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## THE EFFECT OF HABITS OF MIND ON MATHEMATICAL PROBLEM-SOLVING ABILITY OF JUNIOR HIGH SCHOOL STUDENTS

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### ABSTRACT

Mathematical problem-solving ability is one of the cognitive aspects that must be mastered by students in order to be able to solve problems that are often encountered in everyday life. In addition to the cognitive aspect there are affective abilities, one of which is the Habits of Mind. This study aims to analyze and examine in depth the problem-solving abilities that are influenced by the habits of mind in junior high school students. The method in this study uses a correlational method with a quantitative approach. The populational in this study were junior high school students in Bekasi Regency and a sampel of 38 people who were determined by purposive sampling technique at one junior high school in Bekasi Regency. The instrument used is in the form of a problem-solving ability test with 3 questions and a Habits of Mind scale with 25 statements. The result of this study concluded that there were 50% high habits of mind with moderate problem-solving abilities, 15.79% high habits of mind and high problem-solving abilities, 13.16% moderate habits of mind and moderate problem-solving abilities, 21.05% moderate habits of mind and low problem-solving abilities. In addition, there is a positive influence between the habits of mind and the mathematical problem-solving abilities of junior high school students by 20.40%. This show that the higher students' habits of mind, the higher the problem-solving ability of students. Based on the result, it is necessary to carry out further research on habits of mind and students' mathematical problem-solving abilities.

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## INTRODUCTION

Mathematics is a scientific discipline that has an important role in developing students' abilities. In addition, mathematics is one of the subjects studied at every level of education, both from elementary school, middle school, to university. In line with Oviyani (2017) saying

that mathematics is one of the subjects taught at all levels of education. Consciously or unconsciously, humans live side by side with complex problems and need the ability to think and be able to solve problems.

Umar (Nurdiansyah et al., 2021) stated that abilities must be developed in learning mathematics include not only cognitive aspects but also affective aspects. From this opinion, one of the affective abilities must be owned and improved by every student is *Habits of Mind*. Mathematical *Habits of Mind* is a development of thinking skills through habituation or cultivation mathematical thinking (Miliyawati, 2014; Nurdiansyah et al., 2021). *Habits of Mind* means the habit of thinking. Habit is a process of behaving and acting that is done repeatedly until it settles down and is automatically carried out (E. S. Aisyah & Sofyan, 2014; Faqih et al., 2021; Aprilia Dwi Handayani, 2015).

Costa and Kallick in 1885 developed *Habits of Mind* by defining *Habit of Mind* as a characteristic of what intelligents people do when they are faced with problems that are not easy to solve. *Habits of Mind* are the tendency of a person's intelligent behavior to solve problems for which the solution is not immediately known (Altan et al., 2019; Dwirahayu et al., 2018). *Habits of Mind* have an important role in the learning process and individual development in solving problems (Defitriani, 2019). With *Habits of Mind*, students can assess their own ability to understand, reason and work on a question or problem (Indriani et al., 2018). *Habits of Mind* is a positive behavior that is shown by someone and is done automatically and repeatedly (A. D. Handayani et al., 2018).

Positive behavior that can be done repeatedly, such as solving problems that we often encounter in our daily lives. However, awareness of the importance of mathematical problem-solving abilities in everyday life has not been well realized (P. N. Aisyah et al., 2018). Problem solving ability is one of the fundamental abilities that junior high school student must have and improve in learning mathematics (Yuliani et al., 2019).

Aliah et al., (2020) say that in everyday life, consciously or unconsciously, every day we are faced with various problems that demand problem-solving skill. In addition, mathematics also has benefits and an important role not only for science but in learning to be achieved in solving problems to carry out everyday life (Lestari et al., 2019; Lutfiah et al., 2022). The simple thing that we often encounter in solving problems in everyday life is when we are buying an item at a store or at a supermarket and we forget to ask what the unit price is or even how much money we have. Not only that, we often use even simple things such as addition, subtraction, multiplication, and division in our daily activities or activities.

According to Rahmatiya & Miatun (2020) *problem solving* is a student's effort in solving problems, especially in learning mathematics. Problem solving in mathematics learning emphasizes the use of method, procedures, and strategies that can be verified systematically. In line with Rahmawati & Warmi (2022) problem solving is defined as a process of activity adopted by someone, including methods, procedures, and strategies to solve problems until they are finished and meet requirements.

Based on the description above, the aim of this study was to determine whether there is an influence of *Habits of Mind* on the mathematical problem solving abilities of Junior High School students in the material of the System of Two Variable Linear Equations with the hypothesis  $H_0 =$  There is no effect of *Habits of Mind* on the mathematical problem solving abilities of Junior High School students in the material System of Two Variable Linear Equations; and  $H_a =$  There is an influence of *Habits of Mind* on the mathematical problem solving abilities of Junior High School students in the matter of Systems of Two Variable Linear Equations.

