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THE CORRELATION HABIT OF MIND MATHEMATICS AND MATHEMATICAL-PROBLEM SOLVING ABILITY ON THE SUBJECT TWO-DIMENSIONAL FIGURE

Nikmah Sidi Awaly[1], Ade Triana[2]

[1, 2] Student of Mathematics Education, IKIP Siliwangi, Cimahi, Indonesia
[1]-nikmahsa@gmail.com, [2]adetrianadinata@gmail.com

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Abstract

This research already existed before, but this research is different. The purpose of this study is to identify whether there is a positive correlation between habit of mind mathematics and mathematical problem solving abilities of students on the subject two-dimensional figure. This research is classified as quantitative correlational research. The population in this study were all seventh grade students at MTs. Negeri Sumedang 2016/2017 academic year. The sample is class VII D students with purposive sampling technique. The test instrument was a test of mathematical problem solving ability and a mathematical habit of mind attitude scale. The technical data analysis uses simple linear regression analysis. The results of this study are that there is a positive correlation between habit of mind mathematics and mathematical problem solving abilities for middle school students.

Keywords: Mathematical-Problem Solving Skill, Habit of Mind

Abstrak

Penelitian ini sudah ada sebelumnya, namun penelitian ini berbeda. Tujuan penelitian ini untuk mengidentifikasi apakah ada korelasi positif antara *habit of mind* matematis dan kemampuan pemecahan masalah matematik siswa pada subjek bangun datar. Penelitian ini tergolong penelitian kuantitatif korelasional. Populasi dalam penelitian ini seluruh siswa kelas VII di MTs. Negeri Sumedang tahun akademik 2016/2017. Sampel adalah siswa kelas VII D dengan teknik *Purposive Sampling.* Instrumen tes berupa soal tes kemampuan pemecahan masalah matematik dan skala sikap *habit of mind* matematis. Teknis analisis data menggunakan analisis regresi linear sederhana. Hasil dari penelitian ini adalah terdapat korelasi positif antara *habit of mind* matematis dan kemampuan pemecahan masalah matematik siswa sekolah menengah.

Kata Kunci: Kemampuan Pemecahan Masalah Matematik, Kebiasaan Berpikir

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INTRODUCTION

Habit of mind is one of the important affective aspects for students (Ario, 2015; Masni, 2018; Miliyawati, 2016; Permendikbud, 2016). The use of habit of mind mathematically develops

more on students' attitudes in gaining knowledge, for example students are able to survive and be responsible for the problems they receive so they are able to learn continuously.

The indicator of mathematical habit of mind is being able to survive in working on math problems, managing impulsively in thinking of answers before answering mathematical questions, listening with understanding and empathy by accurately describing, flexible thinking by utilizing a number of problem solving strategies, thinking metacognition by pondering and evaluating settlement plans , struggling for accuracy (right and correct), questioning and causing problems, applying past knowledge to new situations, thinking and communicating with clarity and precision in using mathematical language, collecting data through all senses, creating, imagining, innovating, responding with sense admiration, being able to be responsible for risk, finding humor (finishing relaxed and enjoying the problem category), thinking independently (working in groups), and staying open to continuous learning (Costa & Kallick, 2008; Sumarmo, 2014). Based on these indicators, mathematical habit of mind has a role in shaping students 'mindsets which will have an impact on students' mathematical problem solving abilities in mathematics learning (Masni, 2018).

Mathematical problem solving ability is one of the cognitive aspects that must be possessed by each student (Abdullah, Mastur, & Sutarto, 2015; Masri, Suyono, & Deniyanti, 2018; Murniati, Mulyono, & Kharis, 2017; Nurmarisa & Mulyati, 2016; Permendikbud, 2016). This is because learning mathematics is not limited to reading or memorizing. More than that, students must be able to solve the problems they face. According to BNSP (Abdullah et al., 2015; Siswoyuono & Susilo, 2016) in the standard guide to the content of mathematics subjects it was mentioned that problem solving focused on mathematics learning. Mathematical problem solving according to Polya (Aini, Purwanto, & Sa'dijah, 2016; Noriza, Kartono, & Sugianto, 2015) includes (1) understanding the problem, (2) arranging the plan, (3) implementing the plan, (4) checking again. In working on math problems we have actually used problem solving steps, but often we don't realize it. Not even a few students consider intelligent behavior in solving mathematical problems is difficult (Masni, 2018).

