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THE RELATIONSHIP BETWEEN LEARNING MOTIVATION WITH MATHEMATICAL PROBLEM SOLVING ABILITY IN CLASS XI STUDENTS

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Abstract:
The ability to solve problems is one of the cognitive abilities in mathematics that need to be mastered by students. In supporting mastery to solve problems, it is necessary to have the motivation to learn for students. This study aims to determine the relationship between learning motivation to students' mathematical problem-solving. The research method used is the correlation method with a quantitative approach. The population of this study was all students of class XI at Toma Nasional high school 2 and the sample selected was class XI science majors which collected 15 students. The instrument used in this research is a test to measure the ability to solve problems in the form of an explanation of 3 questions, while the non-test instrument to measure the level of learning motivation is in the form of a scale in the questionnaire. Data were analyzed using Pearson's product-moment correlation test. The results of this study indicate that at a significance level of 0.05 there is a relationship between learning motivation and students' problem-solving abilities. In addition, the linear regression equation Y = 12.964+0.422X is obtained, which means that for every additional 1 value of learning motivation, the mathematical problem-solving ability increases by 0.422.

Keywords: Mathematics, Mathematical Problem Solving, Learning Motivation

HUBUNGAN MOTIVASI BELAJAR DENGAN KEMAMPUAN PEMECAHAN MASALAH MATEMATIS PADA SISWA KELAS XI

Abstrak:
Kemampuan pemecahan masalah merupakan salah satu kemampuan koginitif dalam matematika yang perlu dikuasai oleh siswa. Dalam mendukung pencapaian penguasaan kemampuan pemecahan masalah ini diperlukan motivasi belajar bagi siswa. Penelitian ini bertujuan untuk mengetahui hubungan motivasi belajar terhadap kemampuan pemecahan masalah matematis siswa. Metode penelitian yang digunakan adalah metode korelasi dengan pendekatan kuantitatif. Populasi penelitian ini adalah semua siswa kelas XI SMA Negeri 2 Toma dan sampel yang dipilih adalah siswa kelas XI MIPA yang berjumlah 15 siswa. Instrumen yang digunakan dalam penelitian ini yaitu tes untuk mengukur kemampuan pemecahan

masalah matematis berupa soal uraian sebanyak 3 soal, sedangkan instrumen non tes untuk mengukur tingkat motivasi belajar berupa skala dalam kuesioner. Data dianalisis dengan menggunakan uji korelasi product moment pearson. Hasil penelitian ini menunjukkan pada taraf signifikansi 0,05 terdapat hubungan positif motivasi belajar terhadap pencapaian kemampuan pemecahan masalah matematis siswa. Selain itu, diperoleh persamaan regresi linear $\hat{Y} = 12{,}964 + 0{,}422X$ yang berarti bahwa setiap penambahan 1 nilai motivasi belajar, maka nilai kemampuan pemecahan masalah matematis bertambah sebesar 0,422.

Kata kunci: Matematika, Kemampuan Pemecahan Masalah Matematis, Motivasi Belajar

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INTRODUCTION

Mathematical problem-solving ability is one of the mathematical abilities that must be mastered by students. Problem-solving ability is the ability of students to solve mathematical problems according to problem-solving steps (Nurdalilah, Syahputra, & Armanto, 2013). In line with that, Rahmadani and Sirait (2020) states that "Mathematical problem-solving skills are abilities that students must master to be able to understand problems and solve mathematical problems".

Problem is a learning method that makes students creative and critical and active in exploring and investigating the solution to a problem. This mathematical problem-solving ability must be trained and accustomed to students so that in the future they can find solutions to every problem they face. In line with that Mairing (2018), states that "students can develop problem-solving skills in everyday life by learning to solve mathematical problems". That is, students who can solve mathematical problems will have the ability to process and analyze and make decisions on a problem.

The ability to solve mathematical problems is still difficult for students to master, one of which is in linear programming material. This is supported by the results of research by Nuryana and Rosyana (2019) that students' mathematical problem-solving abilities on linear programming material are still low. Among the 26 students in the research sample, only 19.23% of students were able to solve mathematical problems. Student's difficulties in

completing the test include: 1) students have difficulty understanding the questions, 2) students are not able to construct mathematical models, 3) students are still confused about drawing the graph of the settlement set area, and 4) students have difficulty concluding answers when determining the value of the objective function. In addition, in Liyana and Ferdianto's research (2018), it was found that students had difficulty identifying the elements that were known and asked about, the adequacy of the required elements, and applying mathematical problem-solving strategies.

One of the supporting factors in improving and developing students' mathematical problem-solving abilities is learning motivation. Students' motivation in learning mathematics will have an impact on students' success in solving mathematical problems. Motivation is all the driving forces that exist in students in learning activities to ensure student activity and curiosity about the information conveyed by teachers in learning activities so that the desired learning objectives can be achieved (Priansa, 2017).

