TEMATIK: Jurnal Konten Pendidikan Matematika
Volume 2, Number 1, Tahun 2024, pp. 11-10
e-ISSN: 2985-8844 | p-ISSN: 2987-999X
Open Access: https://doi.org/10.55210/jkpm

The Influence of Self-Confidence on Mathematical Problem Solving Ability of Senior High School in Indonesia

Ahmad Wafa Nizami[1], Mukhtiar Hussain Ibupoto[2]

[1]Universitas Negeri Yogyakarta,
[2]Zhejiang Normal University, China
Email : Ahmadwafa@gmail.com

INFORMASI ARTIKEL
Tersedia Online pada:
27 Maret 2024

Kata Kunci:
Percaya Diri, Kemampuan Memecahkan Masalah, Metode Kuantitatif

Keywords:
self-confidence, problem solving ability, quantitative methods

Abstrak

Penelitian ini bertujuan untuk mengetahui tingkat kepercayaan diri siswa, tingkat kemampuan pemecahan masalah matematis, dan apakah kepercayaan diri berpengaruh terhadap kemampuan pemecahan masalah matematis siswa di SMPN 1 Gending kelas VIII. Penelitian ini menggunakan metode kuantitatif. Siswa SMPN 1 Gending yang duduk di kelas VIII merupakan populasi dari penelitian ini. Metode simple random sampling digunakan untuk memilih 69 siswa sebagai sampel penelitian. Kuesioner, pertanyaan esai dan dokumentasi digunakan untuk memperoleh data. Analisis regresi linier sederhana digunakan untuk menganalisis data dengan tingkat signifikansi 5%. Berdasarkan hasil pengolahan data, diperoleh rata-rata kepercayaan diri siswa sebesar 52,17% dengan kategori sedang. Rata-rata kemampuan pemecahan masalah matematis siswa juga berada pada kategori sedang yaitu sebesar 50,73%. Nilai signifikansi yang diperoleh sebesar 0,00 < 0,05 pada uji regresi linier sederhana. Kesimpulannya adalah kepercayaan diri berpengaruh terhadap kemampuan pemecahan masalah matematis siswa. Ditemukan bahwa kepercayaan diri memiliki pengaruh sebesar 76,2% terhadap kemampuan siswa dalam memecahkan masalah matematika, sedangkan 23,8% dipengaruhi oleh aspek lain.

Abstract

The aim of this research is to measure students' level of self-confidence, level of mathematical problem solving abilities, and whether self-confidence influences students' mathematical problem solving abilities at SMPN 1 Gending in class VIII. This research uses quantitative methods. Students of SMPN 1 Gending who are in class VIII are the population of this study. The simple random sampling method was used to select 69 students as research samples. Questionnaires, essay questions and documentation were used to obtain data. Simple linear regression analysis was used to analyze the data with a significance level of 5%. Based on the results of data processing, the average self-confidence was 52.17% in the medium category. The average for students' mathematical problem solving abilities is also in the medium category at 50.73%. The significance value obtained was 0.00 < 0.05 in the simple linear regression test. The conclusion is that self-confidence influences students' ability to solve mathematical problems. It was found that self-confidence had an influence of 76.2% on students' ability to solve mathematical problems, while 23.8% was influenced by other aspects.

INTRODUCTION

From elementary school, middle school, up to high school, mathematics has become one of the mandatory subjects taught. NCTM (2000:7) states that at least students must have standard mathematical abilities, including connection abilities, problem solving abilities, representation abilities, communication abilities and reasoning abilities. Students' ability to solve mathematical problems is an ability to explore and choose a method or approach solving problems through observing and observing the problem then trying and getting and checking the solution again (Fauziah et al., 2018). One way to achieve this ability is through mathematics subjects. According to (Simamora et al., 2018) students' ability to solve mathematical problems has become an element of high-level reasoning ability and is an important thing. The ability to solve problems Low mathematics is a form of problem that needs to be solved.

