

Vocational High School Students' Mathematical Problem-Solving Ability Viewed from Self Confidence

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ABSTRACT

Problem-solving ability is an essential cognitive aspect of Mathematics. One aspect of improving problem-solving is self-confidence. This study describes the mathematical problem-solving ability regarding the self-confidence of 34 students of class X TKRO 2 SMK Wiworotomo Purwokerto for the academic year 2019/2020. The method used is a descriptive qualitative, quantitative approach. The assessment instruments used include tests and self-confidence questionnaires. Students are grouped into low, medium, and high categories based on a self-confidence questionnaire. Each class was sampled using the purposive sampling technique. Data analysis includes reduction, presentation, and conclusion. The results obtained are high self-confidence, and students have good mathematical problem-solving skills, meaning that they fulfill all aspects of problem-solving. Students with medium self-confidence have good problem-solving skills but cannot provide conclusions at the end of the answer. Meanwhile, low self-confidence is not able to achieve indicators of problem-solving abilities. In addition, self-confidence and problem-solving ability have a positive correlation.

Key words: Positive Correlation, Problem Solving Ability, Self Confidence

ABSTRAK

Kemampuan pemecahan masalah merupakan aspek kognitif yang sangat penting dalam Matematika. Aspek untuk meningkatkan pemecahan masalah salah satunya kepercayaan diri. Penelitian ini menggambarkan kemampuan pemecahan masalah matematis ditinjau dari kepercayaan diri siswa kelas X TKRO 2 SMK Wiworotomo Purwokerto tahun pelajaran 2019/2020 sebanyak 34 orang. Metode yang dipakai adalah deskriptif kualitatif pendekatan kuantitatif. Instrumen penilaian yang dipakai meliputi tes dan angket kepercayaan diri. Siswa dikelompokkan kategori rendah, sedang, dan tinggi berdasarkan angket kepercayaan diri. Masing-masing kategori diambil sampel menggunakan teknik purposive sampling. Analisis data meliputi reduksi, penyajian, dan kesimpulan. Hasil yang didapatkan yaitu siswa kepercayaan diri tinggi memiliki kemampuan pemecahan masalah matematis yang baik artinya memenuhi semua aspek pemecahan masalah. Siswa dengan kepercayaan diri sedang memiliki kemampuan pemecahan masalah yang baik namun tidak dapat memberikan kesimpulan di akhir jawaban. Sedangkan, kepercayaan diri rendah tidak mampu mencapai indikator kemampuan pemecahan masalah. Selain itu, kepercayaan diri dan kemampuan pemecahan masalah memiliki korelasi positif.

Kata kunci: Kemampuan Pemecahan Masalah Matematis, Kepercayaan Diri, Korelasi Positif

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Introduction

Formal education is one type of education in Indonesia. In it, the subject that students must take is mathematics. Fields in mathematics are divided into three groups, namely algebra, analysis, and geometry (Ramdan et al., 2018). The way students think is awakened when learning mathematics, and many applications of mathematics are found in life. However, mathematics becomes a frightening specter for some people because the material is difficult to understand. The abilities achieved in mathematics include problem-solving. Solving mathematical problems related to everyday aspects is the main target in learning. This is relevant to research Kusmanto & Marliyana (2014) and Siregar & Surya (2017) that integrating mathematical concepts with aspects of life makes learning more meaningful.

In the K-13, problem-solving ability is the main goal in learning mathematics. Problem-solving ability in mathematics is related to problem-solving skills with the knowledge possessed

(Sujarwo, 2020). Efforts to reach goals with systematic steps using information are called problem solving (Nitko & Brookhart, 2011). Problem-solving is the highest level in Mathematics learning (Priyatin, 2020). In Indonesia, the ability to solve problems in groups is not good. According to the Program for International Students Assessment (PISA) and The Trends International Mathematics and Science Study (TIMSS) 2015, Indonesia ranks 63 out of 70 participating countries with an average score of 386. In fact, 490 is the standard international average score. Then, in 2011 TIMSS was ranked 38 out of 42 countries and had a score of 386. Meanwhile, the middle world score was 500. Educators (in this case, teachers) found that some students had not solved problems because they were not used to solving them. According to Musriandi & Elyza (2017), routinely solving problems, obtaining mathematical concepts, and applying them both individually and together is a solution to increase problem solving abilities. The indicators consist of understanding the problem, making strategies, implementing, and rechecking the answers obtained. In Hidayat & Sariningsih (2018), problem-solving skills can be improved by understanding problem skills, developing solution models, applying models, and interpreting answers. In addition, affective factors can also affect a person's mathematical solving ability, one of which is self-confidence (Surya & Putri, 2017).

