

Correlation Between Learning Motivation and Problem-Solving Ability Based on Gender

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Article Info

Abstract

Keywords:

*Learning Motivation,
Problem Solving Ability,
Gender*

The purpose of this study is to determine the relationship between students' motivation to learn and their mathematical problem-solving abilities based on their gender. This study employs a quantitative method with a correlation survey approach to assess students' motivation and mathematical problem-solving abilities. It involves 73 students from Madrasah Tsanawiyah. The data analysis technique used in this study was the product-moment correlation test, which yielded a value of 0.001 for sig.(2-tailed). Means $0.001 < 0.05$, H_a is accepted, and H_0 is rejected based on male students. The value of sig. (2-tailed) is 0.003, meaning $0.003 < 0.05$, H_a is accepted, and H_0 is rejected based on female students. And the value of sig.(2-tailed) is 0.000, meaning $0.000 < 0.05$ then H_a is accepted, and H_0 is rejected. There is a significant positive correlation between learning motivation and mathematical problem-solving with a correlation coefficient value of 0.435 then the level of correlation between variables is a moderate correlation. The coefficient of determination test is $(0.435)^2 \times 100\% = 18.92\%$. This means that only 18.92% of the contribution of the independent variable, namely learning motivation, to the dependent variable, is the student's mathematics learning outcomes and other things influence 81.08%.

Kata kunci:

*Kemampuan Pemecahan
Masalah,
Motivasi Belajar,
Gender*

Abstrak

Tujuan penelitian ini adalah untuk mengetahui hubungan antara motivasi belajar siswa dengan kemampuan pemecahan masalah matematis berdasarkan jenis kelamin. Penelitian ini menggunakan metode kuantitatif dengan pendekatan survei korelasi untuk menilai motivasi dan kemampuan pemecahan masalah matematis siswa. Melibatkan 73 siswa Madrasah Tsanawiyah. Teknik analisis data yang digunakan dalam penelitian ini adalah uji korelasi product-moment yang menghasilkan nilai sig.(2-tailed) sebesar 0,001. Berarti $0,001 < 0,05$, H_a diterima, dan H_0 ditolak berdasarkan siswa laki-laki. Nilai sig. (2-tailed) adalah 0,003, artinya $0,003 < 0,05$, H_a diterima, dan H_0 ditolak berdasarkan siswa perempuan. Dan nilai sig.(2-tailed) adalah 0,000, artinya $0,000 < 0,05$ maka H_a diterima, dan H_0 ditolak. Terdapat hubungan positif yang signifikan antara motivasi belajar dengan pemecahan masalah matematis dengan nilai koefisien korelasi sebesar 0,435 maka tingkat korelasi antar variabel adalah korelasi sedang. Koefisien determinasi adalah $(0,435)^2 \times 100\% = 18,92\%$. Artinya hanya 18,92% kontribusi variabel bebas yaitu motivasi belajar terhadap variabel terikat adalah hasil belajar matematika siswa dan hal-hal lain yang mempengaruhi 81,08%.

INTRODUCTION

Math is an essential subject to master (Ojose, 2011; Kiemer et al., 2015). Students' ability to solve problems is one aspect of math competency expected of them (Kunter et al., 2015; Roza et al., 2015). In order to achieve success, students must learn how to select information, analyze it, and use problem-solving skills to make discoveries (Retnawati et al., 2018; Huda & Batholona, 2017). As students learn to select relevant information, analyze it, and examine results, they will gain intellectual satisfaction. Their intellectual potential will grow, and they'll learn to make discoveries by going through making. This is why problem-solving is an essential part of mathematics education in schools.

Learning mathematics is an essential aspect for students at school (Acharya, 2017; Mazana et al., 2019; Kloosterman, 2002). In line with what was formulated by the National Council of Teachers of Mathematics (Gattuso & Ottaviani, 2011), Remillard (2011) emphasizes problem-solving as the central focus of the mathematics curriculum. The importance of problem-solving is a vehicle for building higher-order thinking. Thus, problem-solving skills are not only a learning goal, but they are also motivated to work seriously to solve mathematical problems.

In addition to solving math problems, learning motivation is essential for students (Riswanto & Aryani, 2017; Rahardjo & Pertiwi, 2020). Their lack of ability does not cause underachieving students. But due to the lack of motivation, students do not try to move all their learning abilities. It is not uncommon. Teachers often fail to bring a good learning atmosphere due to the use of inappropriate learning methods. So that students who have low achievement are most likely due to the lack of encouragement or motivation. This is by the opinion of Deci & Ryan (2016), which state that learning outcomes are said to be optimal if there is the right motivation. Knowledge and understanding of students' learning motivation is beneficial for teachers to arouse, improve, and maintain students' enthusiasm about the importance of learning. Because no matter how enthusiastic the teacher is to teach students, the learning process will not materialize if learning motivation does not grow in students.