NCTM (2000: 52) states that while students are in the process of learning mathematics, it is hoped that these students can increase their new insights about mathematics by solving problems, resolving problems that arise by relating mathematics to other situations, and applying and adapting various appropriate plans to solve them. problems, reviewing and improving the process of solving mathematical problems. The importance of skills in solving problems was also expressed by (Nurhayati et al., 2016) that students are able to solve various scientific problems,

*Corresponding author.
E-mail addresses: Ahmadwafa@gmail.com

Tematik: *Jurnal Konten Pendidikan Matematika*
Vol. 2, No. 1, 2024, pp. 11-17

especially mathematical problems, as well as systematic, rational, critical and objective reasoning that is needed in real life. This is in accordance with the statement in Minister of National Education Regulation Number 22 of 2006 relating to one of the objectives of mathematics learning in Indonesia, namely that students are equipped with problem-solving abilities, including acquiring students' abilities in understanding problems, conceptualizing mathematical forms, as well as completing models and expressing solutions.

According to interviews with Gending Middle School mathematics teachers, practice questions and tests mostly use choice questions double in Learning Activities For makes assessment easier. Tasks that involve problems which involve students' problem solving abilities are only given occasionally. Matter this cause lack of implementation skills solution student problems, problem solving in the form of unconventional problems. Ability student for solving problems is not spared several factors, one of which is self-confidence. Stated that there are several things that have an influence on the results of students' abilities in solving mathematical problems including students' views on mathematics, students' attention, students' motivation, students' self-efficacy, students' self-confidence, and teacher attitudes and behavior.

According to (Rustan, E., & Bahru, 2018), one of the important things to obtain optimal learning outcomes is students' self-confidence when studying mathematics. Self-confidence is a mental or psychological state where a person can assess himself so that he can provide a strong sense of optimism to take action to achieve life goals (Sholiha & Aulia, 2020). The level of self-confidence has an impact on students' abilities when solving a mathematical problem. This can be seen in the findings of Fauziah, Maya & Fitrianna who found that self-confidence contributes to problem-solving skills and has a strong one-way relationship (Fauziah et al., 2018). This means that as students' level of self-confidence increases, their ability to solve problems will also increase.

During the learning process at SMPN 1 Gending, when the teacher asked students to answer the questions asked, only one or two children answered during the learning process. However, when asked to solve questions outside the learning process, namely by writing them in a book and then collecting them through photos, many were willing to send their answers. This means that quite a few students feel insecure about their abilities or do not have the courage to do so convey the answer for fear of being wrong.

Based on the application of abilities information Mathematical problem solving is still relatively low and students lack self-confidence during the learning process, so the author intends to carry out research on the influence of self-confidence on students' mathematical problem-solving abilities at SMPN 1 Gending.

METHOD

This type of research is research with ex post facto quantitative methods. It is known that quantitative research uses numbers more, starting from collecting data, interpreting data, to presenting the results, and in drawing conclusions it should be followed by tables, pictures, graphs, or other things (Sandu Siyoto dan Ali Sodik, 2015). According to Kerlinger (Ibrahim, et al, 2018) the ex post facto method is a systematic empirical study where the researcher does not control or manipulate the independent variables, because the existence of these variables is already ongoing or cannot be changed.

This research was carried out at SMPN 1 Gending which is on Jalan Setiaki, Dukuh, Sidomukti, Salatiga. The implementation of this research took place on the 16th - 23 August 2021. In this study the population was class VIII students at SMPN 1 Gending, consisting of 218 students and divided into 7 classes. The sample was obtained by applying a simple random sampling technique or in other words the sample was taken randomly from the population and did not look at the existing population strata. The Slovin formula (Rane, M. K. D., & Ridwan, 2019) used to obtain the sample size in this study is:

$$n = \frac{N}{1 + Ne^2}$$

n : the number of research samples

Tematik: *Jurnal Konten Pendidikan Matematika*
Vol. 2, No. 1, 2024, pp. **11-17**

N : large study population
e : tolerance limiterror response (10%)

It is known that the population is 218 students, so a sample of 69 students is obtained with the following calculations.

$$n = \frac{N}{1 + Ne^2}$$
$$= \frac{218}{1 + 218(0.1^2)} = 68.55 \approx 69$$

Questionnaires, tests and documentation were used to collect data for this research. Students' level of self-confidence is measured through questionnaires, and students' ability to solve mathematical problems is measured through tests. During the research process, documentation is required to collect relevant documents. Questionnaires or self-confidence questionnaires and description tests are the instruments used. The instrument has been validated by experts and has been tested for validity and reliability. A simple linear regression test was used in this research to find out whether self-confidence influences students' mathematical problem-solving abilities. Therefore, the equation formula used in the simple linear regression test is:

$\hat{Y}$= a + bX

Description of the equation:
Ŷ = dependent variable
X = independent variable
a =intercept
b = regression coefficient
(Hasan,2004). This research uses SPSS for calculation test regression linear simple.

