

Analysis of Learning Difficulties and Self-Efficacy of Junior High School Students in Solving of Story-Form Mathematics Problems

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Abstract—This study aims to investigate the learning difficulties and students' self-efficacy of junior high school students in South Lampung Regency in solving essay mathematics problems. This research employed quantitative and qualitative approaches. Data were obtained using descriptive question tests, interviews and self-efficacy scale questionnaires. The sampling technique used purposive sampling technique with 32 students as participants. It was found that students' difficulties included difficulties in understanding the questions, in working on the questions, inadequate time provided and anxiety experienced by some students when faced mathematics problem in story-form. Self-efficacy of the students was found to be in the high category with an average of 80.47.

Keywords—analysis of student difficulties factors; self-efficacy; solving mathematical problems; story problems

I. INTRODUCTION

Mathematics is an important ability that must be mastered in everyday life. Mathematics is a science of abstract patterns that have characteristics as a tool to solve problems, as the foundation of scientific and technological studies, and can provide ways to model situations in real life [1]. A strong base in counting helps children to succeed in other fields of study. When mathematics is mentioned, there will be many people who are afraid of mathematics or do not like mathematics and many ask why there are students who are enthusiastic while other students are not interested in learning? Why do some students believe in their abilities in mathematics and others are not capable? This is because students do not have the same concept of understanding in mathematics learning [2-4].

The aim of mathematics education is to actualize student learning at the highest level [5]. However, in reality the majority of students' experience difficulties in solving mathematical problems. The inability of mathematical problem solving is caused by the abstract mathematical nature but the learning process of mathematics where the teacher only explains the material, gives examples of questions and gives practice questions [6]. Students who experience learning difficulties tend to have difficulties in solving problems, both in class and problems in their lives.

Difficulties experienced by students can't be separated from various factors that cause students to experience these mathematical difficulties. Many factors affect difficulties students in solving mathematical problems, including internal (student) and external factors (teacher, parents, school, community, etc.) [7]. But in this case internal factors (students) will be studied, especially in students' knowledge and understanding of mathematics. Reveals that including internal factors are physiological and psychological (for example: intelligence, motivation, achievement, and cognitive abilities) [8]. External factors are environmental and instrumental factors (e.g. school, teacher, curriculum, and learning models).

Students' beliefs and perceptions about subjects that are being studied are important and has an influence on achievement students in learning. Student one with others have differences. Individual differences in students can be affective, psychological, and so on. Self-efficacy is a person's belief in the ability to do something [9]. Self-efficacy refers to one's views about the ability of oneself to perform a certain action, while the outcome expectation refers more to beliefs about the results to be obtained from the action [7].

The low self-efficacy of students in mathematics is indicated by many students don't want to try more to work on math problems, and tend to give up quickly when getting a difficult task. Confidence (efficacy) is the main basis of an action. Someone who has confidence in himself to do an action is called having self-efficacy. Someone who has confidence in himself to do an action is called having self-efficacy. Confidence in the ability to complete a particular task is known as self-efficacy [10].

Self-efficacy is a predictor that determines mathematics performance which is stronger than other factors such as self-concept, anxiety, perceived usefulness of mathematics, gender, or mathematical background [11,12]. In addition, self-efficacy arises by observing the success of students who are working on the same task. The feedback given by the teacher accurately and gives enthusiasm can help the growth of self-efficacy (self-efficacy). The problem that appears in this paper is how the results of the analysis of self-efficacy in mathematics learning.

The results of research by Pintrich and Schunk [13] suggest that students who have high self-efficacy are more able to master various subjects of mathematics and reading assignments than students with low self-efficacy. Sunaryo states that if it is associated with learning achievement in mathematics, then the assessment of students' self-efficacy towards mathematics subjects can contribute to mathematics learning achievement [14]. Besides that, the existence of high self-efficacy towards mathematics lessons encourages students to be more diligent and strive to give attention and look for learning strategies to learn and do mathematical tasks. The difficulties experienced by students in learning mathematics do not make him despair. Perseverance and effort is what can contribute positively to the mathematics learning achievement achieved at school.

Based on the explanation above, it can be concluded that self-efficacy has a positive contribution as well as a very important role in mathematics learning achievement that can be achieved by students. High self-efficacy of students will encourage students to achieve better mathematics learning achievement. Therefore, students are expected to have high self-efficacy.

Based on the results of interviews with math teachers, it was found that self-efficacy measurement has not been completed in their schools. During this time the teacher only looked at student achievement from the test scores. Based on the description, the purpose of this study is to describe the factors of difficulty experienced by students, and to describe the self-efficacy of junior high school students, especially those related to mathematical problem solving in the form of story problems.

