



## HOW DOES PROBLEM-SOLVING METHOD AFFECT STUDENTS' SELF-CONFIDENCE AND MATHEMATICAL UNDERSTANDING?

Putri Dorojatun Rahayuningdewi<sup>1</sup>, Ayu Faradillah<sup>2\*</sup>

<sup>1,2</sup>Department of Mathematics Education, Universitas Muhammadiyah Prof. Dr. Hamka, Jakarta, Indonesia

\*Corresponding author: ayufaradillah@uhamka.ac.id

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### ABSTRACT

This study aimed to determine the effects of problem-solving method on students' self-confidence and mathematical understanding in learning. This study used quantitative and qualitative methods. The research followed the process of quantitative calculation from instruments about mathematical understanding and described students' self-confidence, analyzed using Rasch with the WinSteps application. This research was conducted at SMPN 30 Jakarta with class VIII students as the research population. Based on this population, 34 students were selected as the sample with a cluster random sampling technique. Based on the data obtained, it was known that there is a significant effect of problem-solving methods on mathematical understanding. Meanwhile, Rasch data analysis showed a high category for the relationship between understanding and self-confidence of students by 60%. This proved that the effect of the problem-solving method on self-confidence and mathematical understanding is directly proportional.

## BAGAIMANA PENGARUH METODE PEMECAHAN MASALAH TERHADAP KEPERCAYAAN DIRI DAN PEMAHAMAN KONSEP MATEMATIKA SISWA?

### ABSTRAK

#### Kata Kunci:

Pemahaman konsep matematika

Metode *problem solving*

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Kepercayaan diri

Penelitian ini bertujuan untuk mengetahui pengaruh metode pemecahan masalah terhadap kepercayaan diri siswa dan pemahaman matematika dalam pembelajaran. Penelitian ini menggunakan metode kuantitatif dan kualitatif. Penelitian ini mengikuti proses perhitungan kuantitatif dari instrumen tentang pemahaman matematika dan menggambarkan kepercayaan diri siswa, dianalisis menggunakan Rasch dengan aplikasi WinSteps. Penelitian ini dilakukan di SMP Negeri 30 Jakarta dengan populasi siswa kelas VII. Sampel 34 siswa dipilih menggunakan teknik *cluster sampling*. Berdasarkan data yang diperoleh, diketahui bahwa pengaruh metode pemecahan masalah dengan kemampuan untuk memahami konsep matematika termasuk dalam kategori tinggi. Sementara itu, analisis data Rasch menunjukkan kategori tinggi untuk hubungan pemahaman dan percaya diri siswa sebesar 60%. Ini membuktikan bahwa efek dari metode pemecahan masalah pada kepercayaan diri siswa dan pemahaman konsep matematika berbanding lurus.

## 1. INTRODUCTION

Self-confidence is very important in learning mathematics, because confidence in learning mathematics plays an important role in the success of students in solving math problems. This statement is in line with the results of Hannula's research which stated that students' self-confidence in learning mathematics will influence learning achievement and student success in mathematics [1]. With high self-confidence, students will be more motivated to learn mathematics, which will lead to more optimal mathematics learning achievement.

Apart from self-confidence, the ability to understand mathematical concepts also needs to be mastered by students. Conceptual understanding is an important factor in mathematics learning activities [2]. The importance of understanding mathematical concepts can be seen from the objectives of learning mathematics, namely students must be able to explain the relationship between concepts, and apply concepts or algorithms accurately, flexibly, efficiently, and precisely in solving problems. In accordance with the objectives of learning mathematics above, after going through the learning process it is hoped that students can understand mathematical concepts so that they can use these abilities in dealing with mathematical problems.

Based on observations made at SMP Negeri 30 Jakarta, the learning process there was only teacher-centered. In the learning process students only listen and pay attention to the teacher who was explaining. Then, they copy what the teacher wrote on the board. Students only listen to the teacher without doing practical activities or simulations. They only have to pay attention, record material, and answer sample questions written by the teacher. As a result, students could not understand the concept and cause a lack of self-confidence. Low self-confidence and understanding of concepts will affect mathematics learning achievement [3].