In solving a problem, students must have self-confidence. This is relevant to Aisyah et al. (2018) research that one solution increases problem-solving abilities with self-confidence. Confidence and see as an absolute person are still guided by a self-concept called self-confidence (Lestari & Yudhanegara, 2015). The characteristics of people who do not have low self-confidence are having negative feelings, remembering their weak abilities, and doubting their knowledge (Rohmat & Lestari, 2019). Research conducted by Irhamna et al. (2020) explains that self-confidence positively contributes to improving problem-solving abilities. The contribution of self-confidence scores is higher than other factors, including math anxiety and learning motivation. In line with Santi-Purnama (2018) research, self-confidence significantly affects problem-solving ability. People who have self-confidence will be able to solve problems well. Based on this explanation, the researcher will describe the student's mathematical problem-solving skills in terms of self-confidence.

Research Method

Implementation of research at SMK Wiworotomo Purwokerto in the even semester of 2019/2020. The research subjects were 34 students in class X TKRO 2. The type of research used is descriptive qualitative. This study aims to describe problem solving abilities in terms of self-confidence. How to determine the sample using purposive sampling. The determination is based on specific considerations (Sukestiyarno, 2020). The considerations used are oral communication and the achievement of indicators of problem-solving abilities. The researcher used the purposive sampling technique to find out three students from each self-confidence (low, medium, and high). Then, the students' answers were analyzed based on mathematical problem solving ability indicators. Data collection techniques include self-confidence questionnaires, tests, interviews, and documentation. Data analysis includes reduction, presentation, and conclusion (Sugiyono, 2015). The following is a research scoring guide.

Table 1 is used to assess student self-confidence questionnaires and then grouped into 3, namely high, medium, and low. The score guideline to see students' problem solving abilities are taken from (Ariani & Hartono, 2017).

Table 1. Confidence Questionnaire

Answer	Positive	Negative
Very Agree	5	1
Agree	4	2
Doubtful	3	3
Disagree	2	4
Very Disagree	1	5

Result and Discussion

Based on the self-confidence questionnaire scores, the number of students in the high, medium, and low categories were 10, 16, and 8, respectively. The resulting score of mathematical problem solving ability is based on self-confidence.

Table 2. Obtaining Mathematical Problem Solving Ability Scores

Group	Question			Average
	1	2	3	
High	8	8,3	9	8,4
Medium	7,3	8	8,3	7,89
Low	4,3	1,67	2,3	2,78

Source: Processed from research data (2020).

Based on Table 2, it was found that students with high self-confidence had an average problem-solving ability score of 8.4, moderate self-confidence was obtained at 7.89, and students with low self-confidence had a score of 2.78. Thus, high self-confidence students will get a good value of mathematical solving abilities and vice versa. In other words, there is a positive relationship between self-confidence and problem solving. To support this statement, the researcher presents a correlation table.

