



An Analysis of Students' Errors in Resolving The Problems In The Topic Opportunity

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Abstract

The purpose of this study is to find out the types of student errors that exist in solving problem related to opportunities material. The subjects in this study were class IX students of the Junior High School of HKBP LubukPakam. The method of this study was descriptive with a qualitative approach through a case study. Based on the data analysis, the following results were obtained (1) No students experienced reading errors; (2) 25 students experience reading comprehension difficulties; (3) Seven students experienced transformation errors; (4) One student experienced a weakness in process skill; (5) Six students experienced encoding errors. The factors causing students errors consist of, students not understanding the explanation and purpose of the problem, students were confused which formula to use, students do not understand the procedure of problem solving, students were not careful in calculations or the process of problem solving.

Keywords: *Students' errors, resolving the problems*

Introduction

In the field of education, the teacher plays an important role in the business of transferring knowledge, managing the learning process in the classroom, as well as evaluating the learning process and students' cognitive abilities. Most educator will agree that effective teachers will have a positive impact on student learning mathematics (Hosin Shirvani, 2015). In general,



the barometer of the success of the learning process is known from the learning outcomes obtained by students. Learning outcomes are part of the assessment. The assessment is an important part in ensuring the quality of educational outcomes. Assessment is related to ability (Sutrisno, 2016).

Mathematics is an excellent vehicle for the development of one's intellectual competence in logical reasoning, spatial visualization, analysis and abstract thinking. Students develop the ability to count, reason, think and solve problems through mathematical learning (Akinmola, 2014). From the observations, the researchers saw that the mathematics learning outcomes of many students did not reach the minimum completeness criteria; the students' mathematics learning achievement was still low. This observation is supported by a statement from one of the mathematics teachers, at Junior High School of HKBP LubukPakam, who stated that it was estimated that 25% of the number of Junior High School students reached the minimum completeness criteria without a formal examination. This is because the teacher is less focused on the problems faced by students, especially in solving problems. These problems are certainly related to the abilities and difficulties experienced by students, causing errors in completing tasks. Analysing students' mistakes, in solving math problems, can be telling as to how far students are understand mathematical concepts and mastering the material. This is because the center of mathematics learning is problem solving or prioritizing processes, rather than products or final results. Problem solving skills in mathematics education is the point where knowledge, thinking skills and everyday life come together. As such, problem solving has been emphasized in the state mathematics curriculum since the 1980s (Sevda Yildirim and Zehra Nur Ersözlü, 2013). In the problem solving process, it is important to understand mathematical knowledge and the relationship between knowledge and knowledge structures. Students must be able to unite concepts and processes and apply them to solve problems (Sefa Dündar).

Teachers need to analyze students' abilities. This will ensure that the learning outcomes obtained by students are truly accurate and reflect proper data. This data can then be used to consider making improvements in the learning processes related to students' cognitive ability. Teaching students is based on problem solving that is active and in accordance with constructive views (Naida Bikić, Sanja M. Maričić, dan Milenko Pikula, 2016). Teaching with an emphasis on process science skills is the right entry point for elementary and secondary school teachers (Vivien Mweene Chabalengula, Frackson Mumba and Simeon Mbewe, 2012). The learning process includes understanding different material explanations, and in the process of solving problems (Vilianti, Pratama, & Mampouw, 2018). Therefore, an action is needed to analyze it. Approaches and strategies in problem solving skills should not only be directed towards conducting activities, but also towards comprehensive and involved thinking activities (Nasarudin Abdullah, Lilia Halim & Effandi Zakaria, 2014). One way that this can be done is to give a test to students after the learning is done. The test is designed based on the indicators to be achieved. Of course, in compiling the test, a test grid is needed and also an assessment rubric for students' answers, in solving the questions given through the test, is needed.

The test is a tool that can measure students' cognitive abilities. Also through the test, the teacher can find out the students' problems. If students are faced with a mathematical problem and the student is able to solve it, it means the students does not have a problem. But if students have difficulty completing the questions it means that the students possess a problem (Adnyani, Kurniawan, & Pinahayu, 2018). Therefore, the teacher needs to analyze the problems faced by students. Examining student's thinking abilities can be a measure of the quality of education and standards in school (Taveep Thaneerananon, Wannapong Triampo, dan Artorn Nokkaew, 2016). Student problems can also be known by analyzing the mistakes made by students in solving problems. Understanding problems in learning are at the core of education, teaching and

learning (Rachmawati, 2016). The problem solving process is explained as a complex process that requires a lot of skills to be used together which includes understanding the problem, selecting the information needed between the choices given, changing the information obtained into a mathematical symbol and reaching a solution after the necessary operations (Saygılı, 2017).

