

THE ANALYSIS OF ERROR ON SOLVING GEOMETRY PROBLEM OF STUDENT AT CLASS IX JUNIOR HIGH SCHOOL ON TAMPAN SUBDISTRICT PEKANBARU

Titi Solfitri¹

Yenita Roza²

Program Studi Pendidikan Matematika

Email : Tisolfitri@yahoo.co.id

Abstrak

The weakness of mathematics ability of students can be observed from material mastery of students. The student's error on solving the problem is one of the clues to find out the material mastery of students. Therefore, that errors need to be identified to find the influence factors to get the solution. This study was implemented on Junior High School in Tampan Sub district which involve 3 schools, such as SMP 8, SMP 20, SMP 21 and the students of class IX. The purpose of this study were (1) Observing the kind of errors which were done by students on solving similarity problem (2) Observing the factors which caused the student's error on solving similarity problem. Based on the data analysis, interview and investigation, it can be concluded that students had concept error, procedure error and carelessness error. The factors which caused the student's error were lacking of effort on solving problems, lacking of mastery on the material, less of carefulness on solving problems, lacking of mastery on the prerequisite material and the students did not understand the steps on solving problem.

Keywords: Analysis of Error, Similarity, Concept Error, Procedure Error.

1. INTRODUCTION

Mathematics is a universal science that underlies the development of modern technology, have a key role in many disciplines and promoting the power of human thought. Mathematics courses given to all students starting from elementary schools to provide students with the ability to think logically, analytical, systematic, critical, creative, and the ability to cooperate. It is very necessary so that students can have the ability to acquire, manage, and use information in order to survive in circumstances that is always changing, uncertain and competitive.

In daily life, we always face a lot of problems. The problems were certainly not all of the mathematical problems, but the math has a very central role in solving the problem. This means that mathematics is required by everyone in daily life to help them solve all the problems. The problem is happening now is that teachers can optimize the capabilities of the students so that they are not wrong in applying the knowledge provided by teacher.

The purpose of learning mathematics is that students master the following capabilities: (1) understand math concepts, explain the relationship between concepts, and apply the concepts or algorithms in a flexible, accurate, efficient, and precise in problem-solving; (2) using the reasoning on the pattern and characteristics, perform mathematical manipulation in making generalizations,

compile evidence, or explain mathematical ideas and statements; (3) solve problems that include the ability to understand a problem, design a mathematical model, solve the model and interpret the solution; (4) communicate ideas with symbols, tables, diagrams, or other media to clarify the situation or problem; (5) have an attitude that appreciate the usefulness of mathematics in life, which has the curiosity, attention and interest in studying mathematics, as well as a tenacious attitude and confidence in solving problems .

The goals achievement of education and mathematics learning can be seen from the success of the students in understanding mathematics and using it to solve math problems and other sciences. Therefore, it is necessary to evaluate or test student learning outcomes. The result of this study is called student achievement. However, in reality, the recent learning achievement is still low. The low learning achievement is shown by the low value of daily tests, semester exams, as well as the mathematics' National Final Examination. In fact, according to data from Trends in Mathematics and Science Study (TIMSS), Indonesian learning achievement in general is ranked 35 out of 46 participating countries involving more than 200,000 students.

Lack of students' mathematics learning skills can be seen from how much students can mastering the materials that has given, one way to find out is by giving a test about the relating material to the students. Students' errors during working on the problems may be one of the clues to find out how far the student mastered the material . Therefore, the errors should be identified to find the factors that affect it then we can find the solution to fix the problems and errors. The main question of this study is: "What types of errors that students' have in solving problems related to similarity and also what factors that affect students do errors in solving similarity problems". Furthermore, the purposes of this study are: (1) To determine the types of errors done by the students in solving problems of similarity (2) Knowing what factors are causing the student to make mistakes in solving similarity.

