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Analysis of Students' Mathematic Problem-Solving Ability Based on Application of Learning Methods Electronic (e-learning)

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ABSTRACT

This study aims to analyze and describe the mathematical problem solving abilities of students based on the application of electronic learning methods (e-learning). The study was conducted at 199 Junior High School in Jakarta in class VII even semester 2019/2020. This research is a qualitative research. The research subject was 35 students of the VII-5 class, then 5 students were chosen to represent the category of problem solving abilities. Data collection in this study used test, interview, and documentation. The results showed that the mathematical problem-solving abilities of 35 students in class VII-5 were obtained by 1 student or 2.86% included in the very high category, 7 students or 20% included in the high category, 9 students or 25.71% included in the medium category, 14 students or 40% in the low category, and 4 students or 11.42% in the very low category.

Keywords: Electronic Learning, problem solving ability, learning methods

INTRODUCTION

Mathematics is a basic science in the development of science and technology that can be used as a means of developing potential for students [1]. Learning mathematics can develop the potential of students in improving the ability to solve problems both in learning and in everyday life, thinking logically, analytically, and systematically. Students must have problem-solving abilities to solve every problem, one of the lessons that requires problem-solving skills is learning mathematics.

The ability to solve mathematical problems is an important and fundamental thing that needs to be taught so that students can solve mathematical problems with all their knowledge and understanding. Rajkumar dan Hema [2] define mathematical problem solving abilities, namely abilities that can be used to solve problems by applying cognitive skills such as reasoning and logical thinking.

Problem solving in learning mathematics requires effort or a way to find a solution. Mathematical problem solving abilities can be developed in learning through practice questions that have the potential to improve students' mathematical understanding [3]. Besides being useful for increasing knowledge and understanding, mathematical problem solving abilities are also useful as a way of thinking in order to improve logical reasoning in students [4]. Indicator of mathematical problem solving ability expressed by Polya [5].

Table 1. Indicators for Mathematical Problem Solving

Polya's Problem Solving Steps	Indicator
Understand the problem	Identifying the elements that are known, asked, and the adequacy of the elements needed.
Develop a problem solving plan	Formulating problems or compiling mathematical models
Carry out a problem solving plan	Implementing problem solving strategies in or outside mathematics
Check again	Explain or interpret the results according to the original problem

This research will be conducted at SMP Negeri 199 Jakarta, where the school has implemented the 2013 curriculum and uses a scientific approach in the learning process. Based on the results of observations and interviews conducted with mathematics educators who teach in class VII SMP Negeri 199 Jakarta, it is concluded that in learning mathematics the biggest problem lies in solving mathematics problems. Students still have difficulty finding solutions to problems in test questions and exercises. This is because students have difficulty in determining the steps to solve a problem.

Mahase [6] revealed that almost all human beings in all parts of the world including Indonesia are in grief due to the outbreak of a virus, namely Coronavirus Disease (COVID-19). COVID-19is very easy to spread so that the government of the Republic of Indonesia issued a policy to study at home for students. This has an impact on teaching and learning activities, where schools must temporarily be closed but the learning process must still take place.

Efforts made by educators in order to be able to create a conducive learning process even though they do not meet face to face in the classroom, namely conducting distance learning by utilizing information and communication technology. One of them is through the application of electronic learning methods or e-learning methods. In its application, electronic learning or e-learning methods are supported by technologies such as audio, videotapes, computers, and telephones to obtain the required subject matter [7].

E-learning is a modern learning method that utilizes information technology to disseminate information, materials, and exercises needed for learning activities [8]. Alimron [9] revealed the benefits of the e-learning method in learning, including:

a. The amount of time available for educators and students to interact;
b. Learning activities become flexible, because students can adjust the availability of time for learning;
c. Improving the quality of educators to make teaching materials easier for students to learn and understand;
d. Make it easier to store things related to learning.

The use of e-learning methods to create an interesting and enjoyable atmosphere for students in the learning process cannot be separated from the advantages and disadvantages.Several advantages and disadvantages of the e-learning method were expressed by Fadrianto [7] including:

a. Easy interaction without being limited by time, distance and place;
b. Students can re-learn the subject matter at any time;
c. Able to form independent learning patterns in students;
d. Relatively efficient, because the learning process can be carried out without having to gather in the same place.

