

METACOGNITIVE ABILITY TO MATHEMATICS PROBLEM-SOLVING SKILLS JUNIOR HIGH SCHOOL GRADE VIII

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Abstract

The purpose of this research is to analyze the Influence of Problem Solving Ability Mathematics of VIII class student in SMP N 249 Jakarta. With metacognitive ability to solve mathematical problem. The research method used in this research is survey. Sampling technique using simple random sampling technique of 100 people. Instrument used is metacognitive ability questionnaire instrument and test instrument about math problem solving ability. To collect data on the research in the form of filling the questionnaire as much as 30 points statement with 5 alternative answers and test questions / description of 10 questions. Calculation Result The data normality test using Chikueadrat test obtained that both data are normally distributed. The analysis used simple regression and correlation. The result of hypothesis test resulted $t_{count} > t_{table}$ that is $9,99 > 1,984$ ho rejected show that there is significant influence of metacognitive ability to solving problem of mathematics problem at SMP N 249 Jakarta on Alkanfactor Factorization Material.

Keywords: **Metacognitive Ability, Mathematical, Problem-Solving Ability**

1. INTRODUCTION

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble morals, and skills needed by themselves and the community (Sisdiknas, 2003) And also Education is the main key in improving the quality of a nation (Muhardi, 2004).

Mathematics subjects need to be given to all students starting from elementary school to equip students with logical, analytical, systematic, critical and creative thinking skills as well as the ability to work together. These competencies are needed so that students can have the ability to acquire, manage and utilize information to survive in ever-changing, uncertain and competitive circumstances. However, in reality, based on observations in

several schools, almost all learning schools are still centered on teachers, while the students are only listeners to lectures, as a result of which the learning pattern tends to memorize. Thus, students' creativity in solving problems is hampered so that the learning outcomes tend to be low.

One of the goals of learning mathematics is to develop problem-solving skills. Problem solving is one of the important topics in studying mathematics (Roebiyanto et al., 2017). This ability is an action to solve a problem or the process of finding a solution and utilizing mathematics in solving the problem.

Based on the above problems, researchers can conclude that these various problems indicate many factors in making it difficult for students to learn mathematics lessons. One of the factors that affect the success of students in solving math problems is internal and external factors, such as the students themselves, the school environment, facilities and infrastructure, and the family environment.

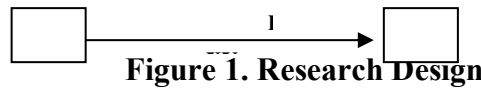
Internal factors are the most dominant factor in supporting mathematical problem-solving skills. However, if these two factors are trained and developed optimally, it will make it easier to receive and understand mathematics lessons. One of the abilities that is theoretically thought to improve students' mathematical problem-solving abilities is metacognitive ability.

Metacognitive ability is one of the important elements that students have in learning and will obviously improve the quality because it concerns students' initiative, so that each person's metacognitive process will be different according to their abilities (Anggo, 2011). Metacognitive activities include thinking activities to plan, monitor, and reflect on how to solve a problem (Livingston, 2017). With the application of metacognitive skills, students are expected to plan and control all the activities they have done so that they can increase their knowledge in solving mathematical problems.

This metacognitive ability not only plays a role in the student's own personality, but can also affect the student's ability to solve mathematical problems. This metacognitive ability includes monitoring memory, comprehension and cognitive effort. The lower the student's metacognitive ability, the lower his awareness to monitor his cognitive ability, which means that the participant will not be able to develop his cognitive ability. With the application of metacognitive skills, it is hoped that it can get students used to planning, controlling and reflecting on all the thinking activities they do so that they can increase their knowledge in solving mathematical problems. With the application of this metacognitive ability, it is hoped that students can improve their mathematical problem-solving skills. Therefore, this research is important to be carried out to find out more about the influence of metacognitive skills on the mathematical problem-solving ability of grade VIII students at SMP N 249 Jakarta.

2. METHOD IMPLEMENTATION

This type of research is survey research and analysis methods that use simple correlation and regression. By using a research design consisting of one independent variable and one bound variable. The survey design in this study is described as follows:



Description:

Variable X = Metacognitive ability

Variable Y = Mathematical Problem-Solving Ability

r_{xy} = Influence between X and Y

The target population in this study is all students of SMP N 249 JAKARTA. The affordable population in this study is all grade VIII students at SMP N 249 Jakarta which totals 100 people.

Data collection for the variable of mathematical problem-solving ability was obtained from the results of the essay question test which amounted to 30 questions, while the variable of students' metacognitive ability was obtained by conducting a written test in the form of a questionnaire to a sample or respondent as many as 30 questions, with 5 alternative answers.

