors and the factors causing the errors made by the research project- 3 in solving the operations of calculating the division of decimal numbers are as follows:

- Conceptual Error

The subject does not understand the concept of changing ordinary fractions into decimal fractions. It can be seen that the subject in changing ordinary fractions to decimal fractions is always multiplied by the number one hundred. This can be seen in the question no. 1,2,4 and 5 examples on student work no. 5: $\frac{10}{25} \times 100 = 0{,}40$

A. Research Findings

After paying attention to the test answers and interviews with all subjects found several important things regarding the subject's mistake in solving the problem of division of decimal numbers, namely :

➢ Error in applying the meaning of the division of fractions, which should :

Less understanding of the subject in the sense of applying fractional division is supposed eg : $\frac{24}{100} : \frac{8}{10}$ should = $\frac{24}{100} \times \frac{10}{8}$ but students are always wrong writing becomes $\frac{24}{100} : \frac{8}{10} = \frac{8}{10} \times \frac{24}{100}$

- Subjects have not been able / inaccurate in simplifying fractions, especially in the numbers of tens or hundreds of students lacking mastery of division.
- Subjects have not been able to understand the concept of changing ordinary fractions into decimal fractions. It can be seen that the subject in changing ordinary fractions to decimal fractions multiplies the result of the fraction multiplication by one hundred. As did S3.
- The subject has not mastered the multiplication and division of numbers, especially S1. Of the few errors found, most subjects made a mistake in changing ordinary fractions into decimal fractions. The subject still did not understand the concept of turning ordinary fractions into decimal fractions.

B. Research Weaknesses

The weaknesses in this study are as follows:

- Researchers' factors as the main instrument are inseparable from deficiencies and neglect.
- The researchers have limited time so that the test questions and interview guidelines are only examined by two validators.
- In conducting error analysis researchers do not first conduct analysis of the material being studied so as to reduce the accuracy of the error analysis itself.
- The time interval between the delivery of material used as a research study and the implementation of the research is too far, so it is possible that many have forgotten what the teacher explained. Even before the research was conducted the students were informed of the material.

IV. CONCLUSION

Based on the results of data analysis and in order to answer the research questions raised, the conclusions of this study are as follows:

A. Conclusions for Research Subjects-1 (S1)

Of the five questions given, it can be concluded types S1 and S1 error factor in solving the problems of the division of decimal fractions is as follows:

- Types of conceptual errors, the causative factors namely Factors causing the errors are:
  - Subjects have not been able to apply the meaning of the division of fractions, which they should.
  - Subject cannot simplify fractions.
  - Subjects cannot change ordinary fractions to decimal fractions. Procedural Error
- Types of procedural errors, the causative factors namely Factors causing the errors are:
  - The subject does not master multiplication, especially those involving multiplication of numbers above 10.
  - Suby oak has not mastered the division.

B. Conclusions for Research Subject-2 (S2)

From the 5 questions given, S2, it can be concluded that the type and factor of error S2 in solving the de simal fraction division problems are as follows:

- Conceptual error
  - Subject cannot simplify fractions.
  - Subject cannot change ordinary fraction to decimal fraction.
- Procedure Error

The subject does not master / is not careful in dividing numbers, especially for numbers that are more than 10.

C. Conclusions for Research Subject-3 (S3)

From the 5 questions given, S3, it can be concluded that the type and factor of S3 error in solving the problem of dividing de simal fractions is Conceptual error, ie the subject has not been able to convert ordinary fractions into decimal fractions. From the three respondents, it can be concluded that the students' mistake in solving the decimal fraction division lies in:

- Students have not finished division and multiplication;
- Students have not been able to apply the meaning of the division of fractions that should be.
- Students have not mastered how to simplify fractions.
- Students can not change ordinary fractions into decimal fractions.

Based on the data above shows the location of student errors in solving the problem of decimal fraction division is as follows:

- Change the division of decimal fractions into regular fraction divisions . Of the 29 students who took the test, there were about 0 or 0% who made mistakes.
- Applying the meaning of division to the fractions of 29 students who took the test, there were about 12 students or 41.38% who made mistakes.
- Complete the settlement operation. Of the 29 students who took the test, there were about 14 students or 48, 97 % made mistakes.
- Turn ordinary fractions into decimal fractions / Determine the final result. Of the 29 students who took the test, there were about 20 people or 69 , 66 % made mistakes.

Errors that stands out is the fourth step, the third and the second is to change a common fraction into fractions de s imal / determine the final result there are 69.66%, 48.97% Completing completion operations, apply the division on fractions meaning there is 41.38%.

V. SUGGESTION

As the end of this research, the researcher has the following suggestions:

- Based on the findings of errors made by students it is expected that the teacher in learning to emphasize the mastery of multiplication and division, worth fractions, simplifying fractions, turning ordinary fractions into decimal fractions.
- Note the deficiencies that exist in this researcher can be used as a reference for conducting similar studies so that weaknesses can be minimized.
- The results of the study and its findings can be used as a foundation for further research, namely to develop

learning tools that can be used as a reference for designing better decimal division learning.

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