Many teachers teach mathematics only by delivering material to students, so students are only able to solve mathematical problems without understanding what is meant by these problems. Besides, students feel insecure in solving math problems because they feel they don't understand the concept properly. To improve students' conceptual understanding and foster self-confidence in students, one of the learning methods that can be used is the problem solving method.

Problem solving method can train students to improve their mathematical conceptual understanding and can also increase their confidence to solve everyday problems. This is relevant to previous research which revealed that there is a positive relationship between the problem-solving method on students' self-confidence and understanding of mathematical concepts [4]–[7].

Aditya Martyanti's research revealed that the problem-solving method contribute to students' positive attitudes towards mathematics and will increase their confidence in learning mathematics. Wardani's research showed that problem-solving influences students' self-confidence in mathematical learning on angle topic. Furthermore, research conducted by Andrayani revealed that the increase in mathematical conceptual understanding and self-regulation in students who were learning with Wankat and Oreovicz-based problem-solving strategy was higher than students who received expository learning.

The difference between this study and Aditya Martyani's research lies in the variables. Where Martyani only examined the effect of problem solving on students' self-confidence. Similar to Martyani's research, Wardani's research only examined the effect of problem solving on student self-confidence. Meanwhile, Surya's research was developed by examining the effect of a problem-solving approach on students'

mathematical communication skills and self-confidence. Furthermore, Andrayani’s research developed this research topic by examining the effect of problem-solving strategies according to Wankat and Oreovicz on students’ ability to understand mathematical concepts and self-regulated learning. In this research, the researchers are interested in researching about the effect of the problem-solving method on students’ self-confidence and understanding of mathematical concepts. The purpose of this study is to find out how the problem-solving method can affect self-confidence and understanding of mathematical concepts of students in junior high school.

**2. METHOD**

This research was conducted in SMPN 30 North Jakarta with all VII grade students as the research population. Samples were taken randomly using a cluster random sampling technique so that one class was determined as an experimental class, which was VII-C of the 2019/2020 school year. The method was a quantitative and qualitative approach, where the quantitative method was used in the first stage of the study by calculating normality, homogeneity, *t*-test, and effect size. The second stage used qualitative method based on the results of the analysis of the Rasch model. Rasch analysis is a statistical technique that is commonly used to analyze both test data and Likert survey data to construct and evaluate question item banks[8]. The Rasch model produced a fit statistical analysis that provided information to the researchers whether the data obtained ideally illustrated that people who had high ability provided patterns of answers to items according to their level of difficulty. Data were analyzed using WinSteps software to produce consistent Rasch output [9]. For calibration that was conducted between respondents and test questions, student responses to the complaint response from the raw score then entered into the logit interval value using Rasch modeling [10]. It was then exported as an excel file.

To easily understand the research methodology, the researchers describe it using a flowchart.

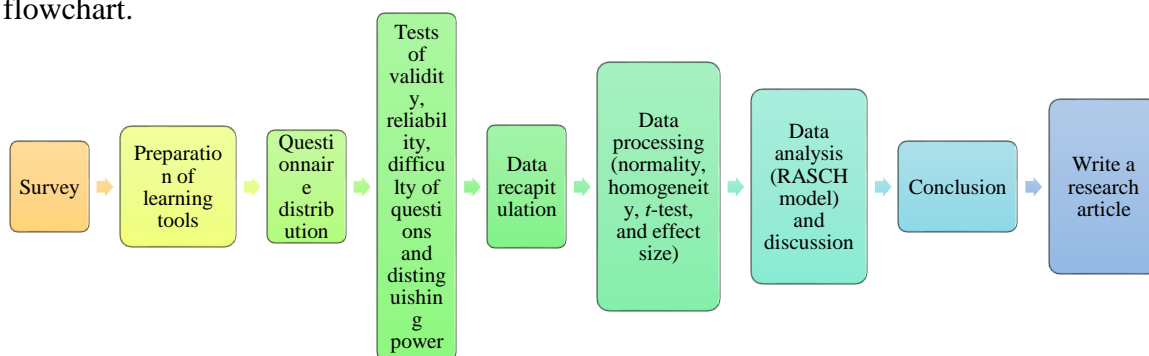


Figure 1. Flowchart of Research Methodology

The research instrument used was in the form of student worksheets of conceptual understanding with 7 questions. Further, the questionnaire on students’ confidence with a scale of 25 questions to determine students’ confidence was analyzed with the Rasch model.

