

The Influence Of Learning Motivation And Learning Discipline On Students' Mathematics Learning Outcomes At SMP Muhammadiyah Al-Kautsar

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Abstract

Low mathematics learning outcomes among junior high school (SMP) students are clearly linked to suboptimal learning motivation and discipline. This study aimed to analyze the effect of learning motivation and learning discipline on students' mathematics learning outcomes, both partially and simultaneously. A quantitative ex post facto approach was employed, involving 34 eighth-grade students of SMP Muhammadiyah Al-Kautsar PK Kartasura selected through purposive sampling. Data on motivation and discipline were collected using questionnaires, while learning outcome data were obtained from documented scores. The data were analyzed using multiple linear regression with SPSS. The results showed that learning motivation had no significant effect on mathematics learning outcomes ($t = 0.276$; $\text{Sig.} = 0.785$), whereas learning discipline had a significant effect ($t = 2.954$; $\text{Sig.} = 0.006$). Simultaneously, motivation and discipline significantly affected mathematics learning outcomes ($F = 8.194$; $\text{Sig.} = 0.001$), contributing 34.6% ($R^2 = 0.346$). These findings confirm that learning discipline has a more dominant influence than learning motivation at the junior high school level.

Keywords : Learning discipline; Learning motivation; Mathematics learning outcomes; Multiple linear regression



INTRODUCTION

Mathematics education plays a strategic role in developing students' logical, systematic, and problem-solving thinking skills (Isdayanti & Aprilia, 2022). However, Indonesian students' mathematics learning outcomes are generally still relatively low. Data from the Indonesian Education Profile shows that students' numeracy skills remain below expected competencies, thus strengthening the quality of mathematics learning continues to be a government concern (Ministry of Education, Culture, Research, and Technology, 2022). Various studies have identified learning motivation and learning discipline as the two internal factors most frequently associated with students' mathematics learning outcomes (Isdayanti & Aprilia, 2022; Jamilah et al., 2024).

In this study, mathematics learning outcomes were measured using test scores on the topic of systems of linear equations with two variables. This topic was selected because it requires students to understand mathematical concepts and solve problems through systematic steps. In line with this, Abdullah et al. (2025) explained that solving problems involving systems of linear equations in two variables requires mathematical problem-solving skills supported by a solid conceptual understanding. Furthermore, the study was conducted while the eighth-grade students were studying this topic, ensuring that mathematics learning outcome data were obtained from assessments on the same material for all students. Therefore, students' scores on the topic were considered to provide a valid representation of their mathematics learning outcomes in accordance with the research objectives.

Learning motivation plays an important role in supporting students' success in mathematics learning. Motivation serves as a driving force that encourages students to be active, persistent, and consistent in participating in learning activities and striving to achieve their learning goals. Students who are motivated to learn tend to be more persistent in facing difficulties and make efforts to understand the mathematical concepts being studied (Habibullah et al., 2022; Riki & Kusno, 2023). In addition to motivation, learning discipline also plays an important role in supporting the learning process. Learning discipline is related to students' ability to manage their time, follow rules, complete assignments, and fulfill their academic responsibilities consistently (Salsabila et al., 2024; Zurahmah & Isnaniah, 2023). Thus, motivation provides students with the drive to learn, while discipline helps establish regularity and consistency in carrying out learning activities. Both factors are important in mathematics learning because understanding concepts and solving problems require effort, persistence, and well-organized learning habits.



Studies over the past five years have shown inconsistent results regarding the roles of learning motivation and learning discipline. Jamilah et al., (2024) found that learning discipline and motivation both had significant effects, both partially and simultaneously, on mathematics learning outcomes in elementary school students. This contrasts with Kartika et al. (2024) who reported that learning motivation and discipline had significant partial effects, but their effects were not significant when tested simultaneously. Hidayatullah & Csíkos (2024) also emphasized the role of learning motivation in mathematics achievement across countries, while Zurahmah & Isnaniah (2023) and Rusmini et al. (2024) emphasized the dominance of learning discipline over learning motivation. These differences in findings indicate that the strength of the influence of learning motivation and discipline on mathematics learning outcomes is contextual, depending on the level of education, student characteristics, and school environment.

This gap provides an important basis for re-examining the influence of motivation and learning discipline in the context of a relatively rarely researched religious-based junior high school, namely Muhammadiyah Al-Kautsar PK Kartasura Junior High School. Preliminary observations conducted by the researcher indicated that students' engagement in mathematics learning and their punctuality in submitting assignments could still be further improved, and that mathematics was generally perceived as a difficult subject. These conditions are theoretically associated with lower levels of learning motivation and learning discipline. However, the extent to which these factors influence mathematics learning outcomes in this particular context has not yet been empirically examined.