Contrary to popular belief, the reality on the ground is quite different. This is based on teacher observations of the learning process in mathematics, which show that teachers only look for easy ways to provide lessons and tend not to focus on the competencies held by their students when pursuing each subject. They also show students examples of problems before giving them questions that correspond to the example. Teachers believe that this will help students improve their skills. Students may lose interest in learning mathematics if the teaching style is repetitive and teacher-dominated. Students will be disinterested in class because they are bored. So that students lack the desire to learn what their teachers are teaching them. In terms of learning activities, motivation plays a significant role in fostering interest in learning and non-intellectual psychological factors. A smart student can fail due to a lack of desire to learn on the part of the student.

METHODS

This type of research is a quantitative research using a survey method with a correlational approach. This method was chosen to obtain data from a certain place to determine the correlation between variables. This study wants to see the correlation between learning motivation and students' mathematical problem-solving abilities based on gender. The subjects selected in this research were 73 students of class VIII at MTs Sibuhuan. The instruments used in the research are surveys and tests. Survey uses a Likert scale to measure attitudes by asking some questions to respondents by choosing the answers that have been provided. The test gives a set of questions to obtain data on mathematical problem-solving abilities.

Meanwhile, descriptive analysis is used for the data analysis technique, namely analyzing data by describing the data that has been collected. Data processing is done by determining the size of data concentration and distribution. The determination of the mean, maximum value, minimum

value, the standard deviation was carried out with the help of IBM SPSS Statistics v. 20 for Windows on descriptive statistics table.

The next step is to test the hypothesis in this study using correlation analysis with the product-moment correlation test, the correlation coefficient significance test, and the coefficient of determination test. Correlation analysis with the aim of knowing the correlation and the significance of the correlation between variables.

- Ho : $\rho \leq 0$: there is no correlation between learning motivation and students' mathematical problem-solving abilities in terms of gender
 Ha : $\rho > 0$: there is a correlation between learning motivation and students' mathematical problem-solving abilities in terms of gender

The product-moment correlation formula is as follows:

$$r_{xy} = \frac{N \sum_{xy} - (\sum_x)(\sum_y)}{\sqrt{\{N \sum x^2 - (\sum x)^2\} \{N \sum y^2 - (\sum y)^2\}}}$$

Note:

- r_{xy} = The correlation coefficient between item scores (X) and the total score (Y)
 N = Number of subjects
 X = Item score or statement item score
 Y = Total score

Product moment correlation test in this study using the help of IBM SPSS Statistics v.20 for windows in the correlation table. The basis for making decisions on correlation tests are:

1. If the value of sig. (2-tailed) < 0.05, then Ha is accepted and Ho is rejected. If the value of sig. (2-tailed) > 0.05, then Ho is accepted, and Ha is rejected.
2. If the value of r arithmetic (Pearson Correlations) > r table Ha is accepted and Ho is rejected. If the value of rcount (Pearson Correlations) < rtable, then Ho is accepted and Ha is rejected.

To determine the level of correlation between learning motivation variables and students' mathematical problem solving abilities, the r_{xy} value obtained can be classified according to the following Guilford criteria (in Lestari & Yudhadhanegara, 2019):

Table 1. Interpretation Validity

Correlation coefficient	Interpretation Validity
$0,00 < r < 0,20$	Very weak correlation
$0,20 \leq r < 0,40$	weak correlation
$0,40 \leq r_{xy} < 0,70$	Moderate correlation
$0,70 \leq r < 0,90$	strong correlation
$0,90 \leq r \leq 1,00$	Very strong correlation

The t-test is a statistical test used to test the truth or falsity. In this study, the researcher conducted a significant test of the correlation coefficient with the t-test at a significance level of 0.05 with the following formula:

$$t_{\text{Count}} = \frac{r \sqrt{n-2}}{\sqrt{1-r^2}}$$

Note:

- t_{Count} = Value of t
 r = Correlation Coefficient Value
 n = Number of Samples

After getting the t_{count} value, then in consultation with the t_{table} value, the determination of the t-test criteria is as follows:

- If $t_{\text{Count}} > t_{\text{table}}$, there is no a significant correlation between learning motivation and students' mathematical problem-solving ability
 If $t_{\text{Count}} < t_{\text{table}}$, there is a significant correlation between learning motivation and students' mathematical problem solving abilities

To measure how much the independent variable contributes to the dependent variable, it can be determined by the coefficient of determination (D) with the following formula:

$$D = r^2 \times 100\%$$

Note:

D = Determination

r = Correlation coefficient value.

However, before statistically processing and analyzing the data with these steps, a transformation of the Method of Success Interval was carried out.

FINDINGS AND DISCUSSION

The results of the analysis of data descriptions on 73 students at MTs Negeri Sibuhuan using the help of IBM SPSS Statistics v. 20 for Windows are in the following table:

Table 2. Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
MB	73	35075	39357	74432	54497.00	8176.191	66850105.528
HB	73	63	37	100	72.16	13.631	185.806
Valid N (listwise)	73						

The next step is to test the hypothesis using the product-moment correlation test using the help of IBM SPSS Statistics v.20 for windows in the table

The Correlation of Students' Mathematics Learning Outcomes with Mathematics Learning Motivation Based on Male Students