The disadvantages of the e-learning method in the learning process including:

a. Lack of interaction between educators and students because they do not meet face to face directly;
b. Educators must master conventional learning techniques and learning techniques using electronic tools;
c. Students who have low learning motivation will have difficulty following the learning process;
d. Lack of skills in mastering electronic devices.

Based on the description above, the researcher conducted a study entitled "Analysis of Students' Mathematical Problem Solving Ability Based on the Application of Electronic Learning Methods (E-Learning)".

RESEARCH METHOD

The method used in this research is descriptive method with a qualitative research approach. Supremum Journal of Mathematics Education (SJME) explains that qualitative research is descriptive research that has a deep purpose to analyze, describe and understand a phenomenon or problem [10]. The research was conducted at SMP Negeri 199 Jakarta. The object of this research is students' mathematical problem solving abilities based on the application of electronic learning methods (e-learning). The subjects in this study involved one class, namely students of class VII-5 SMP Negeri

199 Jakarta who were treated with the electronic learning method (e-learning) in the even semester of the 2019/2020 academic year, totaling 35 people. The data collection techniques used were tests, interviews, and documentation.

Tests given to students to measure students' ability to solve math problems. The test used in this study is in the form of a description with the subject matter of a quadrilateral consisting of 6 items. The type of interview in this study is a semi-structured interview. Interviews were conducted to obtain data

from students regarding the ability of mathematical problems based on the answers to the tests given. The documentation needed in this study is the student's answer sheet related to the ability of mathematical problems.

RESULTS AND DISCUSSION

The test of mathematical problem solving abilities is done individually by students. The categories for the level of mathematical problem solving abilities of students in class VII-5 SMP Negeri 199 Jakarta can be seen in the following table.

Table 2. Categories of Students' Mathematical Problem Solving Ability

Score	Category	Total Students	Percentage
80 – 100	Very high	1	2,85%
64 – 79,9	High	7	20%
55 – 64,9	Medium	9	25,71%
40 – 54,9	Low	14	40%

The results of the test of mathematical problem solving abilities amounted to 6 items and interviews conducted by students with very high, high, medium, low, and very low categories were analyzed based on the problem solving stage revealed by Polya.

a. The category of students' mathematical problem solving ability is very high
   Very high category students can understand the problem by determining what is known and asked correctly for 6 items. Students can make plans by writing down how to determine problem solving that leads to the correct answer to 5 items. Students can carry out plans that have been prepared in the calculation process by obtaining the correct answers to 4 items. Students can re-check the process and answer correctly for 5 items.
b. The category of students' mathematical problem solving ability ishigh
   High category students can understand the problem by determining what is known and asked correctly for 6 items. Students can make plans by writing down how to determine problem solving that leads to correct answers to 5 items. Students can carry out the plans that have been prepared in the calculation process by obtaining the correct answers to 4 questions. Students can re-check the process and answer correctly for 3 items.
c. The category of students' mathematical problem solving ability is medium
   Medium category students can understand the problem by determining what is known and asked correctly for 6 items. Students can plan by arranging problems that lead to correct answers to 3 items. Students can appropriately carry out the plans that have been compiled in the calculation process by obtaining the right answers to 5 items. Students can re-check the process and answer correctly for 3 items.
d. The category of students' mathematical problem solving ability is low
   Low category students can understand the problem by determining what is known and asked appropriately for 6 items. Students can make plans by writing down how to determine problem solving that leads to correct answers to 3 items. Students can carry out plans that have been prepared in the calculation process by obtaining the correct answer to 1 item of question. Students can re-check the process and answer correctly for 2 items.
e. The category of students' mathematical problem solving ability is very low
   Very low category students can understand the problem by determining what is known and asked correctly for 6 items. Students can make plans by writing down how to determine problem solving that leads to the right answer to 2 items. Students can carry out plans that have been prepared in the calculation process by obtaining the correct answer to 1 item of question. Students tend not to re-check the processes and answers that have been obtained.

CONCLUSIONS

The results of the research related to the analysis of students' mathematical problem solving abilities based on the application of the electronic learning method (e-learning), it is known that from 35 students of class VII-5 SMP Negeri 199 Jakarta, 1 student or 2.85% had the mathematical problem solving ability category very high, 7 students or 20% have high category mathematical problem solving abilities, 9 students or 25.71% have medium category mathematical problem solving abilities, 14

students or 40% have low category mathematical problem solving abilities, and 4 students or 11.42% have a very low category of mathematical problem solving ability.

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