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Student Problem Solving Ability Based on Blended Learning

Dian Mayasari[1*], Sadrack Luden Pagiling[2], Abdul Rachman Taufik[3]

[123] *Mathematics Education Department, Universitas Musamus Indonesia*
[*] *Corresponding author. Email: mayasari_fkip@unmus.ac.id*

ABSTRACT
The aim of this study is to describe the ability of problem solving based on Blended Learning. This type of research is qualitative with research subjects in mathematics education students taking Advanced Calculus courses in the Department of Mathematics Education at Musamus University as many as 3 high, medium, and low ability students. The research instrument was a test of problem-solving skills and interview guidelines. Data validated with written data were analysed qualitatively as well as data validation using time triangulation. The results showed low ability students have problem-solving abilities in the less category. This student has limited understanding and application of mathematical rules in solving problems. Medium-ability students tend to have categories of problem-solving abilities depending on the context of the problem. Highly capable students have problem solving skills in either category. This student has a good mathematical performance which is characterized by a good understanding of the problem, planning, implementation and accurate solutions according to the context of the problem.

Keywords: *ability, problem solving, blended learning.*

1. INTRODUCTION

Everyday human beings are always faced with problems, there are problems are considered simple and there are problems that are quite complicated or even make those who face it think and try hard to solve it. Basically, a problem is a situation faced by someone, who needs a solution, and the way to achieve this solution is not immediately known [1][2]. Sometimes problems for one person may not be a problem for others operating at different levels of development.

Problems as quantitative or otherwise situations, which confront individuals or groups of individuals, which require resolution and individuals do not see a clear path to get a solution. Furthermore, the two distinguish between problem the three common forms that are often used, namely: (1) Question is situation that can be resolved by recalling memory (remembering). (2) Exercise is a situation involving continuous training (drill) and practice to return to the skills or algorithms learned previously. (3) Problems is a situation that require thinking and synthesis of knowledge learned previously to solve it [3][4].

Problem solving is the process of closing the gap between what can and what is wanted. This is the act of answering a question, explaining uncertainty or explaining something that was not understood before. Learning mathematics is learning to solve problems [5]. This condition is possible because mathematics is an activity of human life. Problem solving is the main focus of mathematics learning at this time after so long ignored as if mathematics is separated from life activities or daily lives of students [6][3]. Problem solving is a major concern in current mathematics learning activities, both at the elementary, secondary and higher education levels. At the university level, students need opportunities to formulate, plan solutions, and solve complex problems that involve different techniques [2].

They must be encouraged to reflect on their thinking during the problem-solving process so that they can apply and adapt their strategies in developing them to problems and in other contexts. By solving mathematical problems, students gain a way of thinking, accustomed to persevering, having curiosity, and confidence in foreign situations that they encounter outside the classroom [1]. Polya suggests four steps to solving problems namely understanding the problem, planning the solution, implementing the plan, and looking back [7]. According to the National Council of Teachers of Mathematics [1] indicators of problem-solving abilities are as: (a) identifying elements that are known, asked questions, and the adequacy of the elements needed; (b) formulating

mathematical problems or developing mathematical models; (c) applying strategies to solve various problems (new types and problems) in or outside mathematics; (c) explain or interpret the results according to the original problem; (d) use mathematics meaningfully.

The results of the synthesis of problem-solving indicators used in this study can be presented as; (a) understand the problem; (b) choosing a plan for a correct problem-solving strategy; (c) solving problems using correct mathematical concepts; (d) verification and interpretation of results correctly. So, someone is said to have a good mathematical problem-solving ability that is someone is able to understand the information in a whole problem, using the information as a basis for making plans and solving problems with steps, procedures and using mathematics correctly to make correct conclusions based on the context of the problem.