The ability to learn mathematics using problem solving strategies has an impact on a student's abilities and skills (Tambunan, 2019). When encountering a problem, it is very important for it to be understood to develop a solution process. A person cannot find a solution or develop a strategy for a problem he cannot understand (Özlem Doğan Temur, 2012). The process of finding a solution to a particular problem is not a simple process. The process of problem solving requires a lot of thinking skills. The ability to collect information and data, express arguments, decide the correct theory, determine the problem of step completion, is a thought process that allows students to solve problems (R. Bambang Aryan Soekisno, Yaya S. Kusumah, Jozua Sabandar, Darhim, 2015). Solving problems requires building relationships between inputs and anticipated results (Gökhan Özsoy, Hayriye Gül Kuruyer, and Ahmet Çakıroğlu, 2015). If the settlement strategy used is wrong and does not follow the correct provisions, it can certainly lead to errors.

Mistakes related to students' answers in solving questions means a deviation made by students from the correct answers to these questions. In an effort to find students' mistakes in solving math problems, the nature of the teacher's work is the same as the work of a doctor. Diagnosis is a process carried out by the teacher to detect and determine errors made by students in absorbing the lessons delivered by the teacher, especially in doing academic tasks (Wahyudi, 2009).

These errors can be in the form of errors in accepting concepts, principles, using algorithms, counting operations, and others. There are 5 types of errors that can occur especially

in solving math problems, namely reading errors, reading comprehension difficulties, transformation errors, weakness in process skills, and encoding errors.

In mathematical planning the teachers must develop different solutions for each problem. Therefore it is necessary to analyze the problems related to the subject in the lesson, and design the answers they want and provide the material needed in response to the answers given by students (Özreçberoğlu & Çağanağa, 2018). This will help in rearranging the teaching plan by taking back the planning during the implementation phase, eliminating shortcomings and errors.

One part of the mathematics material, that needs to be the center of attention in student mastery, is the subject of opportunity. This is because it is still difficult for students to master and so requires special attention in teaching at school. The material was studied in class IX of junior high school. By considering this matter, the researchers tried to do research with the goal of analysing student errors in solving problems in the opportunity topic. Investigations about the types of mistakes made in various types of tasks also required insight. This investigation is motivated to achieve pedagogy that reaches balance (Kotze, 2018).

Materials and Method

This research includes descriptive qualitative research which describes the types of student mistakes in solving questions about the opportunity material. Further, this research analyses the factors that cause students to make mistakes in solving questions about the opportunities material. The research methods used are the qualitative and quantitative methods. This research was conducted at Junior High School of HKBP LubukPakam. The subjects of this study were students of the class IX Junior High School. They were 26 people. The object of this

research is the mistakes made by students. This data collection tool uses an essay test consisting of 5 items about opportunity material. The questions given are validated and tested first.

Results and Discussion

There are five types of mistakes made by students in solving problems namely reading errors, reading comprehension difficulties, transformation errors, weakness in process skills, and encoding errors. Explanation of the five types of errors is as follows.

Reading Errors

There were no students who made this type of error both on questions number 1, 2, 3, 4, and 5, as shown in Figure 1 below:

Figure 1 shows that, when students complete 5 items of opportunity material, no one makes a mistake in reading a question; reading a sentence incorrectly or mistaking important information in a matter.

Reading Comprehension Difficulty

There are 25 people making mistakes understanding the problem. In question number 1, there were 3 people, in question number 2 there was 2 people, in question number 3 there was 19 people, in question 4 there were 9 people, and in question number 5 were 23 people. This is shown in figure 2 below:

Figure 2 shows that, when students complete 5 items of opportunity material, there are students who make mistakes in understanding questions. Students are not capturing the information contained in the question so that students can further process the solution to the problem. It can be seen in the figure that more students do not understand question 5. However,

few students do not understand question number 2. Students make mistakes because students do not understand the explanation and purpose of the problem and are confused about which formula to use.

