(JIML) JOURNAL OF INNOVATIVE MATHEMATICS LEARNING
Volume 8, No. 3, September 2025
P-ISSN 2621-4733
E-ISSN 2621-4741
https://dx.doi.org/10.22460/jiml.v8i3.p27600

IS LEARNING MOTIVATION CAN AFFECT STUDENTS' PROBLEM-SOLVING SKILLS IN JUNIOR HIGH SCHOOL? A CORRELATION STUDY

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ARTICLE INFO

Article history:

Received May 28, 2025
Revised Jun 10, 2025
Accepted Jun 21, 2025

Keywords:

Problem-Solving Skills
Motivation
Correlation Study
Junior High School

ABSTRACT

Problem solving refers to the process of finding ways to overcome challenges in order to achieve specific goals. In mathematics learning, problem-solving skills must be instilled from an early stage so that students are trained to solve both mathematical problems and real-life challenges. According to Polya, the steps in problem solving include understanding the problem, devising a solution strategy, implementing the strategy, and evaluating the results. Learning motivation is an internal and external drive that encourages students to enjoy and engage enthusiastically in the learning process. This motivation helps students attain optimal academic performance, as strong motivation during learning is likely to produce better outcomes. In other words, individuals with strong motivation tend to achieve better academic results. The purpose of this study is to analyze the correlation between students' learning motivation and their mathematical problem-solving skills at the junior high school level. The participants in this study were 24 students from class VIII.I at SMP Krida Utama Padalarang. The research method used was correlational analysis. Data were collected using a learning motivation questionnaire consisting of 10 positive and 10 negative statements, along with a mathematical problem-solving test on flat-sided solid shapes comprising four essay questions. The results of the study indicate a significant and strong correlation between learning motivation and mathematical problem-solving skills among junior high school students. Regression analysis shows a positive relationship in which higher learning motivation leads to greater problem-solving skills. These research findings provide insights for teachers and researchers to recognize the importance of learning motivation as a key factor in enhancing students' problem-solving skills.

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How to Cite:

Quini, I., F., Latifah, A. G., & Aripin, U. (2025). Is Learning Motivation Can Affect Students' Problem-Solving Skills in Junior High School? A Correlation Study. *JIML, 8*(3), 564-572.

INTRODUCTION

Every educational level consistently offers mathematics since it is essential to human existence and the advancement of other sciences in a variety of fields and everyday situations. According

Fitrianty et al. (2022), as well as Astuti et a*l*. (2020), symbols and abstract concepts are inherent parts of mathematics. Moreover, learning mathematics helps develop human thinking skills by engaging individuals in solving mathematical problems, a skill cultivated through ideas acquired during the mathematics learning process from elementary to high school (Fitrianty et al., 2022).

Mathematics encompasses all aspects of the cognitive domain. Therefore, mathematics education expects students to attain a high level of cognitive skills (Angriani et al., 2018). These include understanding mathematical concepts, solving problems, reasoning, making mathematical connections, and communicating mathematically. One of the most crucial aspects of teaching mathematics is evaluating students' problem-solving skills.

According to the National Council of Teachers of Mathematics (NCTM) (Angriani et al., 2018) problem solving is a critical element in mathematics instruction and should be the central focus of the mathematics curriculum. It is a key competency that students must master, serving as a means to apply their mathematical knowledge (Lukman et al., 2023). Similarly, Fitria et al. (Fitrianty et al., 2022) emphasize that problem solving in mathematics must be developed through consistent practice, encouraging students to solve both mathematical and real-life problems. The NCTM designates problem solving as the core focus of mathematics learning.

Problem solving refers to the effort to overcome difficulties in order to achieve specific goals. Mastery of problem-solving skills enables students to understand concepts and principles more deeply and enhances their skills to solve mathematical problems effectively (Fitrianty et al., 2022). According to Polya (Prastiwi & Nurita, 2018), the steps in problem solving are as follows: (1) understand the problem; (2) devise a plan; (3) carry out the plan; and (4) review the results obtained.

The truth is that many Indonesian students still lack the skills to solve mathematical problems, which is a major objective of mathematics education. The 2018 PISA (Program for International Student Assessment) exam results clearly show that Indonesian pupils have poor problem-solving skills. This assessment measured students' skills in science, reading, and mathematics. The results showed a decline in students' mathematical problem-solving skills compared to previous years, placing Indonesia in a very low category in this domain (Rambe & Afri, 2020). further indicates that Indonesia scored an average of 386 in 2015, which decreased to 379 in 2018 (Tohir, 2019). In that year, Indonesia ranked 73rd out of 79 participating countries (Tohir, 2019).