II. METHODS

This research is a research with quantitative and qualitative approaches. Quantitative research is a process of finding knowledge that uses data in the form of numbers as a tool to analyze information about what you want to know [15]. While qualitative research is a research procedure that produces descriptive data in the form of written or oral words from people and behaviors [16]. The subjects in this study were 32 students of class VII. The instrument used in this study was a test of students' difficulties in solving mathematical problems and non-tests in the form of Likert scale questionnaires and interview guidelines to determine the factors of student difficulties in solving mathematical problems.

The first stage in this study was to provide students with a self-efficacy questionnaire in solving mathematical problems. The second stage by giving a test in the form of a story problem is seen from the mathematical thinking ability that is tested (indicators) on the material in the form of flat rectangles and triangles. The questions given are packaged in the form of essays (story questions) to make it easier for researchers to determine the results of student work in solving mathematical problems. The questions used in the test are as follows.

Problem 1:

Reno will make a pond in his yard with the following sizes, the length of the sides parallel to the pond is planned to be

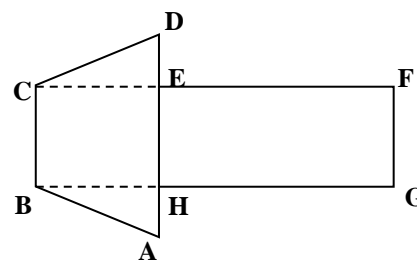
made with sizes of 15 m and 7 m respectively, the other two sides of the same size measuring 5 m each. After that Reno will enclose the pool with iron, every 2 m needed 8 iron to fence the pool. What form is the Astuti pool? Correct Reno's opinion that he needed 100 iron to be able to fence off his pool?

Problem 2:

Ridwan have a rectangular vineyard. The length of the vineyard is $1\frac{1}{4}$ of its width. The area of the vineyard is known to be 180 m^2 . Elang wants to put a fence around his garden with bamboo. Elang believes that he needs no more than 50 m of bamboo to make his garden fence. Give your explanation to find the answer!

Problem 3:

Andi has a mango garden shaped like the picture below!



The EF side has a length of 16 m. The area of EFGH is 64 m^2 . AH length is 6 m. Long CE $\frac{1}{2}$ length EF, around the mango garden will be installed fence with a cost of Rp. 50,000.00 / m. Aji argued that in order to fence his mangrove garden, he needed Rp. 3,500,000.00. Correct the opinion of Aji? Give an explanation of the concept along with mathematical evidence related to the problem!

Problem 4:

Gilang has rice fields with a rice field length of 5 m, and a width of 4 m of rice fields. Gilang want to give fertilizer to all the land in his fields. One packet of fertilizer can be used to fertilize 4 m^2 . What is the shape of the Gilang rice field? If Gilang believes that 5 packs of fertilizer can fertilize all the land in his rice fields. Is Gilang correct?

The statement on the indicator of self-efficacy about authentic mastery experience is in the form of questions about how students master the basic operations of mathematics, mastering the ability of the prerequisites, and learning experiences possessed by students. Indicators of various experiences in the form of questions about how students identify mathematical abilities that are owned by themselves with others, and identify mathematical abilities that are owned in groups. Verbal persuasions indicators are questions about how to assess the mathematical abilities that are held in a group, and understand the explanation of the teacher or other people in the sense of feedback. Physiological indexes indicator. In the form of questions about the use of mathematical abilities in solving problems, recognizing weaknesses and strengths possessed during the learning process, and using critical thinking skills in solving mathematical problems.

The third stage in this research is conducting interviews in the specified sample scope. Based on diagnostic tests students who scored less than 66 were classified as students who had difficulty in solving mathematical problems [7].

Analysis of the data collected is done by (1) checking the results of the questionnaire students' self-efficacy in beliefs solve questions and beliefs in mathematics, (2) examine the test results of students' difficulties in solving problems (true, correct but incomplete, there are errors, not completed, or not working), (3) analyze test results and questionnaire based on the indicators specified in measuring mathematical thinking skills, (4) identifying students who have difficulty in solving mathematical problems, (5) categorizing students' self-efficacy based on very high, high, medium, low, and very low criteria, and (6) suspect the factors of student difficulties in solving questions based on tests [7].

The next step is to determine conclusions based on the analysis of the data collected through tests, questionnaires and interviews. According to [7] conclusions made include (1) concluding the factors of students' difficulties in solving mathematical problems in the form of story problems, (2) categorizing students in solving mathematical problems in the form of story problems.