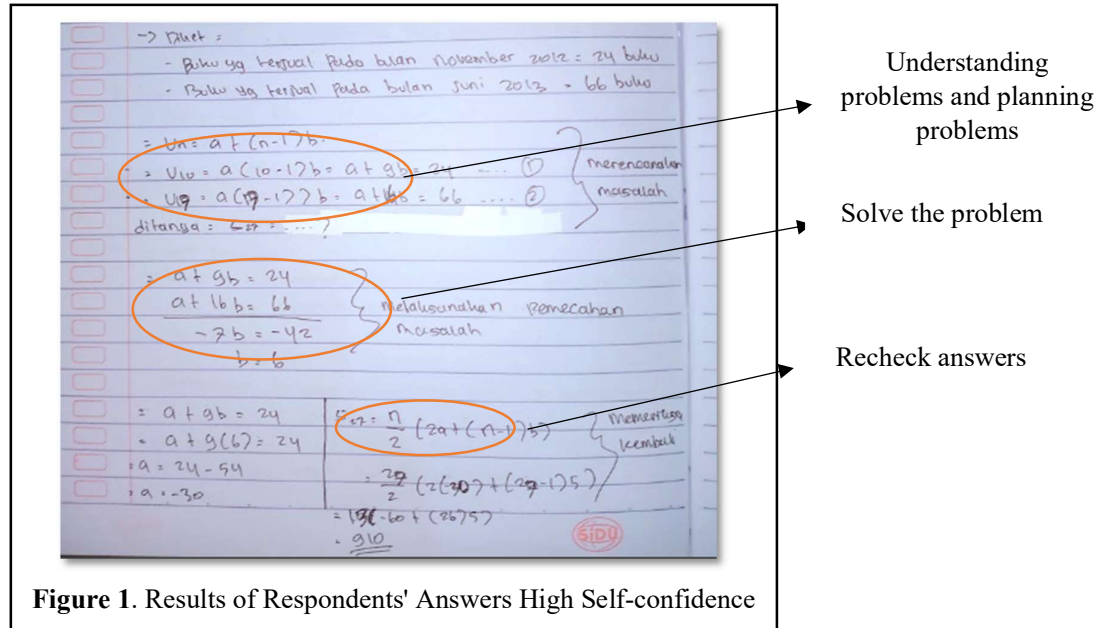
Table 3. Correlation of self-confidence and problem-solving ability

	<i>Self Confidence</i>	<i>Mathematics Problem Solving</i>
Self Confidence	1	
Mathematics Problem Solving	0,380203	1

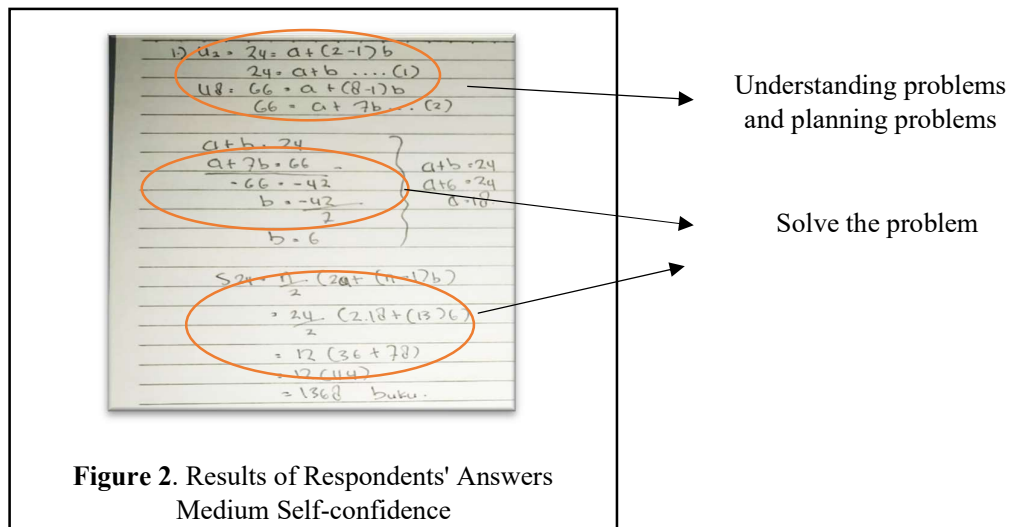
Based on Table 3 above, the correlation number of 0.38 means that self-confidence and problem-solving abilities have a good relationship.

The following are the students' mathematical problem solving ability tests taken from the research sample.

Based on Figure 1, respondents with high self-confidence can convey what is known and what is being asked to fulfill the first indicator. When the interview was conducted, the respondent was able to find out what was there and what the target was on the question so that the respondent could find out the right solution for the problem.



However, from the three respondents, there were several errors, such as not re-examining the results of their work. When working on questions, respondents 1, 2, and 3 can understand what the question means. As for the second indicator, namely making an equation or mathematical model of the equation from what is known in the questions given correctly, and for the third indicator, the respondent can solve the problem with the strategy used. The three respondents have written it perfectly.