One of the contributing factors to the low mathematical problem-solving skills is student motivation (Agsya et al., 2019). Motivation is a key component in the learning process, playing a vital role in fostering enthusiasm and persistence (Andriani & Rasto, 2019). Given its importance, teachers must make every effort to ensure that students are motivated to learn. Learning motivation is one of the essential keys to achieving educational goals (Fernando et al., 2024).

Learning motivation refers to the internal and external drive that encourages students to feel engaged and enthusiastic during the learning process, thereby enhancing their academic achievement (Nurrawi et al., 2023). Strong motivation during learning often leads to better outcomes. In other words, consistent effort supported by strong motivation results in improved academic performance. The intensity of students' motivation plays a crucial role in determining their learning success (Rahman, 2021).

According to Herman *(*Yulianto et al., 2022) students who possess learning motivation exhibit the following characteristics: (1) a tendency to engage in challenging tasks that are within their capskills; (2) a desire to work independently and find solutions on their own; (3) ambition to

grow and achieve better outcomes than before; (4) a future-oriented mindset, where learning is seen as a step toward achieving goals; and (5) perseverance and consistency in completing tasks (Nurrawi et al., 2023).

Analyzing the correlation between problem-solving skills and learning motivation in mathematics education is crucial and essential in light of these findings. Additionally, this study is essential for assessing the correlation between students' mathematical problem-solving skills and learning motivation. Teachers will be able to create more successful teaching methods and raise students' academic performance with a deeper comprehension of this correlation.

Several studies have been conducted on problem-solving skills. In a study by Rahim et al. (2022) based on research conducted in a ninth-grade class, it was concluded that students with very high motivation, indicated by their enthusiasm for exploring and solving problems, were able to correctly solve science-physics problems in accordance with the steps of problem solving. In another study by Pradita et al (2025) Based on the results of data analysis, there is a correlation between learning motivation and students' mathematical problem-solving skills when viewed from learning styles at SMPN 2 Mataram. The correlation value between problem-solving skills and learning motivation, however, was 0.069, indicating a very poor association. Meanwhile, research by Mulyana & Fitrianna (2019) concluded that the correlation between learning motivation and the problem-solving skills of junior high school students was not statistically significant and was categorized as low. Additionally, the effect of learning motivation on mathematical problem-solving skills was found to be only 12.18%, with the remaining 87.82% influenced by other factors. Despite these results, research explicitly examining the correlation between mathematical problem-solving skills and learning desire is still lacking. The purpose of this study was to investigate the correlation between students' learning motivation and their mathematical problem-solving skills among junior high school students. Therefore, this study is entitled "Is Learning Motivation Can Affect Students' Problem-Solving Skills In Junior High School? A Correlation Study".

METHOD

The research methodology employed in this study is correlational research. The primary aim of correlational research is to identify the correlation and the degree of correlation between two or more variables. Specifically, this study employs correlation analysis to investigate the correlation between variables. The Pearson correlation test is applied to determine whether the study's data are normally distributed. This research adopts Galton's Fancy Theory to analyze the correlation between the two quantitative variables (Mulyana & Fitrianna, 2019). The data were analyzed using SPSS version 23 to determine the correlation between students' mathematical problem-solving skills and their learning motivation. The participants in this study consisted of twenty-four eighth-grade students from Krida Utama Padalarang Junior High School. Data were collected using a learning motivation questionnaire, which included ten positive and ten negative items, and a mathematical problem-solving test consisting of four descriptive questions on flat-sided three-dimensional shapes.

The coefficient of determination is calculated after the Pearson correlation test has been conducted. The coefficient of determination represents the percentage of variance in the dependent variable that can be explained by the independent variable. It is denoted by r^2 the square of the correlation coefficient, and is defined as the ratio of the variability of the predicted outcomes to the total variability in the original data. The purpose of this calculation is to determine the extent to which learning motivation affects students' mathematical problem-solving skills. Based on the findings of the study, it can be concluded that there is a significant and strong correlation between junior high school students' mathematical problem-solving

skills and their learning motivation. This indicates that, although other factors also influence the remaining variance, learning motivation contributes to improving students' problem-solving abilities.