The instruments about understanding mathematical concepts had several indicators such as restate a concept, classify objects according to the concept, give examples and non-examples from concept, present concepts in various forms of mathematical representation, a necessary condition, a sufficient concept to use, utilize, and choose certain procedures or operation. It was followed by applying the concepts or algorithms solution to the problem[11]. The test questions that chosen were examined and fulfilled the requirement

to be good questions according to its validity, reliability, difficulty, and differentiator for each question. Here, the example of questions on the instrument had an indicator of finding a concept according to information and experience that already known before.

**Table 1.** Example Questions of Conceptual Understanding

Indicators	Questions	Analysis
Rediscover a concept	Rafa notes that 60% of his classmates are women and he concludes that the ratio of women to men is 3 : 5. Is the conclusion correct? Please explain.	The question shows how the ability of students' mathematical concepts on the indicator of rediscovering a concept is a valid item with a moderate level of difficulty and good differentiation. This problem is able to measure students in a previously unknown concept based on previously known knowledge and experience. [12]
Identify things that are relevant to a concept	Andri has 10 marbles while Anis has 5 pet cats. Based on this statement, can a comparison be made between Andri's marbles and Anis's cat, if there is any comparison? If not, please explain the reason.	The question that shows how the ability of students' mathematical concepts on the indicator of identifying things that are relevant to a concept is a valid item with a moderate level of difficulty and good differentiation. This problem is able to measure students in identifying concepts in the right way. [12]

Furthermore, to measure students' self-confidence, the researchers used a questionnaire taken from Gabriella's research [13].

**Table 2.** Self-confidence Questionnaire

Variable	Indicators	Items	SA	A	D	SD
Self Confidence	Believing in your potential	I believe I can solve the problem well. (+) I am afraid that the question from the teacher that I answer is wrong. (-)				
	Have an independent mindset	I can decide without asking for an opinion from my friends. (+)				
	Have a positive concept of yourself	I'm easily influenced by other people. (-) I have a positive mindset. (+)				

	I always feel inferior to my friends. (-)
Brave to express your opinion	I can express my opinion in front of the class. (+)
	I don't have the self-confidence to express my opinion in front of the class. (-)

Note :

- SA = Strongly Agree
- A = Agree
- D = Disagree
- SD = Strongly Disagree

In Table 2, the indicators of self-confidence questionnaire were believing in your potential, have an independent mindset, have a positive concept of yourself, and brave to express your opinion. There were 25 statements in which 14 of those were positive and 11 of those were negative. There were four choices of answers including SA, A, D, and SD. The researchers used the questionnaire above because it was the questionnaire by Gabriella that had been tested for its validity and reliability.

### 3. RESULTS AND DISCUSSION

This study collected data in two ways, including quantitative and qualitative methods. The researchers used the problem-solving method in providing treatment to the experimental class that was used as a sample and then examined how the problem-solving method was used to understanding mathematical concepts by giving 7 questions. Then, based on the results of these questions, the researchers collected quantitative data by conducting tests of normality, homogeneity, *t*-test, and effect size to find out how influential the method was given. Furthermore, the researchers also examined the extent of the effect of the problem-solving method on students' self-confidence by spreading 25 self-confidence questionnaires. Then, the results were analyzed qualitatively using the RASCH model analysis assistance.

Table 3. Quantitative Results

	Normality	Homogeneity	t-test	Effect size	Conclusion
Count	0.143	1.258	4.163	0.917	H <sub>0</sub> accepted
Table	0.148	1.757	1.994		

Table 3 shows that the data was normally distributed and homogeneous. Effect size result was fairly in the high category so it can be concluded that the problem-solving method affects conceptual understanding.

The researchers described the results of this study by showing the result answers of one of the students who scored high, medium, and low on the problem of the ability to understand mathematical concepts and compares the results on the student's self-confidence questionnaire with student scores on the matter of understanding mathematical concepts.

