

ANALYSIS OF ERRORS IN SOLVING FUNCTION PROBLEMS IN EIGHT GRADE STUDENTS' OF SMP MUHAMMADIYAH 2 GODEAN

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ABSTRACT

Students often make mistakes in solving problems are the function of misconceptions, miscalculations and errors procedure. That's because students do not have the ability to understand the concepts, capabilities in the calculation and the ability to understand the procedure better. This research aims to determine the percentage of types of misconceptions, miscalculations, and procedural errors function procedure eighth-grade students of SMP Muhammadiyah 2 Godean the academic year of 2016/2017. The research was conducted at SMP Muhammadiyah 2 Godean in class VIII C that all students totaling 32. The selection of research subjects taken on the recommendation of teachers, selected class VIII C because this class has an average mathematics achievement is low. Data collection techniques in this research using the test method and the interview method. The instrument used was a problem in narrative form as much as 6 questions and interview guides students. The data analysis technique used is descriptive qualitative analysis techniques to identify each type of mistakes made by the students. The results show the average percentage of misconceptions made by students of 82,292% (very high), the percentage of miscalculations made by the students of 42,708% (medium), and the percentage of procedural errors made by the students of 67,708% (high). Mistakes made by students of class VIII C SMP Muhammadiyah 2 Godean relatively the same: there is no answer, wrong in understanding and translating the question, in applying the formula to resolve the matter, one to operate the calculations, one in determining the final outcome, not coherently in writing step completion, incomplete in writing steps to resolve and does not use logical reasoning to draw conclusions

Keywords: Analysis of Errors, Function.

INTRODUCTION

Education is one of the efforts to provide guidance to students by educators to reach the maturity of students. The maturity of students in question is not only maturity in mastering formal lessons given by educators, but also informal learning that can be embedded in social interactions within the school environment. Education is a process of interaction that encourages learning. Learning is a process of change in behavior, knowledge, and attitude. Teaching and learning process is characterized by the provision of stimulus given to children that can be in the form of practice, experience, motivation, guidance, and services. According to the National Education System Law Number 20 of 2003, namely:

Education is a conscious and planned effort to create an atmosphere of learning and learning process so that students actively develop their potential to have spiritual strength, self-control, personality, intelligence, noble character, and the skills needed by themselves, society, nation, and state.

The success of an education is not only determined by the role of the teacher, but the role of students is also very necessary for the education and development of students to carry out well. Awareness and enthusiasm for learning from students themselves is a strong reason to be able to support the learning process. This will affect student awareness in carrying out good and planned learning that is expected to be able to improve student learning outcomes.

It is hoped that by achieving educational goals students will be able to deal with various life problems that occur in their daily lives with global thinking. So students can continue to advance and develop themselves to be able to compete and face the situation in an increasingly modern era. To achieve this goal many efforts were made to improve students' understanding and mastery of various disciplines. One of the basic sciences referred to is mathematics. Therefore, understanding and mastery of mathematics needs to be improved in order to achieve future welfare. The government, in this case,

has made various efforts such as curriculum improvement which includes educational plans that will be given to students with each curriculum having distinctive features in the way they are delivered, publishing both printed and e-book textbooks, developing various methods and strengthening teachers in mastery of the material. Launching a 9-year compulsory education program, applying mathematics tests in national examinations is also a role of the government to improve understanding and mastery of mathematics.

So far this has been done, but in practice, the results of learning mathematics students are still very less compared to other subjects. Of course, this is a barrier students in achieving the expected learning outcomes. Then it is necessary to do an analysis to look for any factors that underlie the occurrence of these obstacles.

Student learning outcomes are an achievement obtained through efforts that are consciously carried out by students. Students use their minds and minds to do the various questions given in the hope that students make a few mistakes. But there are still many students who make various kinds of mistakes in solving math problems.

Basically, students' mistakes in solving math problems also come from a variety of factors. Internal factors in students such as interest, motivation, and curiosity become fundamental to support students in solving mathematical problems. External factors are no less important as supporting students such as the environment both the school environment and family and residence, the school and its facilities and infrastructure, as well as the curriculum applied. The lower the factors above play a role, the lower the student learning outcomes shown from the mistakes made in solving mathematical problems. That indicates that students have not been able to solve math problems properly.