The novelty of this research lies in testing the influence of motivation and learning discipline partially and simultaneously at the junior high school level in the context of Muhammadiyah-based private schools, which enriches empirical evidence outside the context of elementary schools and public schools that have been more researched previously. Based on this description, this research is formulated to answer three questions, namely whether learning motivation influences students' mathematics learning outcomes, whether learning discipline influences students' mathematics learning outcomes, and whether motivation and learning discipline simultaneously influence students' mathematics learning outcomes. This research aims to analyze the influence of learning motivation and learning discipline on students' mathematics learning outcomes at Muhammadiyah Al-Kautsar Junior High School, both partially and simultaneously, so that it can provide practical recommendations for teachers and schools in efforts to improve mathematics learning outcomes.



RESEARCH METHODS

This study employed a quantitative approach with an ex post facto non-experimental design, as the data were analyzed without any treatment given to the research variables. A survey method was used to collect data on learning motivation and discipline through questionnaires, while data on mathematics learning outcomes were obtained through documentation of students' daily test scores and semester exams. The study was conducted at Muhammadiyah Al-Kautsar PK Kartasura Junior High School, Sukoharjo Regency, in the odd semester of the 2025/2026 academic year.

The study population was all 116 eighth-grade students of Muhammadiyah Al-Kautsar PK Kartasura Junior High School. The study sample was 34 students selected using a purposive sampling technique, namely one study group that met the criteria and obtained permission to be research subjects Sugiyono (2022) The study variables consisted of two independent variables, namely learning motivation (X1) and learning discipline (X2), and one dependent variable, namely mathematics learning outcomes (Y).

Operational definitions of variables are formulated to ensure clear meaning and avoid differences in interpretation (Swarjana, 2022). Learning motivation (X1) is defined as the intrinsic and extrinsic drive that stimulates, directs, and maintains students' learning behavior, with indicators including the desire to succeed, drive to learn, aspirations, perseverance, interest, independence, appreciation, and a conducive learning environment. Learning discipline (X2) is defined as an attitude of compliance with rules and the ability to manage time and complete learning tasks consistently. Mathematics learning outcomes (Y) are measured through students' daily test scores and semester mathematics exams.

The research instruments consisted of a learning motivation questionnaire and a learning discipline questionnaire, compiled based on the indicators of each variable. Instrument validity was tested using Pearson Product Moment correlation, while reliability was tested using Cronbach's Alpha coefficient with the help of SPSS; invalid items were removed before the data was used in further analysis. Before hypothesis testing, the data were tested through four classical assumptions, namely the normality test, the multicollinearity test using the Tolerance and Variance Inflation Factor (VIF) values, the heteroscedasticity test using the Glejser test, and the autocorrelation test using the Durbin-Watson statistic.

Hypothesis testing was conducted using multiple linear regression analysis with the equation $Y = a + b_1X_1 + b_2X_2 + e$, followed by partial tests (t-test), simultaneous tests (F-test),



and coefficient of determination (R^2) to determine the contribution of the independent variables to the dependent variable (Gujarati & Porter, 2022). The decision-making criteria used a significance level of 0.05, meaning that a variable is declared to have a significant effect if the significance value is less than 0.05. All data processing was carried out using the SPSS statistical program.

RESULTS AND DISCUSSION

Descriptive statistical analysis was conducted as a preliminary step to describe the characteristics of the data for each research variable. The results included the number of respondents (N), minimum value, maximum value, mean, and standard deviation, as presented in Table 1.

Table 1. Descriptive Statistics of Research Variables

Variables	N	Minimum	Maximum	Mean	Standard Deviation
Learning Motivation (X1)	34	53	112	84.44	13,780
Learning Discipline (X2)	34	54	112	77.97	11,808
Mathematics Learning Outcomes (Y)	34	70	94	76.53	5,956

The data in Table 1 shows that of the 34 students who became respondents, learning motivation was in the score range of 53–112 with an average of 84.44, learning discipline was in the range of 54–112 with an average of 77.97, and mathematics learning outcomes were in the range of 70–94 with an average of 76.53.