According to Ayu (2017) "Students who have high motivation will continue to strive to understand every material taught by the teacher". However, in reality, students' learning motivation in learning mathematics is very low. This is supported by the results of research by Wahyuni (2021) that 64% of high school students have low learning motivation.

This low student motivation has a close relationship with students' mathematical problem-solving abilities. This is supported by the opinion of Nasution, Surya, and Manullang (2017) "Students who lack achievement are often not due to lack of ability, motivational factors to learn so that they do not try to use all the skills they have". That is, motivation has a very important role for students because students who have low achievement are not necessarily due to their inability but may be due to a lack of encouragement or motivation from themselves or their environment. In addition, students sometimes have a lack of motivation when learning mathematics, because they feel less confident when they get below-average scores in mathematics (Rigusti & Pujiastuti, 2020).

Mirnawati, Rukmigarsari, and Fuady (2021) in their research results that there is a significant relationship between learning motivation and students' mathematical problem-solving abilities. Furthermore, the results of Nisrina's research (2018) show that problem-solving abilities are influenced by learning motivation. The results of research by Rahmah, Aniswita, and Fitri (2020) obtained that the relationship between learning motivation and

students' mathematical problem-solving abilities was 0.69, where the interpretation of the relationship between the two included a strong relationship.

There are few studies related to the relationship between learning motivation and mathematical problem-solving ability. Most of the existing research is related to the effect of learning motivation on students' mathematical problem-solving abilities. Moreover, if the scope of the research is limited to schools in South Nias Regency, there are still no other researchers who have conducted similar research. Therefore, it becomes one of the bases for researchers in conducting research related to the relationship of learning motivation to students' mathematical problem-solving abilities.

METHODS

This study uses a correlational research method with a quantitative approach. In this study, the relationship between variables was analyzed without any treatment being given to these variables. The independent variable (X) in this study is learning motivation, while the dependent variable (Y) is the student's mathematical problem-solving ability.

The population of this research is class XI of Toma national high school 2 in the academic year 2021/2022 and the research sample is class XI science major students at Toma Nasional high school 2 totaling 15 people. Data were collected using test and non-test instruments. Test instruments were given to collect data on students' mathematical solving abilities, while non-test instruments were given to collect data on students' learning motivation

The test instrument for mathematical problem-solving skills is in the form of a description of 3 questions. The test items were first analyzed to see the validity, reliability, discriminatory power, and level of difficulty of the test. The following is an example of a problem-solving ability test item.

Table 1. Example of Mathematical Problem Solving Ability Test Items

Num	Problem-Solving Ability Indicator	Question	Score
1	- Identify the elements that are known, asked, and the completeness of the elements - Formulate		0 – 8

Num	Problem-Solving Ability Indicator	Question	Score
	mathematical models - Solving mathematical models - Checking the correctness of the solution	Members of junior high school scouts in Toma District held camp activities. At the camp, the committee plans to provide 2 types of tents, namely tent A and tent B. Tent A can accommodate 6 people and tent B can accommodate 4 people. The number of camp participants is 150 people. the required tent is not less than 28 pieces. The price of tent A is IDR 500,000 and tent B is IDR 250,000. The number of tents A and B provided by the committee will be calculated so that the costs incurred are minimum. a. Identify the data that is known, asked, and the completeness of the data! b. Make a mathematical model of the problem! c. Solve the mathematical model along with the principles used! d. Double-check the correctness of the obtained solution!	

The learning motivation questionnaire instrument is a list of statements using a Likert scale of 30 statements and is equipped with 4 answer options, namely Strongly Agree (SS), Agree (S), Disagree (KS), and Strongly Disagree (STS). This learning motivation questionnaire consists of positive statements and negative statements. Before being used as a research instrument, the motivation questionnaire had been tested beforehand to determine its validity and reliability of the questionnaire. The following is a lattice of a learning motivation questionnaire.

Table 2. Example Learning Motivation Questionnaire

No	Indicator	Conclusion	
		Positive	**Negative**
1	There is a drive and desire to learn	1, 2, 4	3, 5
2	Shows attention and interest in the assigned tasks	6, 8, 9, 10	7, 11
3	Prefer to work alone	12, 14, 15, 16, 17, 26	13, 18
4	Tenacious in the face of adversity	21, 23	19, 20, 24
5	Enjoy finding and solving math problems	22, 25, 27,28, 30	29

Table 3. Assessment Rubric of Learning Motivation Questionnaire

No	Respons	Score	
		Positive statement	**Negative statement**
1	Strongly Agree (SA)	4	1
2	Agree (A)	3	2
3	Disagree (D)	2	3
4	Strongly Disagree (SD)	1	4

The data used pearson's product-moment correlation test to determine whether there was a relationship between learning motivation and students' mathematical problem-solving abilities. However, before testing the hypothesis, a prerequisite test is carried out, namely the normality test of the data. The data in this study were processed and analyzed using the SPSS 15 application.