The results of the study by Mahmudi & Sumarmo (2015) that learning with problem-based MHM strategies encourages students to think flexibly, such a way of thinking allows students to obtain various solutions or problem solving strategies. This is in line with the results of the study by Nurmarisa et. al. (2016) concluded the results of his research that the habit of mind mathematical strategy can improve mathematical problem solving abilities.

Therefore, it is necessary to do correlational analysis of habit of mind mathematics and mathematical problem solving abilities for students. The purpose of this study is to identify whether there is a correlation between habit of mind mathematics and mathematical problem solving abilities of students on the subject two dimensional figure? Meanwhile, the benefits of research are (1) through research, a description of the correlation between habit of mind mathematics and the mathematical problem solving abilities of students on the subject two dimensional figure is identified. (2) help the teacher in making learning plans on the subject two dimensional figure.

METHOD

The method used in this study is a quantitative method with a correlation approach. Free variable (X) in this study is mathematical habit of mind, while the dependent variable (Y) is the mathematical problem solving ability of students on the subject two dimensional figure. The population in this study were all seventh grade students at MTs. Negeri Sumedang

2016/2017 academic year. The sample was students of class VII D with a Purposive Sampling technique of 41 students. The test instrument was a test of mathematical problem solving ability and a mathematical habit of mind attitude scale that had been tested for validity and reliability. Examples of the scale of the habit of mind mathematical attitude are as follows:

Sikap	Indikator
Ketika mengalami kesulitan dalam mengerjakan soal, saya terus berusaha mencari solusi jawaban dan menyelesaikannya	1
Saya menjawab pertanyaan guru tanpa memahami pertanyaannya	2
Dengan presentasi teman dan penjelasan dari guru membantu saya dalam memahami materi dan mampu menyelesaikan soal pada materi segiempat	3
Saya mampu mengerjakan soal menggunakan alternatif penyelesaian lain	4
Ketika ada soal matematika, saya memperkirakan dahulu cara pengerjaannya, baru kemudian mengerjakannya	5
Saya memeriksa setiap keteraturan langkah penyelesaian soal matematika yang saya kerjakan	6
Saya selalu bertanya ketika tidak mampu memahami materi	7
Saya mampu mengerjakan soal segiempat dengan bantuan rumus yang telah dipelajari	8
Saya kurang mampu menggunakan simbol-simbol matematika dalam mengerjakan soal matematika	9
Saya selalu menuliskan hal-hal penting tentang pelajaran di buku catatan	10
Setelah menjawab suatu soal matematika, saya mempertanyakan "apakah ada cara lain untuk menyelesaikannya"?	11
Saya merasa senang setelah menyelesaikan soal matematika	12
Ketika nilai matematika saya jelek, saya akan terus rajin belajar agar nilai saya menjadi lebih baik	13
Saya tidak senang mengerjakan soal matematika yang sulit	14
Saya kurang mampu menerima pendapat teman saat diskusi kelompok	15
Saya tidak pernah mengulang kembali pelajaran matematika di rumah	16

Figure 1 Examples of Scale Mathematical Habit of Mind Attitudes

Tests of mathematical problem solving abilities have been tested for different strengths and the degree of difficulty of the questions. Test the mathematical problem solving abilities as follows:

1	Brian mempunyai kertas dengan luas $3.6m^2$. Kertas tersebut akan dibuat layang-layang dengan panjang masing-masing diagonalnya adalah $40cm$ dan $30cm$. a. Gambarlah layang-layang tersebut! b. Hitunglah luas layang-layang tersebut! c. Berapa banyak layang-layang yang dapat dibuat Brian?
2	Sebuah kebun berbentuk persegi panjang dibagi oleh pagar secara vertical dan horizontal sehingga terbagi menjadi empat area untuk ditanami empat macam pohon yang berbeda (pohon mangga, rambutan, pisang dan jambu) seperti pada gambar di samping. Luas daerah ketiga area diberikan seperti pada gambar, tentukan luas area yang belum diketahui? 
3	Luas daerah sebuah belahketupat 96 cm^2 dan panjang salah satu diagonalnya adalah 16 cm. Tentukan keliling belahketupat!