Mistakes made by students in solving mathematical problems need to be identified to find out what types of mistakes made by students and cause students to make mistakes in solving math problems. From this identification, it is found that the causes will be used to find out what methods will be used to reduce the intensity of errors made by students in solving mathematical problems. Indirectly, this method can be used to improve the quality of mathematics teaching and learning activities, so that in the end it is expected to be able to improve student mathematics learning outcomes.

Function is a sub of mathematics subject matter, students need to have the ability to understand concepts, the ability to do calculations and the ability to understand good procedures to solve them. The results of an interview with Rina Indrasari, S. Pd. as a mathematics teacher at SMP Muhammadiyah 2 Godean on August 30, 2016, stated that not a few students made mistakes in solving problems because they did not have the ability to understand concepts, the ability to calculate and the ability to understand procedures well.

Based on the background above, it can be identified the problems that arise in the study are as follows:

1. Students do not understand the concept of solving functional material problems.
2. Students have not done a good calculation in solving functional material problems.
3. Students do not understand the procedures for solving functional material problems.
4. Students still need to understand concepts, calculations, and procedures to solve functional material problems.

Limitation problems in this study are:

1. Misconceptions to solve mathematical problems with the functions of VIII grade students of Muhammadiyah 2 Godean Middle School 2016/2017 school year.
2. Miscalculation of completing math problems for students of VIII grade at SMP Muhammadiyah 2 Godean in the 2016/2017 school year.
3. Procedure errors in completing math problems with the functions of VIII grade students of Muhammadiyah 2 Godean Middle School 2016/2017 school year.
4. Analysis of students' mistakes in solving mathematical problems of function material for VIII grade students of SMP Muhammadiyah 2 Godean in the 2016/2017 school year.

Based on the description above, the formulation of the problem in this study are:

1. Types of errors made by students in solving functional material problems in class VIII of SMP Muhammadiyah 2 Godean in the 2016/2017 school year?
2. What is the percentage of each type of student error in solving functional material problems in class VIII of SMP Muhammadiyah 2 Godean in the 2016/2017 school year?

The objectives of this study are:

1. To find out the types of student errors in solving functional material problems in class VIII of SMP Muhammadiyah 2 Godean in the 2016/2017 school year.
2. To find out the large percentage of the types of student errors in solving functional material problems in class VIII of SMP Muhammadiyah 2 Godean in the 2016/2017 school year.

Based on the research objectives to be achieved, this research is expected to have benefits or uses in education both directly and indirectly. The benefits of this research are as follows:

1. The results of this study are expected to be able to contribute to the learning of mathematics, especially with regard to overcoming mistakes in solving problems.
2. As an additional reference material for the teacher to understand the character of students in solving math problems, especially material functions.
3. Contribute information to improve the quality of education in secondary schools.
4. Give input to students so that they begin to realize the mistakes made so that no similar mistakes occur again in the future. 5) Material for consideration, input or reference for further research.

METHODS

This research is qualitative research. Qualitative research is a study with data analyzed in the form of qualitative data. Qualitative research intends to understand the phenomenon of what is experienced by research subjects. In this study, there is no hypothesis. The data to be generated is descriptive data in the form of written or oral words. The research strategy used is a descriptive qualitative method. Descriptive research is research that provides an overview of an existing phenomenon and answers questions that are related to the status (state) of the research subject at a particular time. Descriptive research (descriptive research) is intended to describe a situation or phenomena as they are (Sukmadinata, Nana Syaodih, 2013: 18). Retrieval of data using test and interview methods. The data obtained will be described or described again and then analyzed.

This research will be carried out at SMP Muhammadiyah 2 Godean in class VIII C, with all 32 students. The selection of research subjects is based on the recommendation of the teacher, selected class VIII C because this class has a low average mathematics learning achievement.

Data collection techniques in this study are the test method and interview method. The test method used in this study is a written test in the form of a question description. This written test is in the form of a description of a total of six questions. The test sheet is made by researchers by asking for the help of several parties who are competent in their fields.

In this study, the interviews or interviews conducted were unstructured interviews. Interviews were conducted on students who made mistakes that were used to ascertain the location of the mistakes made by students and know for certain the causes of errors experienced by students in solving functional material problems. Interview guidelines contain questions that researchers ask to strengthen the results of data collection conducted by the test method. Researchers use unstructured interviews so the interview guidelines only contain questions that outline.