3. RESULTS AND DISCUSSION

The description of the data from the research results is grouped into two parts consisting of independent variables, namely metacognitive ability (X) and bound data, namely mathematical problem-solving ability (Y). The number of data sources amounted to 100 respondents from grade VIII students of SMP N 249 Jakarta. Based on the results of the data calculation, the following data was obtained:

Table 1. Descriptive Data Summary

Statistics	Metacognitive abilities	Math Problem Solving
Lowest value	88	23
Highest score	133	100
Mean	103,9	68,5

Median	102,5	69,5
Mode	93,5	67,5
Varians	110,25	327,61
Baku	10,5	18,1
Junction		

Furthermore, in analyzing the data, a normality test and a regression kerenity test were carried out. To find out whether the data comes from a normally distributed population or not, a data normality test is carried out using the Chi square test (χ^2) with a significant level of $\alpha = 0.05$. For more details, the results of the normality test of metacognitive ability and mathematical problem-solving ability can be seen in the following table:

Table 2. Recapitulation of the Results of the Normality Test

Classes	Number of samples	χ^2_{hitung}	χ^2_{tabel}
Metacognitive Abilities	100	12,079	14,067
Math problem solving	100	10,628	14,067

Because χ^2_{hitung} in both classes it is less than possible to conclude that the population data of the two groups is normally duss. After the sample in this study, it was stated that it came from data that was normally distributed. Furthermore, a regression clinicality test was carried out to test the regression equation model of mathematical problem-solving ability over metacognitive ability. To test the hypothesis: χ^2_{tabel}

$$H_0 : Y = a + bX \text{ (lineman)}$$

$$H_1 : Y \neq a + bX \text{ (non-linear)}$$

For more details of the results of the regression engineering test, see the following table:

Table 3. Mathematical Problem-Solving Regression Linearity Test on Metacognitive Ability (X)

Source	of	DK	JK	RJK	Calculation	Table
Variance						
Total	100	491558	-			
Regresses (a)	1	455895,04	455895,04	1,52		1,6433
Regresi (b/a)	1	22062,88	22062,88			

Residue	98	13600,08	138,78
Tuna fit (TC)	27	4982,76	184,55
Error	71	8617,32	121,37

because $F_{cal} = 1.52 < F_{table} = 1.6433$ H_0 is accepted and concluded a linear patterned regression model. The results of the test of the data analysis requirements showed that the normal distribution and regression equation model were declared linear. Furthermore, a research hypothesis test was carried out using the t-test. The t-test is used to see whether the sample has any effect or not

Table 4. Recapitulation of Hypothesis Test Calculation Results

Classes	Sample	Mean	Stuttgart	Table
Metacognitive Abilities	100	103,9	9,98	1,984
Math problem solving	100	68,5		

Based on the calculation above, provided that the error rate $\alpha = 0.5$; $db = n - 2 = 100 - 2 = 98$ so that $t_{table} = 1.984$ is obtained then $t_{count} > t_{table}$ ($9.98 > 1.984$) H_0 is rejected. So, the correlation of variable X with Y or the effect of metacognitive ability on the ability to solve mathematical problems in grade VIII of SMP N 249 Jakarta is significant.

Based on the results of the calculations and tests above using Microsoft excel and using simple regression linearity testing between Y and X with the f test, the regression equation Y over X is obtained. $\hat{Y} = -70.38 + 1.33 X$ of the equation, it can be said that the variable Y will undergo a change in the value of X, meaning that every increase in the X variable by one unit will be followed by an increase in the Y variable by 1.33 units. It is also obtained that $F_{calculate}$ for a simple regression Y with X of 158.98 which is greater than $F_{table} = 3.9381$. So that H_0 is rejected, it can be said that Metacognitive Ability (X) has a very significant effect on Mathematical Problem-Solving Ability (Y)

This research has succeeded in proving that metacognitive abilities have a significant effect or impact on problem-solving skills, especially in mathematics lessons. This is supported by the results of research from Susi Susilawati which is contained in the book *Eduresearch Raise the Standard* (2015: 99) stating that the influence of students' metacognitive abilities on mathematics learning achievement is 86% and the rest is influenced by other factors.

Students will be more interested in learning mathematics, especially algebraic factorization material which is closely related to students' metacognitive abilities, so that problem-solving skills will be more effective if students' abilities can develop well. Thus, the success of students in solving mathematical problems is not only influenced by external factors, but also influenced by internal factors, namely metacognitive abilities.

This shows that there is a positive relationship between metacognitive ability and mathematical problem-solving ability, namely if the higher the student's metacognitive ability, the easier it will be for students to solve mathematical problems in algebraic factorization material.

Metacognitive ability significantly affects the ability to solve mathematical problems, this is very logical because metacognitive ability is the ability of students to manage the time of the learning process well. From the results of the determinant correlation of 62.41%, it can be interpreted that the ability of students contributes 62.41% to solving mathematical problems while the remaining 37.59% is determined by other factors. Through metacognitive skills, not only improve mathematics learning achievement but students are also able to design, monitor, and monitor the learning process consciously.

This research has proven that metacognitive abilities have a significant influence on problem-solving skills, especially mathematical problems. It is hoped that in the future there will be research aimed at developing the role of metacognitive abilities so that the

ability to solve mathematical problems is appropriate and accurate.

4. Conclusion

Based on the research written by the author at SMP N 249 Jakarta in grades VIII A-D with 100 students, it can be concluded that there is an influence of metacognitive ability on mathematical problem-solving ability. This means that the higher the metacognitive ability, the higher the student's mathematical problem-solving ability, and vice versa, the lower the student's metacognitive ability, the lower the problem-solving ability, especially mathematics problems. However, the reality is that there are still many students who are still not aware or know how to process their metacognitive abilities, because good metacognitive abilities are not just embedded in the students but the students themselves are able to practice the habits of metacognitive abilities, therefore metacognitive abilities must be instilled in students, so that students are able to solve problems, especially mathematical problems. Thus, metacognitive abilities are a very strong factor in students' success in solving mathematical problems.

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