Respondents with medium confidence have written information and mathematical models to fulfill the first and second indicators. This can be seen in Figure 2. When the interview was conducted, the respondent understood the information and asked questions so that the respondent could make an equation model from the question. However, some respondents immediately solved the problem without writing down the problem plan first when working on the problem. Respondents also rechecked their answers, but they were not written down in the

answer sheets because the time had run out. So, with moderate self-confidence, respondents do problem-solving according to indicators.

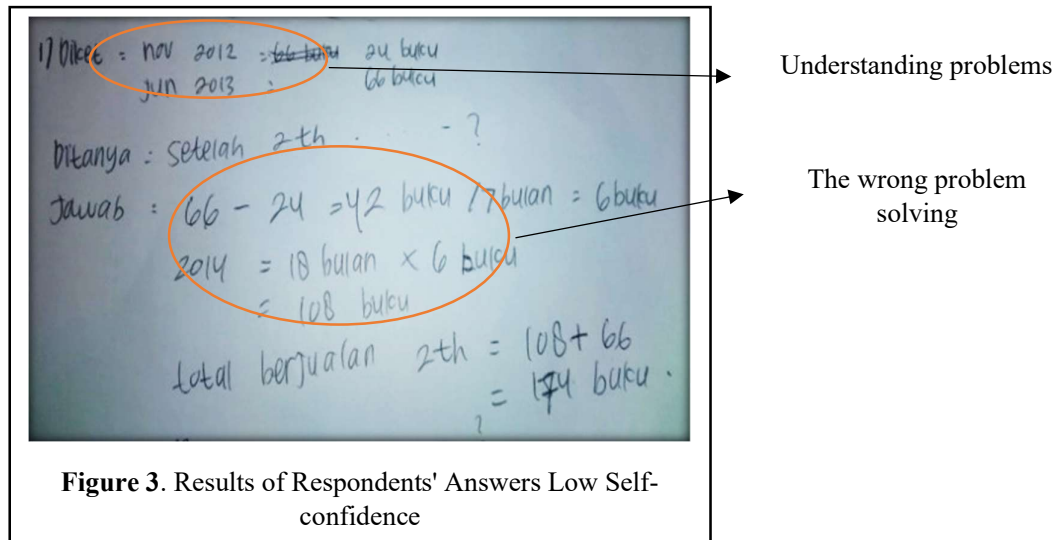


Figure 3. Results of Respondents' Answers Low Self-confidence

Figure 3 above explains that some respondents with low self-confidence have been able to write down the known information. The respondent solves the wrong problem. This is because some respondents do not understand the questions asked. When interviewed, respondents can solve problems using their understanding. In solving the problem, the respondent did not use the strategy or model that should be used because the respondent did not understand the material and the questions asked. In addition, the response also did not re-examine the answer and the concepts used in solving the problem.

Based on the research results above, students who have high self-confidence can solve math problems well. Students with medium confidence can answer questions, but some students do not write in detail the strategies used, directly apply concepts to solve problems, and students with low self-confidence cannot answer questions correctly because of errors in understanding the problem. This study shows the importance of students' self-confidence in solving problems. Students must have confidence in the mathematical concepts that will be used to solve problems correctly. Students who do not have self-confidence will find it challenging to find solutions in solving mathematical problems. This is in line with research Irhamna et al. (2020) and Mualifah et al. (2020) that self-confidence positively impacts students' mathematical problem-solving abilities.

Conclusion

The conclusion that can be drawn is that students who have good self-confidence positively impact problem-solving abilities. It is proven that students with high self-confidence have a problem-solving score of 8.4. Self-confidence is getting an average value of 7.89. Meanwhile, students with low self-confidence have a score of 2.78. In addition, self-confidence and mathematical problem-solving ability have a positive relationship, meaning that self-confidence positively impacts problem-solving abilities. Students with high and medium self-confidence can achieve problem-solving indicators: understanding the problem, drawing up plans, implementing the completion plan, and re-examining the answers. Meanwhile, low self-confidence can only understand the problem but cannot implement the issue.

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