Blended learning is learning that is a mixture of face-to-face learning in the classroom and online [8]. Several research studies have found that blended learning can improve learning outcomes equal to or higher than students who study conventionally or fully online, although success rates vary between disciplines [9]. It is therefore not surprising that many schools or colleges have implemented or considered a blended learning model. This is also supported by the opinion of Graham who stated: "We can be pretty certain that the trend towards blended learning systems will increase ". However, it must be noted that the success of blended learning does not happen automatically, the main factor in the success of blended learning is to consider instructional pedagogy and design related to the best way to utilize technological tools, how to facilitate interaction between students, how to motivate students, and how to arrange material best delivered via the Internet rather than face to face. Teaching material that is done is integral, where through blended learning aims to see the ability of students to solve integral problems [10][11].

Exploring the problem solving abilities of first-year students provides benefits: (1) obtaining an overview of the problem solving abilities of first-year students in accordance with the level of individual ability of students, (2) formulating integral learning activities in accordance with the identification of students' problem solving abilities [12][13].

2. RESEARCH METHODS

This type of research is exploratory descriptive research. The subjects were sixth semester students who took courses in calculus in mathematics majoring in FKIP Musamus University Merauke as many as three students. The selection of subjects by purposive sampling with the criteria of the subject has high, medium and low ability, can communicate well, and has good cultural knowledge. The research instrument was the researcher himself and assisted with four problem solving test questions on integral material, each of the two questions for the first problem solving test and the second problem solving test (time triangulation) and interview guidelines. Research data in the form of written documentation data problem-solving test results and interview data. Research data obtained by tests, then confirmed by interviews. Written data were analyzed qualitatively based on indicators of problem solving ability while interview data were analyzed according to the analysis techniques revealed by Miles & Huberman [14] namely (1) data reduction, (2) data presentation, (3) drawing conclusions. The results of written data analysis and interviews were then validated using time triangulation.

3. RESULT AND DISCUSSION

The explanation below will be presented through written documentation and interviews with research subjects as well as categorizing problem solving abilities, namely high, medium and low.

3.1 High Ability Student

The results of the written documentation on problem 1 are presented in figure 1.

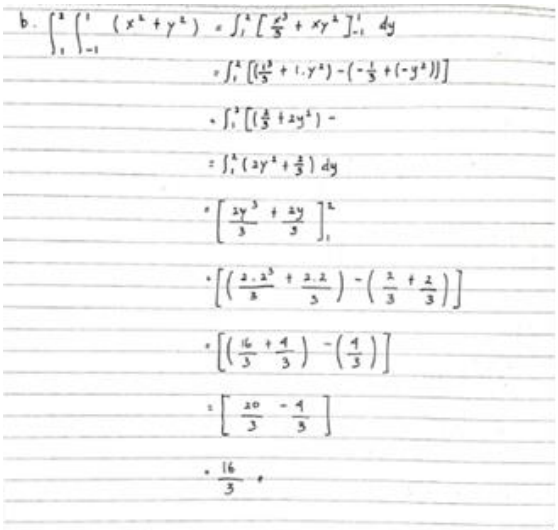

Figure 1. Written results about high ability students

From the results of the written first question, high-ability students write questions by understanding the questions but in the stages of completion in accordance with the stages of integral completion. The results of the interviews show that high-skilled students can understand the information contained in the problem in detail and clearly. The first step in its completion, students write it according to the integral stages. Conclusion problem solving category understanding the problem, plan strategy and solve problem category good and verification result enough category. The problem-solving ability of the first high ability students is in the good category. High ability students in solving problems

in either category. Students lack understanding of the problem and transform it into mathematics. Highly capable students have the ability to use integral rules in problem solving.

3.2 Medium Ability Student

The results of the written documentation on problem 1 are presented in figure 2.