## METHOD

This research was conducted using a correlational quantitative approach with the survey method which is expected to be able to determine whether there is influence of *Habits of Mind* on Junior High School problem solving abilities in the material System of Two Variable Linear Equations (SPLDV). Correlation research is a study that involves collecting data to determine whether there is a relationship and the level of relationship between two or more variables.

The population used in this study is students of class VIII SMP Negeri 1 Tambelang, Bekasi Regency. While the sampling technique used purposive sampling technique by taking a sample of 38 students. The instruments used in this study were the *Habits of Mind* scale and written tests of students' mathematical problem-solving abilities. The test questions for solving mathematical problems consist of 3 items and a scale of *Habits of Mind* consisting of 25 statements.

The data that has been taken is processed and analyzed using a statistical test, namely a simple linear regression test with the help of SPSS version 23 software which can answer the hypothesis formulation. The hypothesis in this study is: there is an influence of *Habits of Mind* on students' mathematical problem-solving abilities. Before carrying out hypothesis testing, there are several prerequisite tests that must be met.

## RESULTS AND DISCUSSION

### Results

*Habits of Mind* scale data and students' mathematical problem solving abilities that have been collected, recapitulated and categorized. Table 1 presented shows the results of filling in and the *Habits of Mind* category on students' mathematical problem solving abilities. There are 50% of students who have high *Habits of Mind* with moderate problem solving abilities, 15.79% of students have high *Habits of Mind* with high problem solving abilities, 13.16% of students have moderate *Habits of Mind* with moderate problem solving abilities, and 21.05% of students who have moderate *Habits of Mind* with low problem solving abilities.

**Table 1.** The Results Categorization of the Habits of Mind Scale and Problem Solving Abilities

No.	Students Code	Habits of Mind	Problem Solving Abilities
1.	S1	Medium	Medium
2.	S2	Medium	Low
3.	S3	High	Medium
4.	S4	High	Medium
5.	S5	High	Medium
6.	S6	Medium	Medium
7.	S7	High	Medium
8.	S8	High	Medium
9.	S9	High	Medium
10.	S10	High	Medium

No.	Students Code	Habits of Mind	Problem Solving Abilities
11.	S11	High	Medium
12.	S12	High	Medium
13.	S13	High	Medium
14.	S14	Medium	Medium
15.	S15	Medium	Low
16.	S16	High	Medium
17.	S17	High	Medium
18.	S18	High	High

After collecting data and categorizing it, then to find out the relationship between habit of mind and students' mathematical problem solving abilities, data analysis was carried out. Based on the results of inferential analysis, the normality test is carried out first. The results are presented in Table 2.

**Table 2.** The Normality Test Results

		Unstandardized Residual
N		38
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	6.34131401
Most Extreme Differences	Absolute	.150
	Positive	.150
	Negative	-.080
Test Statistic		.150
Asymp. Sig. (2-tailed)		.030 <sup>c</sup>
Exact Sig. (2-tailed)		.323
Point Probability		.000

Based on Table 2, the Exact Sig results were obtained. (2-tailed) of  $0.323 > 0.05$  it can be concluded that both data are normally distributed. Ideally, each study should use exact p values in each test (Mehta, C.R., and Patel, 2015). Because the data is normally distributed, it is continued with the Pearson Product Moment Correlation Test. The results are presented in Table 3.

**Table 3.** The Pearson Product Moment Correlation Test Results

		Habits of Mind	Kemampuan Pemecahan Masalah
Habits of Mind	Pearson Correlation	1	.452**
	Sig. (2-tailed)		.004
	N	38	38
Kemampuan Pemecahan Masalah	Pearson Correlation	.452**	1
	Sig. (2-tailed)	.004	
	N	38	38

Based on Table 3, the values of Sig.  $< 0.05$ , it can be concluded that there is a relationship between habits of mind and students' mathematical problem solving abilities. While the direction of the relationship is positive because the simple correlation value (r) is positive, namely 0.452, which means that the higher the *Habits of Mind*, the higher the student's

mathematical problem solving abilities. Furthermore, statistical regression tests were performed using simple linear regression analysis. The results of a simple linear regression analysis were obtained which can be seen in Table 4.

**Table 4.** Regression Test Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.684	10.380		-.451	.654
	Habits of Mind	.591	.194	.452	3.040	.004

Based on the results of the regression analysis test in Table 4, the coefficients value of the *Habits of Mind* variable is 0.591 and the constant value is -4.684. the linear regression equation model obtained is  $\hat{Y} = -4.684 + 0.591X$ , which means that for every addition of 1 value of *Habits of Mind*, the value of mathematical problem solving abilities increases by 0.591.