RESULTS AND DISCUSSION

After the research data was collected by the researcher, then the data was tested for prerequisites, namely the normality test and linearity test. The following are the results of the normality test of problem-solving ability test data and student learning motivation questionnaires.

Table 4. Normality Test Results Problem Solving Ability Test Mathematics and Learning Motivation Questionnaire

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Tes_KPM	0,199	15	0,113	0,926	15	0,240
Angket	0,152	15	0,200	0,948	15	0,240

Based on table 4 above, obtained a significant value in the shapiro-wilk column of 0.240 for the problem-solving ability test and a significant value in the learning motivation questionnaire of 0.500. This shows that the two data values are significantly greater than 0.05 (sig. > 0.05). That is, the two test data of mathematical problem-solving ability and student learning motivation questionnaires are normally distributed.

Furthermore, based on the linearity test, the deviation from the linearity value was obtained at 0.333. That is, 0.333 is greater than 0.05 (0.333 > 0.05) so the two variables of mathematical problem-solving ability and student learning motivation are linear.

Table 5. Linearity Test Results Problem Solving Ability Test Mathematics and Learning Motivation Questionnaire

ANOVA Table

			Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Tes_KPM *Angket	Between Groups	(Combined)	4824,000	13	371,077	5,154	0,333
		Linearity	388,304	1	388,304	5,393	0,259
		Deviation from Linearity	4435,696	12	369,641	5,134	0,333
	Within Groups		72,000	1	72,000		
			4896,000	14			

All the requirements of the regression test have been met, then the Pearson product-moment correlation test was conducted to determine the relationship between learning motivation and mathematical problem-solving abilities.

Table 6. Correlation Test Results Problem Solving Ability Test Mathematics and Learning Motivation Questionnaire

Correlation			
		Tes_KPM	Angket
Tes_KPM	Pearson Correlation	1	0,282
	Sig. (2-tailed)		0,309
	N	15	15
Angket	Pearson Correlation	0,282	1
	Sig. (2-tailed)	0,309	
	N	15	15

In table 6, the correlation value R = 0.282 is greater than 0.05 (R = 0.282 > 0.05). This means that H_0 is accepted and H_a is rejected, so it can be concluded that there is a positive relationship between learning motivation and the achievement of students' mathematical problem-solving abilities at a significance level of 5%. Where the better the student's learning motivation, the better the problem-solving ability. This is in line with the results of research by Mulyana and Fitrianna (2019) that there is a 12.8% relationship between learning motivation and students' mathematical problem-solving abilities. In line with that, in Usman's research (2019) it was found that 23.2% of learning motivation contributed to mathematical problem-solving abilities.

The relationship between learning motivation and mathematical problem-solving ability can be expressed in the form of a linear regression equation where a is a fixed term and b is a regression coefficient of Y on X. The following are the results of a simple linear regression coefficient analysis.

Table 7. Result Coefficient Variable

Coefficient						
Model		Unstandarsized Coefficient		Standardized Coefficient		
		B	Std. error	Beta	t	Sig.
1	(Constant)	12,964	29,720		0,436	0,670
	Motivasi Belajar	0,422	0,399	0,282	1,058	0,309

Based on table 7 above, the coefficient value of the learning motivation variable is 0.422 and the constant is 12.964. Thus, the linear regression equation is obtained. That is, for every additional 1 value of learning motivation, the

value of mathematical problem-solving ability increases by 0.422. This is in line with the research results of Wulandari, Azhar, and Jusra, (2018) that each addition of one score of student learning motivation provides an increase in students' mathematical problem-solving abilities of 0.294 at a constant of 13.376. In addition, Nisrina (2018) states that students who have high motivation will be challenged to work on the questions given by the teacher. Thus, students' mathematical problem-solving abilities are easier to develop and increase.

CONCLUSION

Based on the results of the research data analysis, it can be concluded that there is a significant positive relationship between learning motivation and students' mathematical problem-solving abilities. That is, the higher the student's learning motivation, the higher the student's mathematical problem-solving ability. On the other hand, the lower students' learning motivation, the less good students' mathematical problem-solving abilities. Researchers suggest that teachers are expected to be able to develop students' learning motivation to improve students' ability to solve mathematical problems. In addition, students can understand the mathematical problems given by the teacher correctly so that they get the correct problem-solving. This research is limited to knowing the relationship between learning motivation and mathematical problem-solving ability, so the researcher suggests that further research is related to improving mathematical problem-solving abilities and student learning motivation, for example by applying learning methods or models.