The interpretation table by Sugiyono (2007), which includes the following r-value categories, can be used to determine the degree of correlation:

Table 1. Correlation Interpretation

Coefficient Interval	Correlation Level
0,00 – 0,199	Very Low
0,20 – 0,399	Low
0,40 – 0,599	Medium
0,60 – 0,799	Strong
0,80 – 1,000	Very Strong

The coefficient of determination (CD) test was used to determine the extent to which the learning motivation variable influences mathematical problem-solving skills, using the following formula:

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

Additionally, a significance test (t-test) was conducted to determine whether learning motivation and problem-solving skills are significantly correlated. A simple regression analysis was then performed following the correlational study. According to Sugiyono (Lestari et al., 2022) Simple linear regression analysis is used to predict the value of the dependent variable based on the known value of the independent variable and to examine the extent to which variations in the dependent variable (Y) can be explained by the independent variable (X). In this study, simple linear regression analysis was applied to determine the effect of learning motivation on students' mathematical problem-solving skills.

RESULTS AND DISCUSSION

Results

As shown in Table 2, which presents the following descriptive statistics, a statistical summary is provided to facilitate the interpretation of data on problem-solving skills and learning motivation.

Table.2 Descriptive Statistics

	N	Minimum	Maximum	Mean
problem-solving skills	24	80	97	88,63
learning motivation	24	70	79	74,13
valid N (listwise)	24			

a. Normality Test

Based on the significance value, normality is determined as follows: the data are considered normally distributed if the significance value is greater than 0.05, and not normally distributed if it is less than 0.05. In this study, the normality test was conducted using the Shapiro-Wilk method with the assistance of SPSS software, focusing on two variables: mathematical problem-solving skills and learning motivation. The following table shows the test results:

Table.3 Normality Test

Shapiro-Wilk		
Statistics	Df	Sig.
,947	24	,236
,941	24	,169
Output SPSS 23		

Table 3 shows that the significance value for learning motivation is 0.169, and for mathematical problem-solving skills, it is 0.236. Since both significance values are greater than 0.05 (sig > 0.05), it can be concluded that the sample data are drawn from a normally distributed population.

b. Pearson correlation test

The Pearson correlation test was used to conduct the correlation analysis because the data met the criteria and were normally distributed. The purpose of this test is to determine the strength of the correlation between learning motivation and mathematical problem-solving skills. The significance value is used to interpret the correlation: if the significance value is less than 0.05, the two variables have a significant correlation; if it is greater than 0.05, they do not. The following table presents the results of the Pearson correlation test, which was performed with the assistance of SPSS:

Table.4 Pearson Correlation Test

Correlation			
problem-solving skills	Correlation Coefficient	1,000	,720**
learning motivation	Correlation Coefficient	,720**	1,000
Output SPSS 23			

A correlation coefficient (r) of 0.720 was obtained, as shown in Table 4. According to Table 1, this value indicates a high correlation between learning motivation and mathematical problem-solving skills.

c. Determining the Coefficient of Determination (Coefficient of Determination (CD))

According to the computation results, the coefficient of determination is 51.9%, which means that learning motivation accounts for 51.9% of the variance in students' mathematical problem-solving skills, while the remaining 48.1% is influenced by other factors not examined in this study. Significance test SPSS software was used to conduct this test, and the results are presented in the table below:

Table.5 Significance Test

Coefficients[a]		
Model	t	sig
(Constan)	5,309	0,000
Problem-Solving Skills	4,869	0,000

The significance value, as determined by the t-test results, is 0.000 (sig < 0.05), indicating that the null hypothesis is rejected and the alternative hypothesis is accepted. This suggests that students' learning motivation and their mathematical problem-solving skills are significantly

correlated. Thus, it can be concluded that there is a strong correlation between junior high school students' motivation to learn and their ability to solve mathematical problems.

d. Simple Linear Regression Analysis Test

The calculation of the simple regression analysis was carried out with the assistance of the SPSS version 23 program. Based on the results, the simple regression equation for the effect of learning motivation on mathematical problem-solving skills is as follows:

Y = 38,693 + 0,400 X

The following is an interpretation of this regression equation: a) The constant a = 38,693 indicates that a student's predicted value of mathematical problem-solving skills (Y) is 38.693 if their learning motivation (X) is 0; b) The regression coefficient for X is 0.400, which means that mathematical problem-solving skills increase by 0,400 units for every one-unit increase in learning motivation.

Since the coefficient is positive, it can be concluded that learning motivation and problem-solving skills are positively correlated, suggesting that the more motivated a student is to learn, the more proficient they are at solving problems. Consequently, it can be inferred that variable X affects variable Y.