Transformation Errors

There are seven people making transformation mistakes. In question number 1 there were 4 people, in question number 2 there were 2 people, in question number 3 there was 1 person, and in question number 4 there was 1 person. This can be seen in the Figure 3.

Figure 3 shows that there were no students who made a transformation error in question number 5, but there were errors of transformation made by students on other items. It can be seen in the figure that more students make transformation errors in question number 1 than any other question. The error is caused by students choosing the wrong operation or not understanding the problem solving procedure.

Weakness in Process Skill

One person made a process skill mistake. This was in question number 3. This is shown in figure 4 below:

Figure 4 shows that, when students complete 5 items of opportunity material, there is 1 student making mistakes in process skills only in question number 3, while in other questions there are no errors. The reason for this student making a process skills mistakes was that they were not careful in their calculations.

Encoding Errors

There are six people making mistakes in writing answers / conclusions. In question number 1 there was one person, in question number 2 there are six people, and in question number 4 there are two people. This can be seen in figure 5.

Figure 5 shows that, when students complete 5 items of opportunity material, no students make the mistake of writing the answers to questions number 3 and number 5. But there are mistakes in writing the answers to questions numbers 1, 2, and 4. The cause of this type of error is due to not writing the answer to the question in the desired form; where the problem requires a conclusion.

Of the five types of errors, it can be concluded that the mistake most students make is understanding the problem. But no students make mistakes reading the questions. To find out the causes of student errors, a number of samples were taken representing students who did each type of error. Information obtained showed that students do not understand the explanation and purpose of the problem, students are confused which formula to use, students do not understand the procedure of problem solving, students are not careful in their calculations or problem solving processes, and there are even students who have not been able to write answers with conclusions.

Analysis of the types of errors in solving problems is very important for teachers. In addition, the teacher also needs to know the causes of mistakes made by students in order to improve student learning outcomes and improve the learning process. Therefore, it is expected that through the results of this study, teachers should be motivated to accurately evaluate students and understand the problems faced in learning and in solving problems.



Conclusion

From the results and discussion of the research it can be concluded that no students made mistakes in reading the questions. However, there are students who make mistakes, among others criteria. Twenty-five students made mistakes understanding the problem, seven students made a transformation error, one student made a process skills error, and six students made a mistake writing the answer. Of the 5 types of errors that exist, this research obtained information which suggests that errors are made by students because students do not understand the explanation and purpose of the problem, students confused which formula to use, students do not understand the procedure of problem solving, students are not careful in the calculation or problem solving process, and students have not been able to write answers as conclusions.

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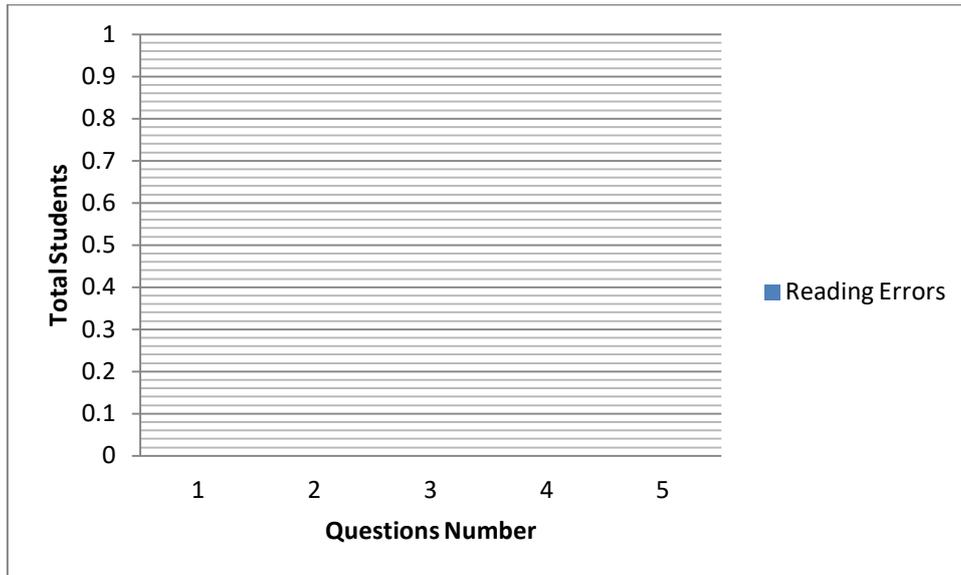