REFERENCES

Ayu, C. (2017). Hubungan motivasi belajar dengan hasil belajar matematika siswa kelas XI IPA SMA N 1 X Koto Kabupaten Tanah Datar. *Tower of Science*, *11*(74), 1–6. https://doi.org/10.33559/mi.v11i74.70.

Liyana, D., & Ferdianto, F. (2018). Analisis kemampuan pemecahan masalah siswa kelas XII SMA materi program linear. *Gammath : Jurnal Ilmiah Program Studi Pendidikan Matematika*, *3*(2), 15–21. https://doi.org/10.32528/gammath.v3i2.1601.

Mairing, J. P. (2018). *Pemecahan masalah matematika: cara siswa memperoleh jalan untuk berpikir kreatif dan sikap positif*. Bandung: Alfabeta.

Mirnawati, M., Rukmigarsari, E., & Fuady, A. (2021). Hubungan motivasi belajar dan kepercayaan diri terhadap kemampuan pemecahan maslaah matematis siswa kelas VIII di SMP Kristen Waikabubak. *Jurnal Penelitian, Pendidikan, Dan Pembelajaran*, *16*(19), 137–142.

Mulyana, U. R., & Fitrianna, A. Y. (2019). Hubungan motivasi belajar terhadap kemampuan pemecahan masalah matematik siswa SMP pada materi segitiga segiempat. *JPMI (Jurnal Pendidikan Matematika Indonesia))*, *2*(6), 415–420. https://dx.doi.org/10.22460/jpmi.v2i6.p415-420.

Nasution, Z. M., Surya, E., & Manullang, M. (2017). Perbedaan kemampuan pemecahan masalah matematik dan motivasi belajar siswa yang diberi pendekatan pembelajaran berbasis masalah dengan pendidikan matematika realistik di SMP negeri 3 Tebing Tinggi. *PARADIKMA*, *10*(1), 67–78. https://doi.org/10.24114/paradikma.v10i1.8688.

Nisrina, N. (2018). Pengaruh minat dan motivasi belajar terhadap kemampuan pemecahan masalah matematik. *ALFARISI: Jurnal Pendidikan MIPA*, *1*(3), 294–303. Retrieved from https://journal.lppmunindra.ac.id/index.php/alfarisi/article/view/8249.

Nurdalilah, Syahputra, E., & Armanto, D. (2013). Perbedaan kemampuan penalaran matematika dan pemecahan masalah pada pembelajaran berbasis masalah dan pembelajaran konvensional di SMA Negeri 1 Kualuh Selatan. *Jurnal Paradikam*, *6*(2), 109–119.

Nuryana, D., & Rosyana, T. (2019). Analisis kemampuan pemecahan masalah matematis siswa SMK pada materi program linear. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *3*(1), 11–20. https://doi.org/10.31004/cendekia.v3i1.74.

Priansa, D. J. (2017). *Pengembangan strategi dan model pembelajaran : Inovatif, kreatif, dan prestatif dalam memahami peserta didik*. Bandung: Pustaka Setia.

Rahmadani, E., & Sirait, S. (2020). Analisis kemampuan pemecahan masalah matematis siswa dalam menyelesaikan soal persamaan linear. *Seminar Nasional Multi Disiplin Ilmu Universitas Asahan*. Retrieved from http://jurnal.una.ac.id/index.php/semnasmudi/article/view/1500.

Rahmah, A. T., Aniswita, A., & Fitri, H. (2020). Pengaruh motivasi belajar siswa terhadap kemampuan pemecahan masalah matematika siswa di kelas VIII MTSN 3 Agam tahun pelajaran 2018/2019. *Jurnal Ilmiah Pendidikan Matematika Al Qalasadi*, *4*(1), 56–62. https://doi.org/10.32505

/qalasadi.v4i1.1174.

Rigusti, W., & Pujiastuti, H. (2020). Analisis kemampuan pemecahan masalah ditinjau dari motivasi belajar matematika siswa. *Prima: Jurnal Pendidikan Matematika*, *4*(1), 1–10. https://dx.doi.org/10.31000/prima.v4i1.2079.

Usman, U. (2019). Hubungan kecerdasan logis-matematis dan motivasi belajar dengan kemampuan pemecahan masalah peserta didik kelas XI SMA Negeri 14 Sinjai. *Sainsmat: Jurnal Ilmiah Ilmu Pengetahuan Alam*, *8*(1), 60–69.

Wahyuni, Y. (2021). Analisis motivasi belajar matematika siswa kelas XII IPA SMA Bunda Padang. *AKSIOMA : Jurnal Matematika Dan Pendidikan Matematika*, *12*(1), 52–59. https://doi.org/10.26877/aks.v12i1.6022.

Wulandari, A. E., Azhar, E., & Jusra, H. (2018). Hubungan antara motivasi belajar terhadap kemampuan pemecahan masalah matematis siswa pada kelas VII. *Prosiding Senamku*, *1*, 397–405.