The instruments used previously were tested for validity and reliability in advance. Based on the results of trials on 40 statements of self-efficacy, it shows that the scale has a validity index of 0.3673, the reliability index is 0.957, and 38 statements are declared valid and feasible to use.

III. RESULT AND DISCUSSION

In this study, researchers collected data through tests, questionnaires of self-efficacy and the results of interviews about solving mathematical problems given. Before being given a test, students' self-efficacy was measured first using a questionnaire. The self-efficacy scale questionnaire consists of 38 item statements. Statements 1 to 12 are statements of indicators of authentic mastery experience related to abilities based on previous experience. Statements 13 to 19 are statements of indicators of various experiences relating to evidence based on competence and comparison. Statements 20 to 25 are statements of verbal persuasions that refer to direct feedback or words given by the teacher. Statements 26 to 38 are statements of physiological indexes that relate to the assessment of strengths, weaknesses and weaknesses in a task.

The questionnaire in the Likert scale is composed of four choices, namely SS (strongly agree), S (agree), TS (disagree) and STS (strongly disagree). Each choice has a different score. In positive statements SS = 5, S = 4, TS = 2 and STS = 1. Conversely for negative statements SS = 1, S = 2, TS = 3 and STS = 4. The questionnaire is guided by the researcher so that students really understand the purpose of each statement stated on the questionnaire so that students choose exactly one of the four available options that are appropriate to their circumstances.

Based on the results of questionnaires obtained the results of achievement of self-efficacy indicators are presented in Table 1 as follows:

TABLE I. PERCENTAGE OF ACHIEVEMENT OF SELF-EFFICACY

Indicator	Achievement SE (%)
Authentic mastery experience	80,83
Various experiences	80,47
Verbal persuasions	81,12
Physiological indexes	79,45
Average	80,47

According to Sadewi [17], the level of self-efficacy of students towards mathematics learning is presented in Table 2 below.

TABLE II. CRITERIA FOR SELF-EFFICACY LEVELS

Interval (%)	Criteria
$91 \leq - \leq 100$	Very high
$78 \leq - \leq 90$	High
$65 \leq - \leq 77$	Moderate-High
$52 \leq - \leq 64$	Moderate-Low
$39 \leq - \leq 51$	Quite low
$26 \leq - \leq 38$	Low
$14 \leq - \leq 25$	Very low

Based on the table above it can be seen that the 1st authentic mastery experience self-efficacy indicator is 80.83%, the indicator for the 2 various experiences is 80.47%, the 3rd indicator verbal persuasion is 81.12%, and the 4th indicator of physiological indexes is 79.45%, with an overall average of 80.47%, this means that students' self-efficacy in mathematics learning has high criteria.

The indicator of self-efficacy that experienced the highest increase was verbal persuasions of 81.12%, this was seen when students held group discussions, students worked with their groups and were able to explain the material they understood to friends in the group [18]. The interaction between students and their group friends will form a view of how he plays a role in his group or makes students more familiar with the abilities he has compared to his friends. The learning process is carried out in collaboration and working on tasks in groups more effectively [19]. Some students have a positive outlook on their abilities but some have a negative view of their abilities. These negative views can turn positive when students and their groups feel they have been able to solve the problem well. Positive self-efficacy of students can also be formed if other people give a positive assessment of their abilities. This can be seen, when students present the results of group discussions or express their ideas/opinions then the teacher gives verbal appreciation / appreciation in the form of praise or applause to the student, then the student feels that other people appreciate the abilities he has so that he will be more confident and have positive self-efficacy.

The results of the given test are used to determine the difficulties in solving mathematical problems. Students who experience learning difficulties score below 66 in the test. After collecting all the answer sheets that have been done by the students, then the researcher corrects to see the results.

After giving questionnaires and tests, the next step is to conduct interviews. Interviews were conducted by determining the research subject. The research subjects were determined

based on the results of tests that had been conducted which had a score below 66 or that the researchers had difficulty in solving mathematical problems and obtained five subjects to be interviewed about what factors were causing students difficulties in solving mathematical problems given.

The interviews were conducted according to the interview guidelines, but not formally. This means that the questions given can be developed by researchers according to the answers given by students.

Based on the results of interviews with the causes of students having difficulty in solving mathematical problems in the form of story problems, students cannot understand the sentences in the questions, students are less careful in working on the questions, students are too hasty to solve questions, easy to give up, less time is given, and anxiety experienced by students when they get math problems in the form of stories.

IV. CONCLUSION

Based on the data and information obtained, it can be concluded that the factors that cause students to experience learning difficulties are difficulty in understanding the questions, students are less careful in working on the questions, students are too hasty to solve problems, students give up easily, students do not have enough time and students' anxiety when getting math problems in the form of stories.

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