RESULT AND DISCUSSION

The questionnaire used to measure the level of self-confidence consists of 26 items and has been tested for validity and reliability. The calculation of the range of self-confidence questionnaire instruments is:

- Maximum value = 26 x 4 = 104
- Minimum value = 26 x 1 = 26
- Difference in value = 104 – 26 = 78
- Number of categories = 3
- Value interval = 78 : 3 = 26

Percentage every category formula is used:

$$P = ^r \frac{X}{N} 100\%$$

Information:
P = Percentage F = Frequency
N = Number of respondents.
The results obtained in Table 1 are based on calculations.

Tabel 1. Level of Self-Confidence

		intervals		
NO	**Mark**	**Amount**	**Percentage**	**Note**
1	26-51	1	1.45%	Low
2	52-77	36	52.17%	Currently
3	78-104	32	46.38%	Tall

Tematik: *Jurnal Konten Pendidikan Matematika*
Vol. 2, No. 1, 2024, pp. 11-17

In Table 1 it can be seen that there is 1 student whose level of self-confidence is low with a percentage of 1.45%, there are 36 students whose level of self-confidence is moderate with a percentage of 52.17%, and 32 students whose level of self-confidence is high with a percentage of 46.38%. According to (Aprilia Afifah et al., 2022), students' levels of self-confidence vary due to influencing factors such as physical condition, self-concept, individual experience, family, school and community environment.

After going through validity and reliability tests, 5 essay test questions were obtained as a tool to measure the level of students' mathematical problem solving abilities. The range calculation for the mathematical problem solving ability test instrument is:

- Maximum value = 5 x 10 = 50
- Minimum value = 5 x 0 = 0
- Difference in value = 50 – 0 = 50
- Number of categories = 3
- Value interval = 50 : 3 = 16.67 ≈ 17

Percentage every category formula is used:

$$P =^{r} \frac{X}{N} 100\%$$

Information:
P = Percentage F = Frequency
N = Number of respondents.
The results obtained in Table 2 are based on calculations.

Tabel 2. Level of Solving Ability Math Problems

intervals				
NO	**Mark**	**Amount**	**Percentage**	**Note**
1	0-16	21	30.43%	Low
2	17-33	35	50.73%	Current
3	34-50	13	18.84%	Tall

In Table 2 it can be seen that as many as 21 students have low category problem solving abilities with a percentage of 30.43%, 35 students with medium category problem solving abilities with a percentage of 50.73%, and 13 students have high category problem solving abilities with a percentage of 18 .84%. It was found that the level of students' problem solving abilities was in the medium category, in line with the results of research by (Rianti, 2018) in class VIII of SMP Negeri 1 Leces which stated that the percentage of students' problem solving abilities was 61.11%. in the medium category. According to Pimta (Aldrin, et al., 2018) this is because there are a number of factor Which influence students' problem solving abilities including self-ability, trust self, concentration, motivation, students' attitudes towards mathematics, and teachers' attitudes and behavior. Study This apply indicators solution problem based on the stages according to Polya, namely: 1) the stage of understanding the problem, the indicator is that students state what information they already know and what problem is being asked about in the question; 2) developing stage plan the indicators are decisive draft solve problem; 3) the stage of realizing the indicator plans is implementing a settlement plan according to the concept and accurately calculating the settlement; 4) stage of checking the indicators again, students confirm the answer withrecheck the steps and results of the solution and write them down conclusion of the settlement results.

Analysis of the percentage of indicators in solving mathematical problems according to Polya for students used the formula:

$$Presentase = \frac{total\ skor\ setiap\ indikator}{total\ skor} \times 100\%$$

Tematik: *Jurnal Konten Pendidikan Matematika*
Vol. 2, No. 1, 2024, pp. **11-17**

Tabel 3. Percentage of Ability Indicators Mathematical Problem Solving

Intervals			
NO	**Mark**	**se**	**Percentage**
1	Understand problem	191	12.16%
2	Expandn plan-plan	332	21.13%
3	Carry out plans	664	42.27%
4	Inspect return	384	24.44%
	Total	1571	100%

Based on Table 3 seems like indicator First (understand problem) obtained 12.16% of the total overall score. At this stage, students have not written down what they know and are asked in the question, but immediately write down formulas or carry out calculations. Indicator second (develop plans) obtained 21.13% seen from several students who correctly wrote down the solution plan but it was not complete, or the solution plan was not relevant to the problem. The third indicator (implementing plans) obtained 42.27% where students were able to carry out the solution plan appropriately, even though there were things in the calculations that were not correct. The fourth indicator (checking back) got 24.44%. In the final stage, students re-examine and write conclusions even though they are inaccurate or even irrelevant to the problem.