The results of the students' post-test can be seen in Table 4 below.

**Table 4.** Posttest Results of Mathematical Conceptual Understanding

Grade Interval	Category	N
90 – 100	High	18
80 – 89.99	Medium	9
50 – 79.99	Low	7
0 – 49.99	Very Low	0

Table 4 shows the students' posttest results following the problem-solving method. Problem-solving is the ability of students to determine how to solve a mathematical problem for which the solution is unknown yet [14]. Problem-solving can affect students' understanding of mathematical concepts, leading them to be more enthusiastic in learning mathematics. A study conducted by Andrayani explained that there was an increase in students' understanding of mathematical concepts by using the problem-solving method [7]. The entire learning process in the problem-solving method can help students to be more independent and believe in their intellectual skills. The problem-solving method can also provide more meaningful learning and create proactive learning processes so that students can understand the concepts and solve problems well.

### 3.1 Analysis of Students' Mathematical Conceptual Understanding

In this part, the researchers presented two problems with moderate and high difficulty level. The researchers chose problems with those levels of difficulty to measure the degree of understanding of students' mathematical concepts. This can be seen from the exercises with medium and high difficulty levels that can train students to creatively solve problems and improve conceptual understanding for the better. Meanwhile, all students can solve easy problems, so those questions cannot be used to measure the level of each student's mathematical conceptual understanding.

**Table 5.** Questions with A Medium Level and High Level

Question	Indicators	Difficulty Level	Analysis
Amir provided a plastic bag of food for 10 fish which will run out within 12 days. If there are 25 fish now, how many days does one plastic bag provided by Amir will run out?	Apply concepts or algorithms for solving a problem	Medium level	This problem can measure the ability of students to apply concepts that can solve problems with appropriate steps [12]. The student wrote down the problem that was known correctly and used the appropriate algorithm. This can measure students' understanding of the problems they know and use the right steps to solve them.
Father will distribute a total of Rp 240,000.00 to Amir and Budi with a ratio of 3 : 5. Determine the amount of money received by Amir and Budi ?	Apply concepts or algorithms for solving a problem	High Level	This problem can measure the ability of students to apply concepts that can solve problems with appropriate steps [12]. The student wrote down the problem that was known correctly and used the

appropriate algorithm. This can measure students' understanding of the problems they know and use the right steps to solve them.

Table 5 shows examples of problems with medium and high levels of difficulty. Then, with these questions, three answers of students with different scores were selected to find out the students' mathematical conceptual understanding with the given problems.

**Table 6.** The Results of The Answers of Students Who Get Gigh, Medium, and Low Scores

Question	Score Category	Subject's Answer	Analysis
10 fish are known to be able to spend food within 12 days. How many days approximately the food will run out for 25 fish.	High	<p>10 fish spend the food in 12 days</p> <p>25 fish spend the food in <math>x</math> days</p> $\frac{10}{25} = \frac{x}{12}$ $x = \frac{(10)(12)}{25} = 4.8 \text{ or rounded } 5$ <p>So, the estimated time needed for 25 fish to spend one bag of food is 5 days.</p>	<p>As we can see, the student wrote the information they know from the question. Then, the student wrote the concept they used to solve the problem by making a proportion inverse formula of <math>\frac{10}{25} = \frac{x}{12}</math>. After writing the formula that was used for solving the problem, the student calculated the value of <math>x</math>, which was <math>x = \frac{(12)(10)}{25}</math>. The value of <math>x</math> that was calculated by the student was 4.8 and then rounded to 5 days. We could conclude that the student obtained the correct conclusion through a good answering process with complete algorithms and correct answers. It proves that the student has a good comprehension of mathematical concepts. The data can be explained based on research that had been done by Harry that students who have good conceptual understanding skills can solve the problem correctly according to the specified indicators.[15], [16]</p>
	Medium	<p>10 fish 12 days</p> <p>25 fish <math>x</math> days</p> $\frac{10}{25} = \frac{x}{12}$ $x = \frac{(10)(12)}{25} = 4.8 \text{ or rounded } 4$ <p>So, the estimated time needed for 25 fish to spend one bag of food is 4 days.</p>	<p>As we can see, the student wrote the information they knew from the question. Then, the student wrote the concept they used to solve the problem by making a proportion inverse formula of <math>\frac{10}{25} = \frac{x}{12}</math>. After writing the formula that used for solving the problem, the student calculated the value of <math>x</math> which was <math>x = \frac{(12)(10)}{25}</math>. The value of <math>x</math> calculated by the student was 4.8 and then rounded to 4 days. We can conclude that the student used the right process but have the wrong conclusion. Therefore, the answer they calculated was wrong. It proves that the student has a medium comprehension of mathematical concepts.[15]–[16]</p>
	Low	$\frac{10}{25} = \frac{x}{(25)(12)}$ $x = \frac{12}{10} = 30$	<p>As we know, the student writes the information they know from the question. Unfortunately, the student used the wrong concept to solve this problem. The student</p>