Discussions

Learning motivation and mathematical problem-solving skills are significantly correlated, according to the results of the correlation and significance tests. The Pearson correlation test was used because the study data were normally distributed. Using an interval or ratio scale, this test determines the direction and strength of the correlation between two variables. Consequently, a correlation coefficient interpretation table was used to interpret the strength of the correlation. The results of this study showed that there is a high correlation between the two variables.

The coefficient of determination was then calculated after the Pearson correlation test was completed. The coefficient of determination represents the percentage of the variance in the dependent variable that can be explained by the independent variable. It is denoted by r^2, the square of the correlation coefficient, and is defined as the ratio of the explained variability to the total variability in the original data. The purpose of this calculation is to determine the extent to which learning motivation affects students' mathematical problem-solving skills. The results of this study led to the conclusion that junior high school students' mathematical problem-solving skills and learning motivation are significantly and strongly correlated. This suggests that although other factors contribute to the remaining variation, learning motivation plays a role in enhancing problem-solving skills.

Accordingly, Rigusti & Pujiastuti (2020) state that several indicators can be used to assess students' mathematical problem-solving skills, including their ability to understand the problem, formulate appropriate solutions, implement strategies effectively, and evaluate the actions taken throughout the problem-solving process. Furthermore, according to (Hasanah & Firmansyah (2022) Two main components influence students' success in mathematical problem-solving skills. The first is internal factors, which originate from within the students themselves, including prior knowledge, level of intelligence, learning motivation, study habits, and other related aspects. External factors that influence students originate from sources outside the individual, such as the family environment, school environment, community environment, and others. Meanwhile, motivation plays a crucial role in encouraging individuals to actively engage in and participate in an activity or program.

Based on the previous explanation, external factors such as the family environment and internal factors such as learning motivation influence students' mathematical problem-solving skills. These findings indicate that learning motivation plays a significant role in enhancing these skills. The correlation between the two variables is strong and positively significant. On the other hand, students who lack motivation to learn typically struggle to solve mathematical problems. Learning motivation is one of the main factors that encourages students to be more engaged, diligent, and confident when facing challenges in mathematics education.

Accordingly, a study by Harefa (2018) found a strong correlation between students' motivation to learn and their problem-solving abilities when working with thermochemical material in a practicum setting. Similarly, Sukendra & Yuliastini (2019) found that the mathematics learning outcomes of 11th graders at SMA Negeri 1 Denpasar during the 2018–2019 school year showed a simultaneous association among students' problem-solving skills, parental education level, and motivation to learn. Additionally, Mirnawati et al. (2021) demonstrated a significant correlation between students' mathematical problem-solving skills and learning motivation, suggesting that learning motivation may be an influential factor. Furthermore, the findings of a study by Lestari et al. (2022) also, show a strong correlation between mathematical problem-solving skills and students' motivation to learn.

According to the study's findings, junior high school students' mathematical problem-solving skills are significantly and strongly correlated with their motivation to learn. Learning motivation has a significant impact on problem-solving abilities. However, other factors also play a role besides learning motivation. Problem-solving skills may be influenced by additional variables, such as the learning environment, students' prior knowledge of mathematics, and various other factors. These aspects require further investigation in future studies.

CONCLUSION

According to the study's findings, junior high school students' motivation to learn and their mathematical problem-solving skills are significantly and strongly correlated. The regression analysis shows a positive relationship between motivation and problem-solving skills, indicating that higher motivation leads to better problem-solving skills. Learning motivation makes a significant contribution and has a considerable impact on problem-solving skills. However, it is not the only factor that influences these skills. Other factors may also play a role, including the learning environment, students' prior mathematical knowledge, and other related variables. Future studies should investigate these factors in greater detail.

Based on the above conclusion, the researcher suggests that students should continuously enhance their motivation to learn mathematics to practice and develop their problem-solving skills. For teachers, it is expected that they consistently motivate to encourage students to actively improve these skills, as well as create learning environments that allow students to gain experience in solving problems using various strategies. Furthermore, future researchers are advised to consider using different materials or incorporating additional variables in their studies.

ACKNOWLEDGMENTS

The authors would like to thank Allah SWT, who has helped us create this article. They would also like to thank the mathematics study program of IKIP Siliwangi, which has made the course of writing scientific articles possible. The authors also thank the SMP Krida Utama Padalarang school for giving permission to the authors to conduct this research, as well as to the students who have been willing to fill in the instruments for us to analyze. Thank you to the research partners who were willing to work together to complete this research.

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