SPSS assistance was used to process the data that had been obtained..The influence of students' self-confidence on their ability to solve mathematical problems can be determined through a simple linear regression test. The SPSS output from the simple linear regression test is shown in the following figure.

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-44,464	4,648		-9,566	,000
S.C	,874	,060	,873	14,643	,000
a. Dependent Variable: KPM					

Figure 1. Simple Linear Regression Output

Interpretation:

1) Unstandardized Coefficientsis value coefficient Which not standardized. Furthermore, in coefficient B there is a constant value, namely the Y value when then, these values are applied in the equation $\hat{Y} = a + bX$ or obtained Y = -44.464 + 0.874X. The equation has the following meanings: i) constant value (a) has a negative sign, namely -44.464, meaning that if students do not have self-confidence then students' mathematical problem solving abilities will decrease, ii) the value of the coefficient regression variableself-confidence (b) has a positive value of 0.874, which means that if the self-confidence score increases by 1, then ability student insolving mathematical problems will also experience an increase of 0.874.
2) The significance value obtained was 0.00 < 0.05, which indicates that variable X has an influence on variable Y or that students' ability to solve mathematical problems is influenced by self-confidence.
3) It is known tcount> ttablenamely 14,643 >1.996, then the conclusion is that the self-confidence variable (X) has an influence on the mathematical problem-solving ability variable (Y).

Tematik: *Jurnal Konten Pendidikan Matematika*
Vol. 2, No. 1, 2024, pp. 11-17

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,873[a]	,762	,758	5,353	2,089
a. Predictors: (Constant), SC					
b. Dependent Variable: KPM					

Figure 2. Determination Equation Test

Note:

1) The R number obtained is 0.873, which means that there is a correlation between the self-confidence variable and the mathematical problem-solving ability variable of 0.873. This reveals that there is a close relationship because the R value is close to 1.
2) R Squarenamely the determinant coefficient of 0.762 which means that self-confidence (independent variable) has an influence on students' ability to solve mathematical problems (dependent variable). Meanwhile, the other 23.8% was influenced by other aspects.
3) Standard Error of the Estimateis an estimation error with a significant value of 5.353error inestimates the value of mathematical problem solving ability at 5.353.

By observing the results of a simple linear regression analysis test, it was found that self-confidence has an impact on students' ability to solve mathematical problems. Every time an increase in value occurs in a student's self-confidence, this is followed by an increase in the student's ability to solve mathematical problems. Likewise, if a student's self-confidence decreases, their ability to solve mathematical problems also decreases.

This statement is supported by the significance value obtained at 0.00 < 0.05 and the Y regression equation is obtained = -44.464 + 0.874X. Apart from that, the R2 value was obtained, namely 0.762, which shows that self-confidence (variable The results of this study are also in line with a number of studies that have been conducted, one of which is by (Fauziah et al., 2018) which revealed that self-confidence influences 45.16% of mathematical problem solving abilities, while the remaining 54.84% influenced by other aspects. Apart from that, the findings of (Dewi et al., 2023) show that self-esteem, self-regulation and self-confidence have a significant effect on the ability of students in class VII in solving mathematical problems in algebra operations material at SMPN 1 Banyuanyar in the 2017/2018 academic year.

According to (Hanifah Ameliah & Munawaroh, 2016), self-confidence can make students more optimistic, ready when faced with various problems in the learning process, and able to solve problems by maximizing his abilities.It was concluded that if students have a high level of self-confidence then their problem solving abilities can increase.

CONCLUSION

Referring to the results and discussion of the research, it was concluded that there was a significant influence on self-confidence, namely 76.2% on mathematical problem solving abilities in class VIII students at SMPN 1 Gending in the 2021/2022 academic year. Students' mathematical problem solving abilities will increase if they have a high level of self-confidence. Conversely, if students have a low level of self-confidence, their mathematical problem solving abilities will decrease. The results of this research show that self-confidence influences the abilities of students at SMP N 1 Gending class VIII to solve mathematical problems in the 2021/2022 academic year.