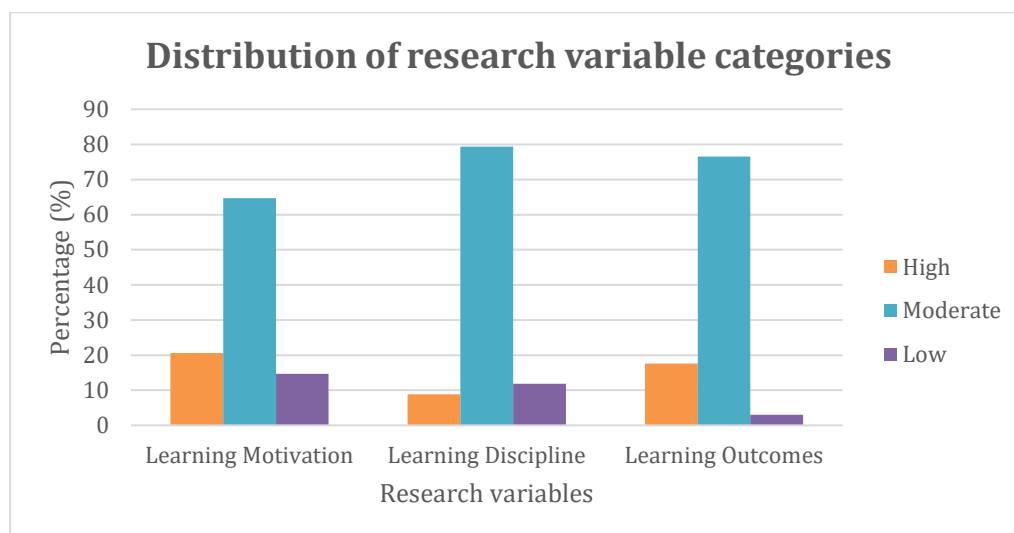


Figure 1. Distribution of Research Variable Categories

The results of the categorization of the levels of each variable showed that the majority of students were in the medium category, namely 64.7% in learning motivation, 79.4% in learning discipline, and 76.5% in mathematics learning outcomes, while only a small number of students were in the high category (20.6% motivation; 8.8% discipline; 17.6% learning outcomes). The instrument validity test using Pearson Product Moment correlation showed that most of the motivation and learning discipline questionnaire items were declared valid ($r_{\text{count}} > r_{\text{table}} = 0.339$), with several invalid items removed before further analysis was carried out.

Classical assumption tests were conducted as a preliminary step to ensure that the data met the assumptions required for multiple linear regression analysis. The tests included assessments of normality, multicollinearity, heteroscedasticity, and autocorrelation, as presented in Table 2.

Table 2. Results of the Classical Assumption Test

Test	Mark	Criteria	Information
Normality	Sig. = 0.091	Sig. > 0.05	Normally distributed data

Multicollinearity (X1)	Tolerance=0.600; VIF=1.667	Tolerance>0.10; VIF<10	Not occur
Multicollinearity (X2)	Tolerance=0.600; VIF=1.667	Tolerance>0.10; VIF<10	Not occur
Heteroscedasticity (X1)	Sig. = 0.819	Sig. > 0.05	Not occur
Heteroscedasticity (X2)	Sig. = 0.216	Sig. > 0.05	Not occur
Autocorrelation (DW)	DW=1.935; dU=1.54; 4-dU=2.46	dU < DW < 4-dU	Not occur

The results of the classical assumption test in Table 2 show that the research data has fulfilled all the assumptions of multiple linear regression, namely normal distribution, no multicollinearity, no heteroscedasticity, and no autocorrelation, so that the regression model is suitable for use in hypothesis testing.

After all the classical assumptions had been satisfied, multiple linear regression analysis was conducted to examine the effects of learning motivation and learning discipline on students' mathematics learning outcomes, both individually and simultaneously. The results of the multiple linear regression analysis are presented in Table 3.

Table 3. Results of Multiple Linear Regression Analysis and Partial Test (t-Test)

Variables	B	t	Sig.	Information
Constant	52,856	8,562	0,000	-
Learning Motivation (X1)	0.022	0.276	0.785	Not Significant
Learning Discipline (X2)	0.279	2,954	0.006	Significant

Based on Table 3, the regression equation is $Y = 52.856 + 0.022X_1 + 0.279X_2$. The t-test results show that learning motivation does not have a significant effect on mathematics learning outcomes (Sig. = 0.785 > 0.05), while learning discipline has a significant effect (Sig. = 0.006 < 0.05). The learning discipline regression coefficient of 0.279 indicates that every one unit increase



in learning discipline is followed by an increase in mathematics learning outcomes of 0.279 units, assuming constant learning motivation.

Subsequent analyses were conducted using the simultaneous significance test (F-test) and the coefficient of determination (R^2) to evaluate the combined effects of the two independent variables on students' mathematics learning outcomes and to determine the proportion of variance in mathematics learning outcomes explained by the regression model. A summary of the analysis results is presented in Table 4.

Table 4. Results of Simultaneous Test (F Test) and Coefficient of Determination

Model	F	Sig.	R^2	Adjusted R^2
Regression	8,194	0.001	0.346	0.304

The F test results in Table 4 show an F value of 8.194 with a significance of 0.001 (<0.05), so that learning motivation and learning discipline simultaneously have a significant effect on mathematics learning outcomes. The coefficient of determination (R^2) value of 0.346 indicates that the two independent variables are able to explain 34.6% of the variation in mathematics learning outcomes, while the remaining 65.4% is influenced by other factors outside this study.