<p>So, the estimated time needed for 25 fish to spend one bag of food is 30 days.</p>	<p>used a direct proportion formula of <math>\frac{10}{25} = \frac{12}{x}</math>. After writing the formula to solve the problem, the student calculated the value of x, which was <math>x = \frac{(25)(12)}{10}</math>. The student calculated the value of x using that formula and obtained the result of 30 days. We can conclude that the student got the wrong process and algorithms. In the end, the student got the wrong conclusion about the concept that was used. Therefore, the answer they got was wrong because of not comprehending the concept. This proves that the student has a low comprehension of mathematical concepts.[15]–[16]</p>
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Based on the analysis of the data above, the author emphasizes the importance of learning activities in mathematics learning so that students’ understanding of mathematical concepts becomes good and resulting in good learning outcomes. Learning activities are processed and very fundamental elements in the implementation of each type and level of education [17].

**Table 7.** The Results of Students’ Answers Who Get High, Medium, and Low Scores

Question	Score Category	Subject’s Answer	Analysis
Father will distribute Rp 240.000 to Amir and Budi with a ratio of 3:5. Determine how the amount of money that will be received by Amir and Budi.	High	$\text{Amir} = \frac{3}{8} \times 240.000 = 90.000$ $\text{Budi} = \frac{5}{8} \times 240.000 = 150.000$ <p>So, the money received by Amir is Rp90,000 and the money received by Budi is Rp 150,000</p>	Students already write the information they know from the question that we can see. After that, the students write the concept they use to solve the problem, which is this formula $\text{Amir} = \frac{3}{8} \times 240.000$ and $\text{Budi} = \frac{5}{8} \times 240.000$ . After writing the formula, the students calculate how much money Amir and Budi have, $\text{Amir} = \frac{3}{8} \times 240.000 = 90.000$ , and $\text{Budi} = \frac{5}{8} \times 240.000 = 150.000$ . The students calculate that Amir has Rp90.000 and Budi has Rp150.000. We can conclude that the student got the correct conclusion, the process of the answer is good, with complete algorithms and correct answer, this is proof that the students have a good comprehension in mathematical concepts.[15]–[16]
	Medium	$\text{Amir} = \frac{3}{8} \times 240.000 = 120.000$ $\text{Budi} = \frac{5}{8} \times 240.000 = 200.000$ <p>So, the money received by Amir is Rp120,000 and the money received by Budi is Rp 200,000</p>	As we can see, the student wrote the information they know from the question. Then, the student wrote the concept they used to solve the problem, which was $\text{Amir} = \frac{3}{8} \times 240.000$ , and $\text{Budi} = \frac{5}{8} \times 240.000$ . After writing the formula, the student calculates the amount of money received by Amir and



Low

$$\text{Amir} = \frac{3}{5} \times 240.000 = 144.000$$

$$\text{Budi} = \frac{5}{3} \times 240.000 = 400.000$$

So, the money received by Amir is Rp144,000 and the money received by Budi is Rp 400,000

$$\text{Budi. Amir} = \frac{3}{8} \times 240.000 = 120.000,$$

$$\text{and Budi} = \frac{5}{8} \times 240.000 = 200.000.$$

The student calculated that Amir had Rp 120.000 and Budi had Rp 200.000. We can conclude that the student used the right process but have the wrong conclusion. Therefore, the answer calculated was wrong. It proves that the student has a medium comprehension of mathematical concepts.[15]–[16]

As we can see, the student wrote the information they know from the question Then, the student wrote the concept they used to solve the problem, which was Amir =  $\frac{3}{5} \times 240.000$ , and

$$\text{Budi} = \frac{5}{3} \times 240.000.$$

After writing the formula, the student calculated the amount of money received by Amir and Budi. Amir =  $\frac{3}{5} \times 240.000 = 144.000$  and Budi =  $\frac{5}{3} \times 240.000 = 400.000$ .