Figure 1. Many Students Make Reading Errors

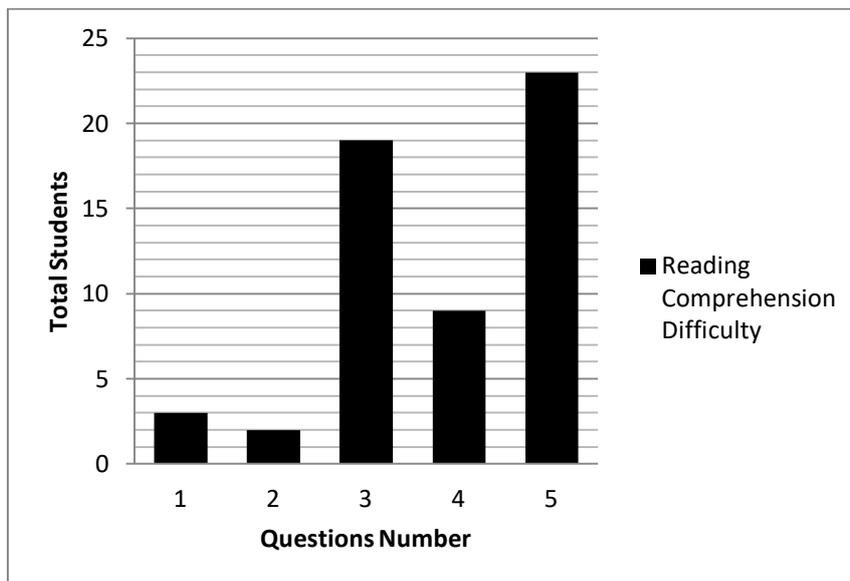


Figure 2. Many Students Have Difficulty Understanding Reading

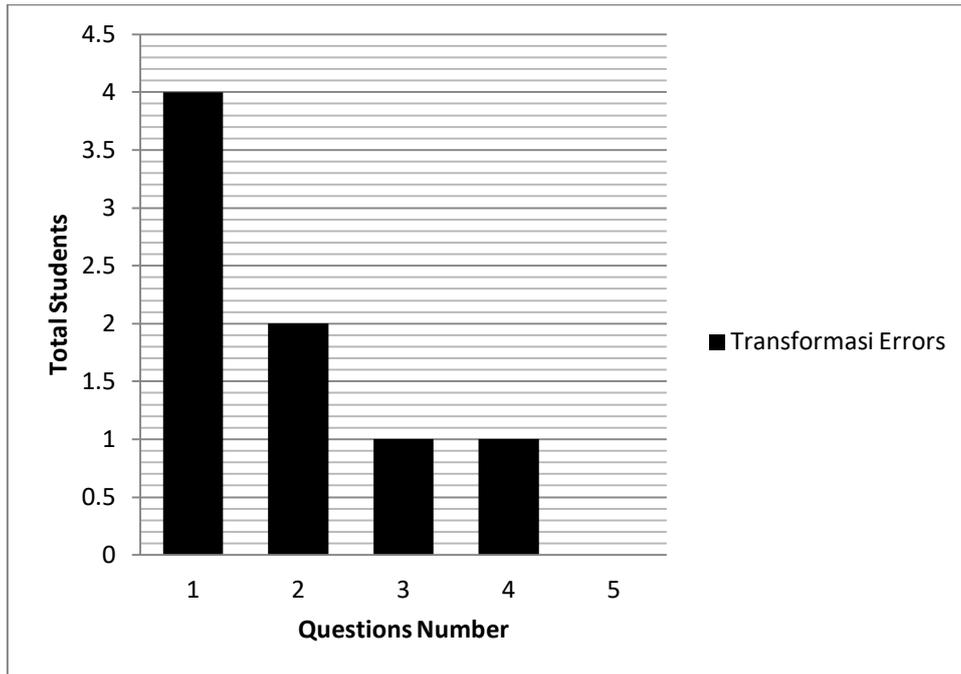


Figure 3. Many Students Make Transformation Errors