This research is a qualitative descriptive study, so the data analysis is non-statistic. The data will appear in the form of words and not a series of numbers. According to Miles and Huberman (Sugiyono, 2009: 246), qualitative data analysis consists of three activities that occur simultaneously, namely data reduction, data presentation and drawing conclusions/verification.

To calculate the average percentage of each type of error in solving mathematical problems of function material for students of class VIII of SMP Muhammadiyah 2 Godean in the 2016/2017 school year, the following formulas are used:

1. To calculate the average percentage of concept errors

$$K = \frac{k}{n} \times 100\%$$

Information:

K : Average percentage of concept errors in answering questions

k : The average number of respondents made mistakes answering questions

n : Number of respondents

(Siswanto, Lisanti Budi dan Widayati, 2014:842)

2. To calculate the average percentage error calculation

$$H = \frac{h}{n} \times 100\%$$

Information:

H : Average percentage of calculation errors in answering questions

h : The average number of respondents made mistakes answering questions

n : Number of respondents

(Siswanto, Lisanti Budi dan Widayati, 2014:842)

3. To calculate the average percentage of procedure errors

$$P = \frac{p}{n} \times 100\%$$

Information:

P : Average percentage of procedural errors in answering question

p : The average number of respondents made mistakes answering questions

n : Number of respondents

(Siswanto, Lisanti Budi dan Widayati, 2014:843)

After knowing the percentage of concept errors, calculation errors and procedural errors made by students, they can then be classified using the following criteria:

Table 1. Criteria for Error Types

No.	Criteria	Category
1.	$80\% \leq X \leq 100\%$	Very high
2.	$60\% \leq X < 80\%$	High
3.	$40\% \leq X < 60\%$	Is
4.	$20\% \leq X < 40\%$	Low
5.	$0\% \leq X < 20\%$	Very low

(Arikunto, Suharsimi, 2009:75)

RESULTS AND DISCUSSION

In questions number 4, 5 and 6 all students make mistakes in concepts, calculations, and procedures. After investigating it turns out the material for questions numbers 4, 5 and 6 have not been given. So if you do the calculation by just taking questions number 1, 2 and 3 only, the results of the calculation for each error are as follows:

- a. Concept Error

Table 2. Percentage of Students Making a Concept Mistake in Problem No. 1, 2 and 3

No. Question	Many students	Percentage Amount
1	32	100%
2	30	93,75%
3	17	53,125%
Total : 79		Average : 82,292%

Based on the results of the data it can be concluded that the average percentage of concept errors made by students of class VIII C of Muhammadiyah 2 Godean Middle School 2016/2017 is 82.292% which is included in the very high category.

b. Calculation Error

Table 3. Percentage of Students Making Calculation Mistakes in Problem No. 1, 2 and 3

No. Question	Many students	Percentage Amount
1	5	15,625%
2	7	21,875%
3	29	90,625%
Total : 41		Average : 42,708%

Based on the results of the data it can be concluded that the average percentage of calculation errors made by students of class VIII C of Muhammadiyah 2 Godean Middle School 2016/2017 is 42.708% which is included in the medium category.

c. Error Procedure

Table 4. Percentage of Students Making Procedural Mistakes in Problem No. 1, 2 and 3

No. Question	Many students	Percentage Amount
1	32	100%
2	28	87,5%
3	5	15,625%
Total : 65		Average : 67,708%

Based on the results of the data it can be concluded that the average percentage of procedural errors made by students of class VIII C of Muhammadiyah 2 Godean Middle School 2016/2017 is 67.708% which is included in the high category.

CONCLUSION

From the results of the discussion, the researcher can conclude that there is an error in completing the function questions for students of class VIII C Muhammadiyah 2 Godean Middle School 2016/2017:

1. Based on the results of the data it can be concluded that the average percentage of concept errors made by students of class VIII C of Muhammadiyah 2 Godean Junior High School in Sleman in the 2016/2017 academic year amounted to 82.292% which is included in the very high category.
2. Based on the results of the data it can be concluded that the average percentage of calculation errors made by students of class VIII C of Muhammadiyah 2 Godean Junior High School Sleman district in 2016/2017 is 42.708% which is included in the medium category.
3. Based on the results of the data it can be concluded that the average percentage of procedural errors made by students of class VIII C of Muhammadiyah 2 Godean Junior High School in Sleman district in 2016/2017 is 67.708% which is included in the high category.

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