**Table 5.** ANOVA Summary

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	381.962	1	381.962	9.242	.004 <sup>b</sup>
	Residual	1487.854	36	41.329		
	Total	1869.816	37			

In Table 5 it can be seen that the value of  $F_{hit} = 9.242$  with a value of Sig. is  $0.004 < 0.05$ , the test decision can be concluded that there is a significant influence between *Habits of Mind* on mathematical problem solving abilities. That the higher value of *Habits of Mind* in students will have an effect the better their problem solving abilities. Likewise, the lower value of habits of mind, the less ability to solve problems. Whereas in Table 6 results will be know from how big the relationship is between the habits of mind and the ability to solve mathematical problem. The following is Table 6.

**Table 6.** Correlation Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.452 <sup>a</sup>	.204	.182	6.429

From the Table 6 above, it is found that the value of the correlation coefficient (R) is 0.452 with  $R^2 = 20.40\%$ , that found the ability to solve mathematical problem is influenced by *Habits of Mind* of 20.40%, the rest is influenced by other possible variables. Thus the magnitude of the positive correlation between *Habits of Mind* and mathematical problem solving ability can be seen from the correlation coefficient value of 0.452, which means that the positive relationship is quite significant. Where the better the *Habits of Mind* have a better influence on ability to solve mathematical problem. That students with high achievement motivation will provide better problem solving abilities than students who have low habits of mind.

### **Discussions**

Based on data processing from the result of the analysis of the *Habits of Mind* scale using the Likert scale and problem solving abilities by giving questions to students, the result is that the better the *Habits of Mind* will have a better influence on students' mathematical problem solving abilities and provide a positive relationship quite significant. This is in line with Dwirahayu et al., (2018) which states that *Habits of Mind* affects students' mathematical problem solving abilities, where intrinsic motivation will encourage students to act and make

better efforts when dealing with mathematical tasks. Apart from that, Malasari et al (2019) also said that *Habits of Mind* have a positive influence on students' ability to solve problems.

*Habits of Mind* can also be called habits of thought defined by Costa and Kallick (Dwirahayu et al., 2018), that the characteristics of someone who is intelligent in carrying out a problem with a solution that is usually difficult to find. *Habits of Mind* are not natural or innate talents, but are behavioral habits that are carried out deliberately and consciously in time and habits (Hasanah & Purwasih, 2022). Success in solving mathematical problem can be supported by *Habits of Mind*, which shows the importance of *Habits OF Mind* in learning mathematics (Malasari et al., 2019).

According to Miliyawati (Anggriani & Septian, 2019), when faced with problem students tend to form certain patterns of intellectual behavior that can encourage individual success in solving these problems. Therefore, the habits of thinking that a person has will affect his success, one of which is his success in learning. Students' problem solving abilities can be increased by getting them used to solving non-routine problems, so that students must be able and accustomed to understanding the information requested in the questions, besides that the importance of students' knowledge and skill in the process of solving problems is not only in the final result (Utami & Wutsqa, 2017).

Hermi (Hermawati et al., 2021) states that the way to develop students' abilities in problem solving is by providing problem solving experience to other problems, a good strategy refers to students who use techniques/ methods to solve mathematical problems correctly so that help the calculation procedure to find a solution.

In this study, the value of the positive correlation between *Habits of Mind* and the ability to solve mathematical problems can be seen from the value of the correlation coefficient, which is 0.452, which means that the positive relationship is quite significant. Where the better the *Habits of Mind* will have a better influence on the ability to solve mathematical problems. Students with high achievement motivation will provide better problem solving abilities than students who have low habits of mind.

## CONCLUSION

Based on the data analysis and discussion that has been explained, the results of this study concluded that there were 15.79% of students who had high *Habits of Mind* with high problem solving abilities, 50% of students who had high *Habits of Mind* with medium problem solving abilities, 13.16% of students who have medium *Habits of Mind* and problem solving abilities, and 21.05% of students who have medium *Habits of Mind* and low problem solving abilities. In addition, there is a positive influence between *Habits of Mind* and the mathematical problem solving abilities of junior high school students by 20.40%. This shows that the higher the *Habits of Mind* possessed by students will have a better effect on their mathematical problem solving abilities.

Suggestions for future researchers to be able to continue research by implementing the use of a learning model that can improve problem solving skills or students' thinking habits. Besides that, it can also be continued with research on the development of learning tools to improve students' mathematical problem solving abilities and thinking habits.

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