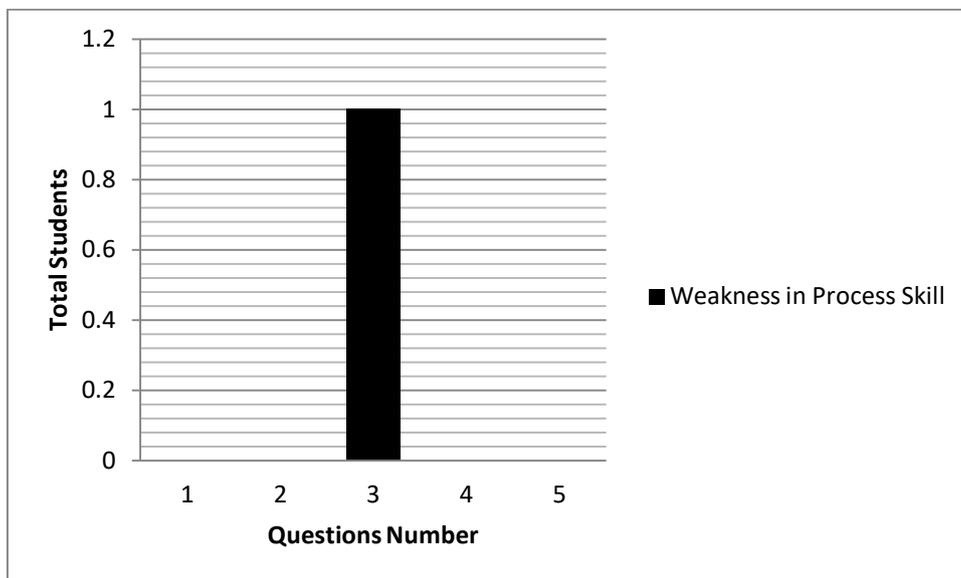


Figure 4. Many Students Make Process Skill Errors

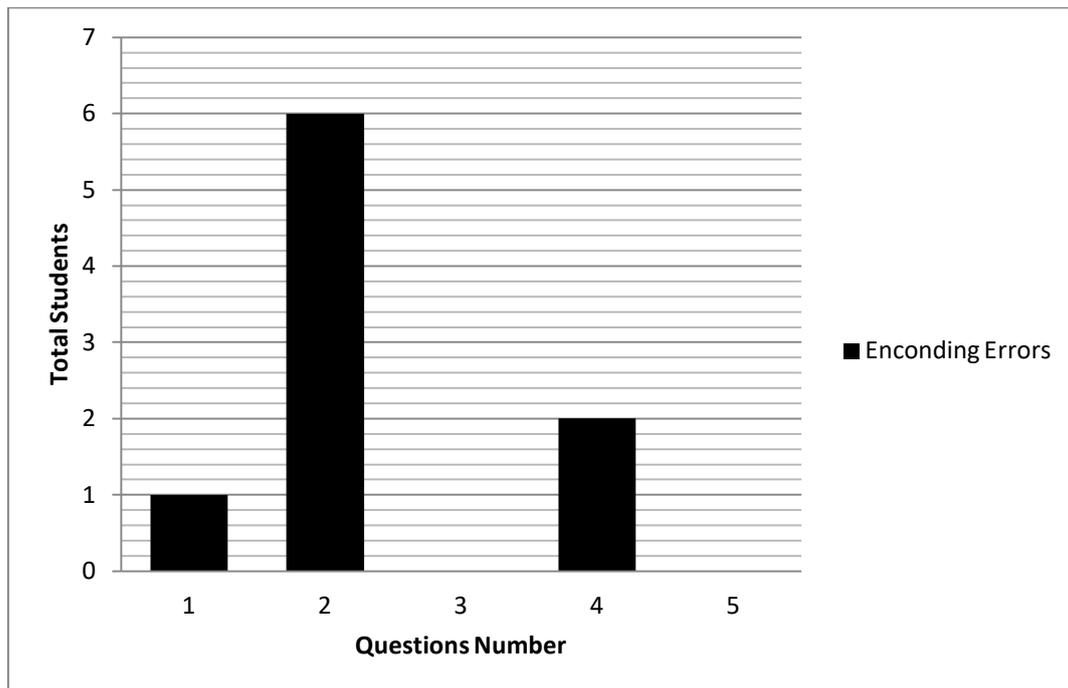


Figure 5. Many Students Make Encoding Errors

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