DISCUSSION

The data description shows that the majority of students fall into the moderate category, both in terms of learning motivation (64.7%), learning discipline (79.4%), and mathematics learning outcomes (76.5%). This condition aligns with Ridho'i (2022) view that mathematics learning outcomes are the product of the interaction of various internal and external factors. Therefore, motivation and learning discipline in the moderate category do not necessarily result in high learning outcomes because they are also influenced by factors other than these two variables.

The partial test results indicate that learning motivation does not significantly influence students' mathematics learning outcomes (Sig. = 0.785). This finding differs from the research results of Hidayatullah & Csikos (2024) and Kartika et al. (2024) who found that learning motivation significantly influences students' mathematics achievement. This difference is thought to occur because students' learning motivation has not yet been fully realized in the form



of effective learning strategies. Fitri Rahmi & Amrizal (2023) explain that motivation functions as a driver and director of learning behavior, but this drive only impacts learning outcomes if accompanied by the ability to manage learning strategies and time appropriately. In line with this, Miladiyah et al. (2023) and Alkhateeb (2025) emphasize that extrinsic motivation such as value encouragement and rewards tend to be temporary, so without the support of stable intrinsic motivation and the application of metacognitive strategies, learning motivation does not always convert into statistically significant improvements in learning outcomes.

In contrast to learning motivation, learning discipline has been shown to have a significant effect on students' mathematics learning outcomes (Sig. = 0.006), with a positive regression coefficient of 0.279. This finding is consistent with the research findings of Zurahmah & Isnaniah (2023), Rusmini et al. (2024) and Arina & Dahliawati (2023) who also found that learning discipline has a strong influence on mathematics learning outcomes. Students' consistency in following learning rules, completing assignments on time, and utilizing study time regularly is thought to contribute directly to the understanding of hierarchical mathematical concepts that require continuous practice Aulia & Supriyadi (2022); Wahyuni & Ahmad (2024) The characteristics of Muhammadiyah Al-Kautsar PK Kartasura Junior High School as a religious-based school that implements structured disciplinary habits also strengthens the assumption that the school environment plays a role in strengthening the relationship between learning discipline and students' mathematics learning outcomes, as also found in the context of elementary education by (Sembiring et al. 2025)

The results of the simultaneous test indicate that motivation and learning discipline together have a significant effect on mathematics learning outcomes ($F = 8.194$; Sig. = 0.001). This finding is in line with the results of research by Jamilah et al. (2024) who also found a significant simultaneous effect between the two variables on mathematics learning outcomes of elementary school students, despite different educational levels. This result is somewhat different from the findings of Kartika et al. (2024) who reported that although motivation and learning discipline have a significant effect partially, their influence becomes insignificant when tested simultaneously. This difference is likely influenced by sample characteristics, sample size, and different school contexts, so that the interaction between motivation and learning discipline on mathematics learning outcomes is not always consistent across research populations.

The coefficient of determination (R^2) of 0.346 indicates that learning motivation and learning discipline jointly explained 34.6% of the variance in students' mathematics learning



outcomes, while the remaining 65.4% was attributable to other factors not examined in this study. This moderate explanatory power supports the view that mathematics learning outcomes are influenced by a complex interaction of internal and external factors. Muthe and Pasaribu (2023) also reported that students' motivation and parental educational background contribute to mathematics learning achievement. Therefore, future studies should consider incorporating these and other relevant variables to develop a more comprehensive explanatory model.

Overall, the findings of this study confirm that, in the context of Muhammadiyah-based junior high schools, learning discipline is a more dominant predictor of student mathematics learning outcomes than learning motivation. Consequently, strengthening learning discipline through consistent classroom management should be a top priority for mathematics teachers, without neglecting efforts to strengthen learning motivation as a long-term supporting factor.

CONCLUSION

Based on the results of the analysis, it can be concluded that learning motivation did not have a significant effect on the mathematics learning outcomes of students at Muhammadiyah Al-Kautsar PK Kartasura Junior High School. In contrast, learning discipline had a positive and significant effect on mathematics learning outcomes. Furthermore, learning motivation and learning discipline jointly had a significant effect on students' mathematics learning outcomes. These findings indicate that learning discipline plays a greater role than learning motivation in supporting the achievement of mathematics learning outcomes. Therefore, efforts to improve mathematics learning outcomes should be supported by fostering good learning discipline without overlooking the importance of learning motivation as one of the factors contributing to the learning process.

Teachers are advised to implement consistent learning rules and positive reinforcement to build student discipline in mathematics learning. Students are advised to improve learning discipline through time management and timely completion of assignments. Schools are advised to create a conducive learning environment and involve parents in monitoring student learning discipline at home. Future researchers are advised to add other variables such as family environment, learning interests, or use of learning media, as well as expand the number and scope of research samples.



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