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THE ABILITY TO SOLVE MATHEMATICAL PROBLEMS IN TERMS OF SELF-CONFIDENCE IN TWO-DIMENSIONAL FIGURE MATERIAL

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Abstract

This study aims to describe the ability to solve mathematical problems in terms of self-confidence in two-dimensional figure material. This research uses a descriptive qualitative research method. The subjects in this study were students of SMP Negeri 9 Serang City class VII selected by purposive sampling. The time of the research was carried out in the even semester of the 2020/2021 academic year. The instruments used in this study were self-confidence questionnaires, mathematical problem-solving ability tests, and interview guides. Data collection techniques in this study used the triangulation method through tests, questionnaires, and interviews. The analysis techniques used are data reduction, data display, and conclusion drawing/verification. The results of this study indicate that: (1) subjects with high self-confidence can solve three problems solving according to Polya namely, understand the problem, devise a plan, and carry out the plan, (2) subjects with average self-confidence can solve two problems solving according to Polya namely, understand the problem and devise a plan, and (3) subjects with low self-confidence only able to fulfill the stages of problem solving according to Polya namely, understand the problem.
Keywords: two-dimentional figure; problem solving ability; self-confidence.

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INTRODUCTION

Humans are always faced with various problems in everyday life. Problems can be solved if humans have quality resources. One of the efforts to increase human resources can be done with education. In formal education mathematics is one of the subjects that must be studied by students. Mathematics plays an important role in all aspects of life, one of which is to increase the power of human thought. Mathematics is known as the queen of sciences that facilitates the process of developing other sciences. This is in line with Das (2019),

"*Mathematics as a science-based course or discipline is known as a queen of all subjects*".

There are five standards of mathematical ability that students must have based on NCTM (2000) namely problem solving, communication, connection, reasoning, and representation skills. Therefore, problem solving ability is an important component in learning mathematics that must be possessed by students. According to Branca (Putra et al., 2018) mathematical problem solving ability is the basic ability of students in learning mathematics which is the main focus in the mathematics curriculum and is even referred to as the heart of mathematics. In line with that, Gunawan & Putra (2019) revealed that problem solving ability is one of the important mathematical skills to be developed.

However, in reality the problem solving ability in Indonesia is still low. This can be seen from the results of PISA (*the programme for international student assessment*) in 2018, Indonesia's mathematical ability was ranked 73 out of 79 countries. Therefore, the research conducted by Putra et al (2018) stated that in one junior high school with 36 students as research subjects showed that problem solving skills were still low.

Two-dimensional figure is one of the subjects in the mathematics curriculum that must be studied. Solving problems on two-dimensional figure requires students to find the right concepts, principles, and formulas and are expected to be able to apply them in everyday life (Hakim & Kurniasih, 2019). In addition, the material for two-dimensional figure was chosen because these materials are often encountered in daily life, both in finding area and perimeter.

Problem solving ability can also be influenced by cognitive aspects and affective aspects. The development of important affective aspects in supporting mathematics learning, one of which is self-confidence. In international studies such as PIRLS, PISA, and TIMSS, self-confidence is an important dimension in mathematics (Çiftçi & Yildiz, 2019). In line with this, research conducted by Masfufah et al. (2018) states that there is a significant relationship between self-confidence and mathematical problem solving ability. Confidence is a valuable

character in social life to express all the potential that exists in theirs (Syam & Amri, 2017). Based on research conducted by Vandini (2015) self-confidence has a strong and significant influence, increasing self-confidence in students will be followed by increased learning achievement. In line with that, Amri (2018) revealed that self-confidence is one of the essential requirements for individuals to develop activity and creativity in an effort to improve achievement. Based on the statement above, the aim of this research is to describe the ability to solve mathematical problems in terms of self-confidence in two-dimensional figure material.

METHOD

This research uses descriptive qualitative research method. Qualitative research does not use the term population because qualitative research departs from certain cases and research results are not applied to the population (Sugiyono, 2012). The subjects in this study were 6 grade VII students of SMP Negeri 9 Serang City who were selected by purposive sampling, specifically 2 students with high, medium, and low self-confidence. The time of the research was carried out in the even semester of the 2020/2021 academic year. Data collection techniques in this study were through tests, questionnaires, and interviews. The instrument in this study used a flat wake problem solving ability test, a self-confidence questionnaire, and an interview guide. Miles and Huberman (1984) stated that activities in qualitative data analysis were carried out interactively and continued until the data was saturated (Sugiyono, 2012). The analysis techniques used are data reduction, data display, and conclusion drawing/verification. Data analysis was carried out by describing data from selected research subjects using the Polya stage. Polya (Yayuk et al., 2018) there are four stages of problem solving, namely: (1) understand the problem this means that students identify what is known in the problem, what is asked in the question, (2) devise a plan this means that students need to identify relationships from known and asked data so that they can determine the operations, strategies, or procedures needed to solve problems, (3) carry out the plan this means that students carry out a problem solving process to determine a real solution by

using a plan that has been made previously, and (4) look back this means that students match the results that have been obtained with the things asked and can explain the answers that have been obtained to get a conclusion.

RESULT AND DISCUSSION

The first step of this research is that the researcher provides a self-confidence questionnaire instrument to 22 students. The questionnaire aims to determine the classification of students' self-confidence based on the categories of high, medium, and low self-confidence. Furthermore, the selection of research subjects was carried out by purposive sampling by selecting one student to represent each category. Research subjects who have been selected according to the category of high, medium, and low confidence will be given a mathematical problem-solving ability test and interviewed about the results of the mathematical problem-solving ability test.