Figure 2 Mathematical Problem Solving Ability Test

The data analysis used in this study is simple linear regression, including (1) normality test, (2) regression equation, (3) linearity test, (4) significant regression test, (5) significant regression coefficient test, (6) test significant correlation coefficient, (7) coefficient of determination.

RESULTS AND DISCUSSION

Results

The results of the previous normality test, data are normally distributed. Meanwhile, a simple linear regression calculation produces a regression equation Y = -45.465 + 1.383X regression indicating that there is an increase in students' mathematical problem solving abilities 1.383 for each unit of increased habit of mind mathematics.

Tabel 1 The Result of Linear Test

			Sum of Squares	df	Mean Square	F	Sig.
Mathematical-Problem Solving Ability * Habit of Mind Mathematics	Between Groups	(Combined)	2099.983	14	149.999	.853	.612
		Linearity	1242.066	1	1242.066	7.066	.013
		Deviation from Linearity	857.918	13	65.994	.375	.966
	Within Groups		4570.186	26	175.776		
	Total		6670.170	40			

Based on the data in Table 1, the conclusion is that the correlation between habit of mind mathematics and mathematical problem solving abilities on the subject two dimensional figure is linear.

The results of the regression significance test are presented in Table 2.

Tabel 2 The results of the regression significance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1242.066	1	1242.066	8.924	.005[b]
	Residual	5428.104	39	139.182		
	Total	6670.170	40			

a. Dependent Variable: Mathematical-Problem Solving Ability
b. Predictors: (Constant), Habit of Mind Mathematics

Based on the data in Table 2, the conclusion is the correlation between habit of mind mathematics and mathematical problem solving abilities on the subject two dimensional figure with a significant.

The results of the significance test of the regression coefficient use the value of t obtained that the regression coefficient is significant.

Tabel 3 The Result of the Degree of Corelation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.432[a]	.186	.165	11.79755	.186	8.924	1	39	.005	1.972

a. Predictors: (Constant), Habit of Mind Mathematics
b. Dependent Variable: Mathematical Problem Solving Ability

Based on Table 3 the calculation of determination coefficient, the value of r^2 = 0.186 or 18.6%. That is, the mathematical problem solving ability is influenced by 18.6% of the

mathematical habit of mind of students and 81.4% is influenced by other factors besides mathematical habit of mind.

Based on the calculation of the correlation coefficient obtained by the value r = 0.432. According to Guilford criteria, 0.432 is included in the criteria for moderate correlation coefficient.

Discussion

Based on the analysis of research data it can be concluded that there is a positive correlation between habit of mind mathematics with mathematical problem solving abilities of students on the subject two dimensional figure. This is in accordance with the opinion of Nurmarisa et al. (2016) said that the application of thinking habits of mind to make students begin to get used to high-level thinking starting from solving routine problems to solving non-routine problems.

The truth of the hypothesis is supported by several related studies. Masni (2018) revealed that there was an association between mathematical problem solving abilities and the habits of mind mathematics of students who obtained Advanced Organizer Metacognitive Learning and students who obtained the Scientific Discovery Learning Approach.

This study uses a QSH learning model with 6 learning activities. The activities are (1) giving question cards; (2) write questions for each group; (3) playing cards throughout the group; (4) reviewing questions held; (5) make an agreement on the questions to be resolved and (6) resolve the questions. Analysis of student answers:

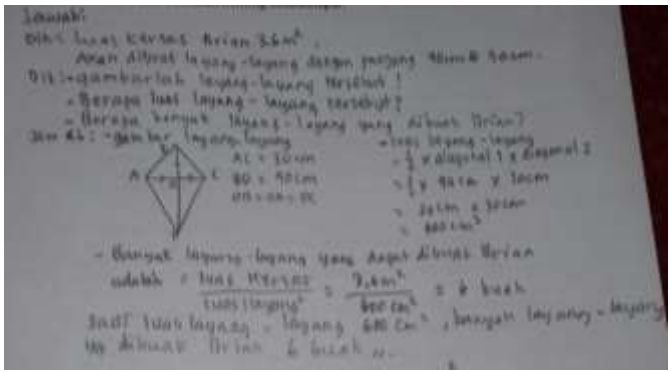

Figure 3 Student Answer No. 1

Based on Figure 3, student answers have referred to the steps for solving problems according to Polya. However, students do not make mathematical models correctly. Grade VII students have studied algebra and PLSV, students should be able to make mathematical models of the questions given by using language and mathematical symbols.

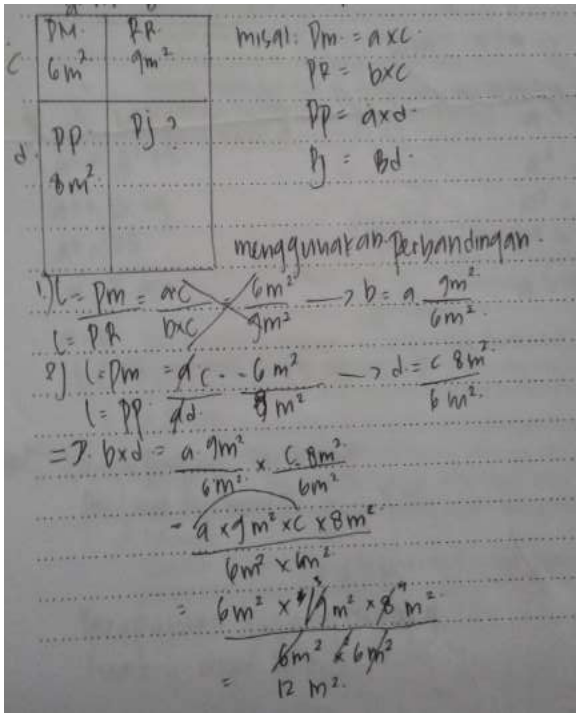

Figure 4 Student Answer No. 2

Based on Figure 4, students' answers are less precise. He did not write down the elements that were known, asked and adequacy of the elements, and did not reinterpret the results into the questions. As a result, student answers are less than perfect. But students are able to solve mathematical problems significantly, namely by using comparisons.

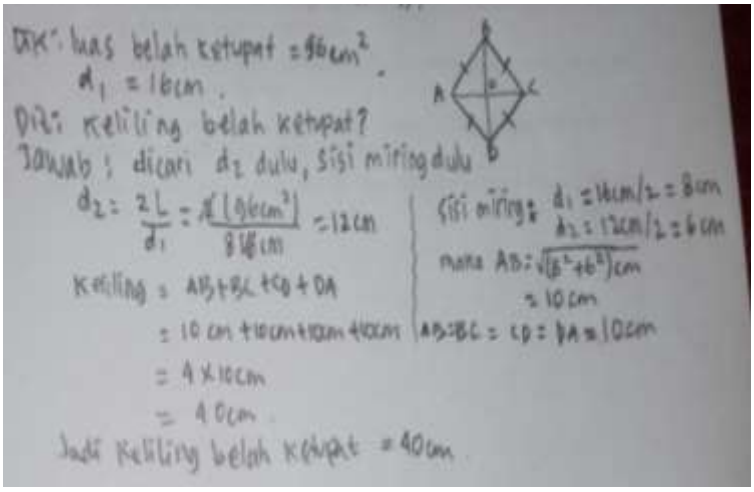

Figure 5 Student Answers No. 3

Based on Figure 5, students are almost perfect in using problem solving steps according to Polya. Students are able to solve mathematical problems significantly, using the Pythagoras formula.

CONCLUSION

The conclusion that can be drawn is that habit of mind mathematics has a significant correlation to the mathematical problem solving ability on the subject two dimensional figure for class VII students in MTs. Negeri Sumedang. This can be seen from the value of the habit

of mind mathematical questionnaire with the posttest value of students' mathematical problem solving abilities.

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