Table 3. Correlation Results Based on Male Students

Correlation	r_{count}	r_{table}	Sig.(2-tailed)
XY	0,529	0,325	0,001

It can be seen that the value of sig.(2-tailed) is $0.001 < 0.05$, $r_{\text{count}} (0.529) > r_{\text{table}} (0.325)$, with the value of $t_{\text{count}} (4.347) > t_{\text{table}} (2.030)$ then there is a significant correlation between learning motivation and students' mathematical problem-solving abilities at Mts Negeri Sibuhuan. The correlation coefficient value is 0.529, then the level of correlation between variables is a moderate correlation. By testing the coefficient of determination is $(0.529)^2 \times 100\% = 27.99\%$. This means that only 27.98% of the contribution of the independent variable is learning motivation on the dependent variable, namely the students' mathematical problem-solving ability, and 72.01% is influenced by other things based on male students. It is in line with research findings by Sagala (2019). That

research found differences in understanding the concept between male and female students where male students are higher than female students.

Correlation of Students' Mathematics Learning Outcomes with Mathematics Learning Motivation Based on Female Students

Table 4. Correlation Results Based on Female Students

Correlation	r _{count}	r _{table}	Sig.(2-tailed)
XY	0,480	0,329	0,003

It can be seen that the value of sig.(2-tailed) is $0.003 < 0.05$, $r_{count} (0.480) > r_{table} (0.329)$, with $t_{count} (3.637) > t_{table} (2.032)$ then there is a significant correlation between students' learning motivation and the mathematical problem-solving ability of female students of class VIII MTs Negeri Sibuhuan. The correlation coefficient value is 0.480, then the level of correlation between variables is a moderate correlation. The coefficient of determination test is $(480)^2 \times 100\% = 23.04\%$. This means that only 23.04% of the independent variables contribute, namely learning motivation to the dependent variable, namely students' mathematics learning outcomes and 76.96% is influenced by other things based on female students.

The Correlation of Students' Mathematics Learning Outcomes with Mathematics Learning Motivation Based on Gender

Table 5. Correlation Results Based on Gender

Correlation	r _{count}	r _{table}	Sig.(2-tailed)
XY	0,435	0,235	0,000

It can be seen that the value of sig.(2-tailed) is $0.000 < 0.05$, $r_{count} (0.435) > r_{table} (0.235)$, with the value of $t_{count} (4.520) > t_{table} (1.993)$ then there is a correlation There is a significant positive correlation between learning motivation and mathematical problem-solving ability in class VIII MTs Negeri Sibuhuan when viewed by gender. With a correlation coefficient value of 0.435, the level of correlation between variables is a moderate correlation. The coefficient of determination test is $(0.435)^2 \times 100\% = 18.92\%$. This means that only 18.92% of the contribution of the independent variable is learning motivation on the dependent variable, namely students' mathematics learning outcomes, and 81.08% is influenced by other things based on male students and female students.

From the table of SPSS results can be seen in sig. (2-tailed) obtained a value of 0.001. Means $0.001 < 0.05$ then H_a is accepted and H_0 is rejected based on male students. The value of sig.(2-tailed) is 0.003, meaning $0.003 < 0.05$, H_a is accepted, and H_0 is rejected based on female students. And the value of sig.(2-tailed) is 0.000, meaning $0.000 < 0.05$ then H_a is accepted, and H_0 is rejected based on gender. Students' ability to solve mathematical problems improves in direct proportion to their level of motivation in the classroom. Some studies came up with different conclusions. According to Bal-Tastan (2018), the gender gap in science education was insignificant, but the nationality gap was significant. When it comes to motivational beliefs about science, gender and grade level play a significant role, according to research by Liou (2021).

CONCLUSION

The correlation between students' learning motivation and mathematical problem-solving ability was examined based on gender using a sample of 73 students. The correlation coefficient (r)

based on male is 0.529, which is positive. This implies a one-way relationship: the greater the student's motivation to learn, the greater the student's mathematics learning outcomes. With t arithmetic (4,347) > t table (2,030), there is a significant correlation between male students in class VIII MTs Negeri Sibuhuan's motivation to learn and mathematical problem-solving ability. The correlation coefficient (r) value based on female students is 0.480 which is positive. This means that there is a unidirectional correlation, the better the students' learning motivation, the more students' mathematical problem-solving abilities will increase. With the value of t arithmetic (3.637) > t table (2.032) so that there is a correlation between learning motivation and mathematical problem-solving ability of students at Mts Negeri Sibuhuan in class VIII female students. then the value of the correlation coefficient (r) based on gender class VIII MTs Negeri Sibuhuan is 0.435 which is positive. This means that there is a unidirectional correlation. The better the students' learning motivation, the more students' mathematical problem-solving abilities will increase. With the value of t arithmetic (4,520) > t table (1,993) so that there is a correlation between learning motivation and students' mathematical problem-solving abilities in terms of gender. With the coefficient of determination test, it is obtained $(0.529)^2 \times 100\% = 27.99\%$ contribution of learning motivation to male students' mathematics learning outcomes, $(0.480)^2 \times 100\% = 23.04\%$ contribution of learning motivation to students' mathematical problem-solving abilities female, and $(0.435)^2 \times 100\% = 18.92\%$ contribution of learning motivation to students' mathematics learning outcomes based on gender.

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