The student calculated that Amir had Rp144.000 and Budi had Rp400.000. We can conclude that the student used the wrong process and algorithms. In the end, the student got the wrong conclusion about the concept that was used. Therefore, the answer they got was wrong because of not comprehending the concept. It proves that the student has a low comprehension of mathematical concepts. [15]–[16]

Analysis of the data above shows the influence of problem-solving on understanding mathematical concepts. The ability to solve problems is needed by students in understanding concepts, relationships between concepts, and other fields. Good problem solving generally builds a problem representation to facilitate understanding [18]. Students who have the ability to understand high mathematical concepts must have better performance than those who have low understanding abilities of the mathematical concept. The higher the ability of students to understand mathematical concepts, the higher the mathematics learning achievement.

### 3.2 Analysis of Students' Self-Confidence

The self-confidence questionnaire was given to students during their participation in mathematics learning, aiming to obtain a picture of students' self confidence towards understanding mathematical concepts. In filling out the questionnaire, students were asked to choose one of the answer choices according to their self-description. The results of students' self-confidence in each indicator was shown in Table 8 below.

**Table 8.** Self Confidence Questionnaire Value for Each Indicator

Indicator	Average presentation	Interpretation
Believing in your potential	75%	Strong
Have an independent mindset	69%	Strong

Have a positive concept of yourself	64%	Strong
Brave to express your opinion	78%	Strong

Table 8 shows the indicator of *believe in your ability* by 75%, *acts independently in making a decision* by 69%, *have a positive self-concept* by 64%, and *brave to express an opinion* by 79%. All percentages on self-confidence indicators show high criteria. Therefore, it indicates that students have good self-confidence for each indicator. Based on the self-confidence questionnaire, the researchers conducted an analysis using the RASCH model as presented in the Figure 2 below.

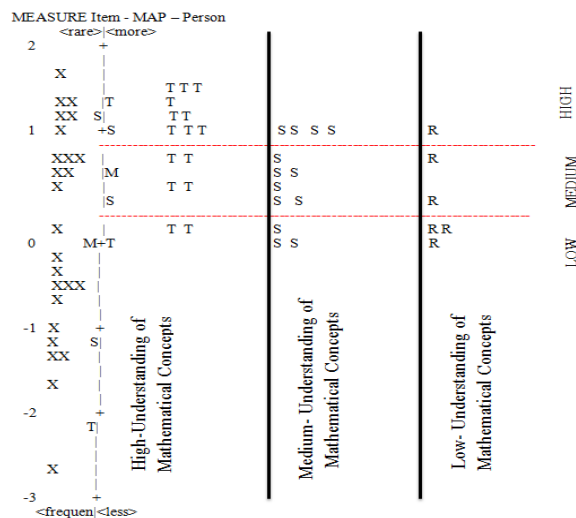


Figure 2. The Analysis of A Self-confident Questionnaire

Figure 2 shows that the percentage of students who have high conceptual understanding and high confidence is 60% with a total of 9 students; students who have medium conceptual understanding and medium confidence is 46.16% with a total of 6 students, and students who have low conceptual understanding and low confidence is 50% with a total of 3 students. It can be concluded that students' understanding of concepts and self-confidence is directly proportional. This shows that students' good understanding of mathematical concepts also affects students' confidence.