Errors made by students in solving problems , the first is *reading error*, where the students made a mistake in reading the important words in question or the student misread the headline, so that students not using the information to solve problems. *Reading comprehension difficulty* is the second type of error, where student is actually have understand the problems but can't collect the information from the problems so that students can't find the solution. The third type of error is *transform error*, where student fails in understanding the problems that will be transformed in mathematics sentences. *Weakness in proses skill* is the fourth type where student has doing well in using basic rules but make mistakes in calculation process. *Encoding error* is the fifth type where students make mistakes in using the notation. The sixth type is *corelles error* that caused by the carelessness or less careful. Errors in solving a problem mostly seen in solving mathematics problem, and this study focus on the errors about concepts, procedures, operational errors or carelessness.

2. METHODS

This study is a qualitative descriptive study with sample from students of class IX of SMP 20, SMP 21, SMP 8 and SMP 23, where one class was drawn at random from

each school. The technique of collecting data used in this study is a written test techniques and direct communication with interview techniques. Written test techniques used in this study are math problems related to similarity. Interview is a collecting data technique to gain information by asking questions directly to the interviewees. It used to get the information related to the students' type of errors and also the factors that caused students make mistakes in solving similarity problems.

The test which is used in this study is a concept understanding test in the form of essay. The test was given to evaluate the students' ability in understanding precondition and main concepts of the similarity. The test preparation steps are (1) the preparation of blueprints (2) writing the item of questions (3) The validity of the test.

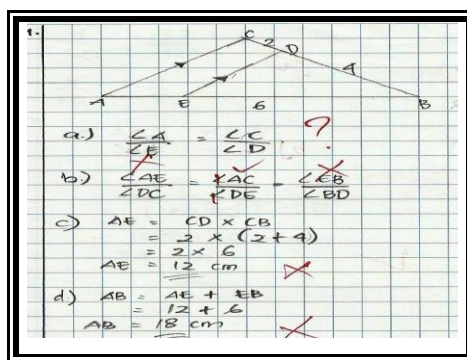
3. RESULTS AND DISCUSSION

Here are outlined results shows the mistakes made by students in solving similarity problems as the table below.

Table 1. Erros by Students of SMPN 20

Number of Question	Type of Error		
	Concept	Procedure	Careless
1a	7	7	
1b	12	8	3
1c	3	5	3
1d	9		2
2a	12	1	1
2b	7	1	3
2c	6	4	1
3a	8	3	1
3b	10		4
4a	10	4	5
4b	7	2	
5	9	1	3

In question number 1, there are some students do errors in answering the question. The types of the errors are conceptual error, where students fail in understanding abstract ideas. The picture below shows the example of student's mistake.



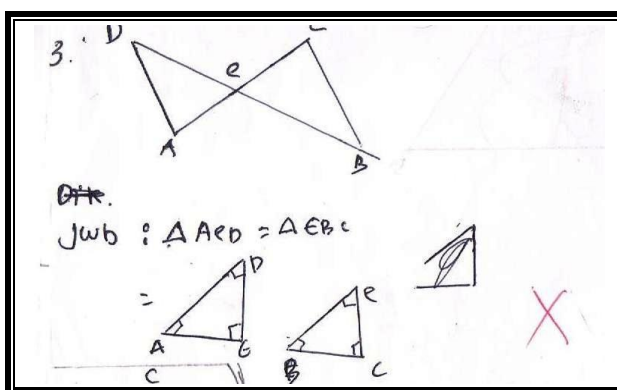
Picture 1. Example of conceptual error of question number 1

Picture 1 show that in the part (a) of the answer, student was not able to completely giving the proof about the similarity characteristics from two figures that has given. In the part (b), student makes mistakes in understanding the problems. Meanwhile in part (c), student did a conceptual error by using the wrong formula to find the solution. In part (d), student has using the correct formula but the error comes from the incorrect result that has achieved in previous part.

Table 2. Erros by Students of SMPN 8

Number of Question	Type of Error		
	Concept	Procedure	Concept
1a	5	2	
1b	5		5
2	2	1	
3	3		4
4	4		3
5	1	1	
6	3		3
7	8		
8	9	1	4
9a	7	2	
9b	6	1	2
10	2		5

In question number 3 there are some students that giving the answer incorrectly. The type of error is also the conceptual where students fail in understanding the abstract ideas. The example of those errors is shown in picture below.