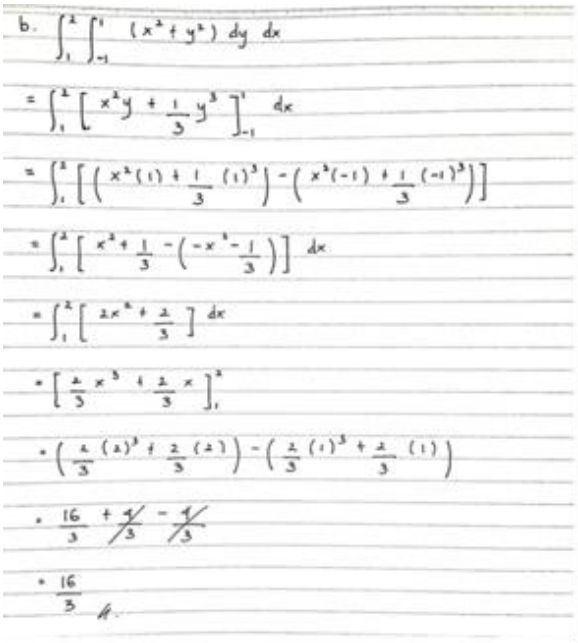

Figure 2. Written results about medium ability students

From the results of the written first question, students who are capable are writing questions by understanding the questions but in the stages of completion in accordance with the stages of integral completion. The results of the interviews showed that capable students were able to understand the information contained in the problem in detail and clearly. The first step in its completion, students write it according to the integral stages. Conclusion problem solving indicator understanding problem and solve problem is good category and plan a solve Abd verification result is category enough.

3.3 Lower Ability Student

Below will be presented the results of written documentation and interviews of research subjects as well as the distribution of their problem solving abilities. The results of the documentation are written on the first problemThe results of the written documentation on problem 1 are presented in figure 3.

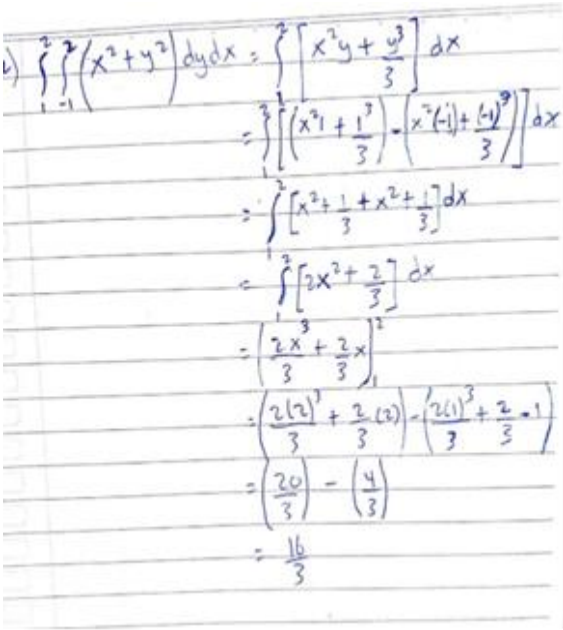

Figure 3. Written results about medium ability students

From the results of the written first problem, students write questions by understanding the questions, but in the stages of completion are not in accordance with the stages of integral completion. The results of the interviews showed that students with low ability did not understand the information contained in the problem in detail and clearly. The first step in the solution, students immediately integrate into the dx problem without being known from the previous problem. Low ability students are not able to solve problems because they do not understand the concept of integral solving. Conclusion problem solving ability first. Conclusion problem solving indicator understanding problem and solve problem is enough category and plan a solve Abd verification result is category less.

4. CONCLUSION

The findings of this study explain the ability of students to solve internal problems tend to differ according to individual abilities. High ability students tend to be better at solving problems compared to medium and low ability students. The main problem found is the lack of understanding of the problem and the formulation of the problem into the mathematical model. Nonetheless, research subjects have sufficient minimal problem-solving abilities. These findings reveal that mathematical ability strongly supports students' ability to solve mathematical problems even though they are presented in an unusual context. Individual ability is a good predictor of mathematical problem-solving activities in general. With good mathematical skills, students will be able to adapt to given problems because their cognitive structure has good mathematical capacity that can be used, modified and implemented in a variety of situations. Researchers can then explore the ability to

solve student problems with forms of problem solving related to students' daily lives. This exploration aims to obtain comprehensive information for the appropriate treatment of learning that supports the improvement of problem-solving abilities.

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