Tematik: *Jurnal Konten Pendidikan Matematika*
Vol. 2, No. 1, 2024, pp. **11-17**

REFERENCES

Aldrin, E., Mairing, J. P., & Subagjo, A. (2018). *Pengaruh Kecerdasan Emosional Terhadap Kemampuan Berpikir Divergen Dalam Memecahkan Masalah Matematika Materi Statistika.*

Aprilia Afifah, Dewi Hamidah, & Irfan Burhani. (2022). STUDI KOMPARASI TINGKAT KEPERCAYAAN DIRI (SELF CONFIDENCE) SISWA ANTARA KELAS HOMOGEN DENGAN KELAS HETEROGEN DI SEKOLAH MENENGAH ATAS. *Happiness, Journal of Psychology and Islamic Science*, *3*(1). https://doi.org/10.30762/happiness.v3i1.352

Dewi, A. K., Zaenuri, Z., Walid, W., Sugiman, S., & Pujiastuti, E. (2023). PENGARUH KEPERCAYAAN DIRI TERHADAP KEMAMPUAN PEMECAHAN MASALAH MATEMATIS SISWA SMP N 7 SALATIGA. *JIPMat*, *8*(2). https://doi.org/10.26877/jipmat.v8i2.15577

Fauziah, R., Maya, R., & Fitrianna, A. Y. (2018). HUBUNGAN SELF CONFIDENCE TERHADAP KEMAMPUAN PEMECAHAN MASALAH MATEMATIS SISWA SMP. *JPMI (Jurnal Pembelajaran Matematika Inovatif)*, *1*(5). https://doi.org/10.22460/jpmi.v1i5.p881-886

Hanifah Ameliah, I., & Munawaroh, M. (2016). PENGARUH KEINGINTAHUAN DAN RASA PERCAYA DIRI SISWA TERHADAP HASIL BELAJAR MATEMATIKA KELAS VII MTs NEGERI I KOTA CIREBON. *Eduma : Mathematics Education Learning and Teaching*, *5*(1). https://doi.org/10.24235/eduma.v5i1.598

Ibrahim, A., Alang, A. H., Madi, B., & Ahmad, M. A. D. (2018). *Metodologi Penelitian*. Makassar: Gunadarma Ilmu.

Nurhayati, E., Mulyana, T., Avip, B., Martadiputra, P., Matematika, P., & Pascasarjana, S. (2016). Penerapan scaffolding untuk pencapaian kemampuan pemecahan masalah matematis. *Jurnal Penelitian Pendidikan Dan Pengajaran Matematika*, *2*(2).

Rane, M. K. D., & Ridwan, M. S. W. (2019). Pengaruh Kualitas Layanan, Biaya Pendidikan, dan Fasilitas Pendidikan Terhadap Keputusan Konsumen dengan Brand Image Sebagai Variabel Intervening dalam Memilih Program Studi pada Fakultas Ekonomi Universitas Kristen Artha Wacana Kupang. *Angewandte Chemie International Edition*, *6*(11).

Rianti, R. (2018). Profil kemampuan pemecahan masalah matematis siswa SMP pada materi bangun ruang sisi datar. *Jurnal Pendidikan Tambusai*, *2*(2), 802-812.

Rustan, E., & Bahru, M. S. (2018). Strengthening Self Confidence in Mathematics Learning through Suggestopedia Method. *Al-Khwarizmi: Jurnal Pendidikan Matematika Dan Ilmu Pengetahuan Alam*, *1*(6), 1–14.

Sandu Siyoto dan Ali Sodik. (2015). Dasar Metodologi Penelitian. *Literasi Media Publishing,*.

Sholiha, S., & Aulia, L. A.-A. (2020). Hubungan Self Concept dan Self Confidence. *Jurnal Psikologi : Jurnal Ilmiah Fakultas Psikologi Universitas Yudharta Pasuruan*, *7*(1). https://doi.org/10.35891/jip.v7i1.1954

Simamora, R. E., Saragih, S., & Hasratuddin, H. (2018). Improving Students' Mathematical Problem Solving Ability and Self-Efficacy through Guided Discovery Learning in Local Culture Context. *International Electronic Journal of Mathematics Education*, *14*(1). https://doi.org/10.12973/iejme/3966