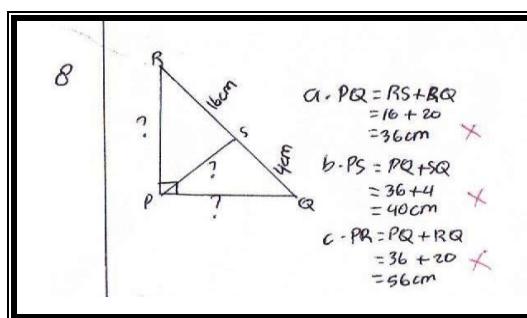
Picture 2. Example of student's error answering question number 3

Picture 2 shows the error comes from conceptual error that caused by the student who is still not able to express the ideas into the correct mathematics sentence. The picture also shows that the student was only giving the proof by drawing two triangles without giving further explanation about the picture so that the answer is not completely giving the exact meaning.

Table 3. Erros by Students of SMPN 21

Number of Question	Type of Error		
	Concept		Concept
1a	5		1
1b	5	1	
2	2		
3	3	3	
4	4	1	2
5	1		
6	3	5	3
7	12		
8	10	1	4
9a	7		
9b	6	2	3
1a	5	3	

In question number 8, some students did errors in form of conceptual and procedural errors. The example of the error is shown in picture below.



Picture 3. Example of student's error answering question number 8

Picture 3 shows that the student do the conceptual error caused by the incorrect formula to find the solution.

Table 4. Errors by Students of SMPN 23

Number of Question	Type of Error		
	Concept	Procedual	Concept
1a	2	2	1
1b	12		1
1c	8	3	1
1d	4		4
2a	12	1	3
2b	4		2
2c	5	2	3
3a	4		3
3b	6	4	3
4a	12	2	3
4b	5		4
5	1	1	7

At question number 5, some students give the answer incorrectly. The types of error are conceptual and procedural errors. The example of the error is shown in picture below.

Handwritten student work for question 5. The work shows several errors:

- The proportion $\frac{50}{40} = \frac{x}{16}$ is written, but a red 'X' is drawn over it.
- The equation $40x = 800$ is written.
- The equation $x = \frac{800}{400}$ is written.
- The result $= 20 \text{ cm}$ is written.
- The calculation $5199 = 20 \cdot 7$ is written.
- The result $= 13 \text{ cm}$ is written.
- The formula for area is written: $\text{Jarak bawah karton} \times \text{lebar karton}$.
- The calculation $13 \text{ cm} \times 7 \text{ cm}$ is written.
- The final result $= 101 \text{ cm}$ is written.

Picture 4. Example of student's error in answering question number 5

Picture 4 shows that the student is able to determine the correct formula to solve the problem but there are some errors due to the mistake on writing down the information so that the final answer is incorrect.

Based on the overall results of the study, many students make conceptual errors rather than procedural and carelessness error. That condition might be caused by several things gained from interviews with some students. From the interviews, students expressed some factors that caused errors, such as (1) students have forgotten the precondition material they have learned in Grade I and II (2) They also state that in learning, they are confused because the teacher does not use the media to teach and just write in the white board (3) careless (4) does not fully understand the material (5) the lack of effort in solving the problems, and less confidence.

4. CONCLUSION AND RECOMMENDATION

a. Conclusion

Based on the results and discussion of this study, it can be concluded that the type of errors that mostly done by the students of class IX Junior High School on Tampan sub district in solving the similarity problems are conceptual, procedural, and careless errors. The dominant errors are come from conceptual errors. From the results of interview, factors that causing errors on students are (1) students have forgotten the precondition material they have learned in Grade I and II (2) They also state that they are confused in receiving materials because the teacher does not use the instructional media to teach and just write in the whiteboard (3) careless (4) students are not fully understand the material (5) the lack of effort in solving the problems, and less confidence.

b. Recommendation

Based on the results of study, researcher gives the following recommendation (1) teacher should deliver the material with the help of instructional media. It will avoid the impression of memorizing formula (2) after giving the test, teacher should discuss

the mistakes that students did in the test so the students will not doing the same mistakes over again.

5. LITERATURE

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