1. The ability to solve math problems in the category of high self-confidence

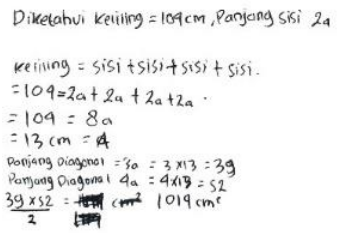

Figure 1. Subject Answer S1

Based on the results of tests and interviews, the subject of S1 can write and mention the circumference of the rhombus and the length of the side of the rhombus, which is 104 cm in circumference and 2a cm in length so that the S1 subject is able to understand the problem. The test results show that the subject of S1 can write the formula for the circumference of a rhombus correctly and the results of the interview show that the subject of S1 can mention the area of a rhombus. In addition, the subject of S1 can answer the formula used to solve the problem. Therefore, the subject of S1 can make a devise plan. Furthermore, the test results show that the subject of S1 can answer correctly by calculating the circumference of the rhombus to find the value of a, then the value of a is

used to find the length of the diagonal of the rhombus by substituting it, then a calculation is carried out to find the area of the rhombus and the result is 1014 cm^2 so that S1 courses are able to carry out the completion plan. Based on the test results, the subject of S1 did not re-check and draw conclusions so that the subject of S1 could not look back.

2. The ability to solve mathematical problems in the medium self-confidence category

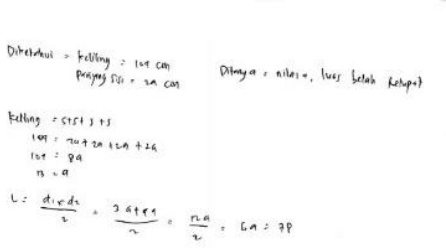

Figure 2. Subject Answer S2

Based on the results of tests and interviews, the subject of S2 can write and mention the circumference of the rhombus and the length of the side of the rhombus, which is 104 cm in circumference and 2a cm in length so that the S2 subject is able to understand the problem. The results of the tests and interviews of the master's subjects were able to write and mention the formulas for the circumference of a rhombus and the area of a rhombus correctly so that the master's subjects were able to make devise plans. The test results showed that the subject of S2 answered the question by calculating the circumference of the rhombus to find the value of a, then the subject of S2 did the calculation of the area of the rhombus but made an error in the calculation so that the subject of S2 had not been able to carry out the completion plan. Based on the test results, the S2 subject did not re-check and draw conclusions so that the S2 subject could not look back.

3. The ability to solve mathematical problems in the low self-confidence category

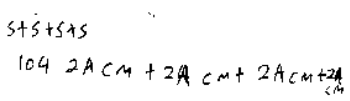

Figure 3. Subject Answer S3

Based on the results of the interview, the subject of S3 is able to state what is known and asked in the question so that the subject of S3 is able to understand the problem. The test results for the subject of S3 only write the formula for the circumference of a rhombus. Likewise with the results of the interview, the subject of S3 did not understand the problem so that the subject of S3 had not been able to make a devise plan. Furthermore, because the subject of S3 only writes the formula and does not operate it, the subject of S3 has not been able to carry out the completion plan. This means that the S3 subject has not been able to look back.

Subjects who have high self-confidence are able to carry out three stages of Polya, namely understanding the problem, devise a plan, and carry out the plan. Students who have self-confidence will try hard to get the results in accordance with their wishes and have a sense of optimism in achieving the expected goals and are active in the process. (Nurlailiyatus, 2013). According to Kelitman dan Stankov (Muhamad, 2016) Students who have high self-confidence will complete their work faster than students who have low self-confidence. The same thing was also expressed by Agustyaningrum & Widjajanti (2013) which reveals that individuals who have good self-confidence are able to complete a job or problem (Agustyaningrum & Widjajanti, 2013).

Subjects who have moderate self-confidence are able to carry out both stages of Polya, namely understanding the problem and devise a plan. Students who lack self-confidence will feel less capable so they cannot express their opinions and are afraid to try (Nurlailiyatus, 2013). According to Muhamad (2016) without self-confidence, students will hesitate in solving a problem, resulting in students not being optimal in solving problems.

Subjects who have low self-confidence are only able to do the first stage of problem solving according to Polya, namely understanding the problem. Low self-confidence will make students nervous, indecisive, and indecisive when completing assignments (Setyowati & Widana, 2016). One of

the problems of students is that they cannot determine the formula that should be used to solve the problem (Farida, 2015). According to Agustyaningrum & Suryantini (2017) revealed that low self-confidence can lead to low learning outcomes because they do not want to accept challenges in learning.

CONCLUSION

Based on the results of the research and discussion, it was concluded that students with high self-confidence category showed that they were able to fulfill the three stages of problem solving according to Polya, namely understanding the problem, devise a plan, and carry out the plan. Students with medium self-confidence show that they are able to fulfill two stages of problem solving according to Polya, namely understanding the problem and devise a plan. Students with low self-confidence category show that they are only able to fulfill one stage of problem solving according to Polya, namely understanding the problem.

Based on the results of the research, discussion, and conclusions obtained, there are several suggestions given, including the following: (1) educators are expected to help further increase students' self-confidence which can have implications for better math problems and (2) this research is only limited to the ability to solve mathematical problems in terms of confidence in flat material. It is suggested that further researchers can apply it to affective aspects and other materials and develop further so that students are better at problem solving skills.

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