The picture above shows that a good understanding of mathematical concepts also affects students' self-confidence. Self-confidence is essential for students to succeed in learning mathematics [19]. In learning mathematics, the self-confidence of each student is very important because it can build an optimistic attitude during learning. Students' confidence will help improve the ability to understand students' mathematical concepts so that students can determine the best course of action and can solve problems well. With confidence, students will be more motivated and prefer to learn mathematics. Self-confidence must be increased because it is crucial and affects the ability to understand the concept even though the effect is not too large [20]. In increasing students' self-confidence and mathematical conceptual understanding, there are many influential factors. One of them is the learning methods carried out by the teacher. Therefore, to develop students' confidence and conceptual understanding in the mathematics learning, the researchers used problem-solving method to increase self-confidence and students' mathematical conceptual understanding. Table 9 describe the process that researchers taken during research process

**Table 9.** Storyboard About The Application of The Method

Syntax Problem Solving	Self Confidence	Understanding Mathematical Concepts
Defining the problem	The syntax problem-solving of “defining the problem” affects the statement on the self-confidence questionnaire of <i>I am sure can solve the problem well</i> . 20% of students strongly agree, 68% of students agree, and 12% of students disagree on the statement. This shows that students are confident in their abilities and they are confident that they can do the given questions well. [21]–[24]	The syntax problem-solving of “defining the problem” affects the matter of conceptual understanding, in which <i>Rafa notes that 60% of his classmates are women and he concludes that the ratio of women to men is 3 : 5. Is the conclusion correct? Please explain</i> . With the indicator of identifying a concept in the right way, 73.52% of students answered correctly and 26.48% of students answered incorrectly. The results obtained indicate that the problem-solving method affects students’ understanding of concepts. [25]–[27]
Planning a problem	The syntax problem-solving of “planning a problem” affects the statement on the self-confidence questionnaire that <i>I can plan something without asking for help and consideration from friends</i> . That means students are able to diagnose the problem themselves without the help of others. As many as 40% of students strongly agree, 40% of students agree and 20% of students disagree on the statement. This shows that by diagnosing problems students can take on their responsibilities and so as not to depend on others. [21]–[24]	The syntax problem-solving of “planning a problem” affects the matter of conceptual understanding, in which <i>in addition to Amir’s house, there is a plot of land in the form of a long square. Amir’s father plans to plant various types of medicines. The circumference of the land is 40 m, and the ratio of the length and width is 3: 2. Determine the length and width</i> . With the indicator of ability to link various concepts, 67.64% of students answered correctly and 32.36% of students answered incorrectly. The results prove that students with carefully planned problems are able to relate the influence of various concepts well.[25]–[27]
Implementing strategy	The syntax of problem-solving “implementing strategy” affects the statement on the self-confidence questionnaire of <i>I dare to express my opinion in front of the class</i> . 28% of students strongly agree, 40% of students agree, and 32% of students disagree. This shows the need for self-confidence. [21]–[24]	The syntax problem-solving of “implementing strategy” affects the matter of understanding the concept, in which <i>a contractor estimates that a bridge will be completed within 24 days if done by 30 workers. After the work went on for 10 days, the work was stopped for 4 days for some reason. Determine the number of workers that must be added so that the bridge is completed on time</i> . With the indicator of ability to apply concepts or algorithms to solve problems, 88.23% of students answered correctly, and 11.77% of students answered incorrectly. The results prove that the problem-solving method affects students’ understanding of concepts. [25]–[27]
Checking again	The syntax problem-solving of “checking back” affects the statement on the self-confidence questionnaire of <i>I am always looking for the best way</i> . 12% of students strongly agree, 48% of students agree,	The syntax problem-solving of “checking back” affects the problem of understanding concepts with the indicator of identifying things that are relevant to a concept in the right way., where the students re-examine the answers generated precisely. [25]–[27]

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and 40% of students disagree. It shows that students have to recheck their answers carefully. [21]–[24]

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#### 4. CONCLUSION

The results of the analysis above indicate that problem-solving method was able to affect the students' self-confidence and mathematical conceptual understanding with high effectiveness (0.917). Besides, students who have a high understanding of mathematical concept also have high self-confidence, so that self-confidence is directly proportional to conceptual understanding. Students who have a high conceptual understanding with a high self-confidence was amounted to 60%. This proven that the problem-solving method affects students' confidence and understanding of mathematical concepts.

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