



THE EFFECT OF LEARNING INTEREST AND LEARNING MOTIVATION ON STUDENTS' MATHEMATICS LEARNING ACHIEVEMENT

Ine Theana Pebriani¹, Joko Purwanto^{2*}, Eka Setyaningsih³, Erni Widiyastuti⁴, Gunawan⁵, Jaka Wijaya Kusuma⁶, Indira Pipit Miranti⁷

^{1,2,3,4,5}Universitas Muhammadiyah Purwokerto

⁶Universitas Bina Bangsa

⁷Universitas Ibnu Sina Ajibarang

*Corresponding Author: jokotien@gmail.com

Abstract

Study interest and study motivation is needed in learning. Study interest and study motivation have an influence on students' achievement in learning mathematics. This study aims to determine 1) the effect of study interest on students' mathematics learning achievement; 2) The effect of study motivation on students' mathematics learning achievement; 3) The influence of study interest and motivation on students' mathematics learning achievement. This research was conducted at SMA Negeri 3 Banjar. The type of research used is quantitative with ex post facto methods. The population in this study was class X MIPA SMA Negeri 3 Banjar, while the sample was selected by Cluster Random Sampling X MIPA 2. Data collection techniques used questionnaires and tests that had passed the validity and reliability tests. Testing the data begins with the prerequisite test, namely the linearity test, normality test, multicollinearity test, and heteroscedasticity test. Then do a hypothesis test, namely the correlation coefficient, coefficient of determination, partial test (t test), and simultaneous test (F test) and form a multiple linear regression model. The linear regression model formed is $\hat{Y} = -13.961 + 0.581X_1 + 0.663X_2$. The results of the study stated that 1) Interest in learning had a positive effect on students' mathematics learning achievement by 40.3%; 2) Study motivation affects students' mathematics learning achievement by 37.7%; 3) Study Interest and study motivation have a significant effect on students mathematics learning achievement by 76.4%.

Keywords: *Study Interest, Study Motivation, Students Mathematics Learning Achievement.*

INTRODUCTION

Mathematics learning achievement according to Syaputra (2019) is the understanding and math skills that students have through students' active learning in the classroom. Learning achievement has an important role in the field of education, this is in line with the statement Ningsih & Nurrahmah (2016) that the success of students' learning can be seen from their learning achievements. The statement was strengthened Syafi'i *et al.* (2018) that learning achievement is a person's highest ability at a certain moment that causes a stimulus and reaction so that a change in skills and skills is obtained.

According to Asri *et al.* (2021) Interest is one of the factors that has a big impact on improving students' mathematics learning achievement. Interest in learning is a sense of curiosity and high interest possessed by students which is characterized by enthusiasm, participation, and perseverance in learning

activities. Research results Sirait (2016) showed that 49.8% of students' increase in mathematics learning achievement was influenced by interest in learning.

In addition, learning motivation also affects students' mathematics learning achievement. According to Practical *et al.* (2018) Motivation in learning serves as a driver for the emergence of enthusiasm and desire to learn. Lomu & Widodo (2018) said that motivation can transform a person's energy by identifying the emergence of affective and actions to achieve certain goals, as well as as driving a person to do something. In relation to learning activities, motivation has a strong relationship in the need to exploit oneself so that motivation has an important influence on students' learning activities to achieve learning achievements. The statement is supported by the results of the research Stuart & Friantini (2019) which shows that 19.5% of students' mathematics learning achievement is influenced by learning motivation.

Based on the results of an interview with one of the teachers in charge of mathematics subjects at SMAN 3 Banjar, there are around 60% of students who lack interest and motivation when participating in mathematics learning. Based on the results of the discussion, it shows that interest in learning and motivation to learn can be said to be low. Meanwhile, based on the results of the research above, both strongly support mathematics learning achievements. Therefore, in order to find out the magnitude of the influence given by learning interest and learning motivation on mathematics learning achievement, it is necessary to carry out a study entitled "The Influence of Learning Interest and Learning Motivation on Students' Mathematics Learning Achievement" at SMAN 3 Banjar.

METHOD

This type of research is a quantitative research of *the ex post facto* method using multiple regression analysis techniques to determine the influence between two independent variables and dependent variables. This research was carried out at SMA Negeri 3 Banjar. The sample used in this study was class X MIPA 2 as many as 32 students who were selected by *cluster random sampling technique*. In this study, there are three variables, namely two independent variables and one dependent variable. Independent variables include learning interest (X1) and learning motivation (X2). Both independent variables were collected through a questionnaire. For the dependent variable, there is only one, namely the student's mathematics learning achievement (Y) obtained from the administration of a mathematics test. Before and the questionnaire and test are given, first in the analysis of the instrument using validity tests and reliability tests.

Learning interest and learning motivation are factors that affect mathematics learning achievement, illustrated in the following paradigm figure 1.

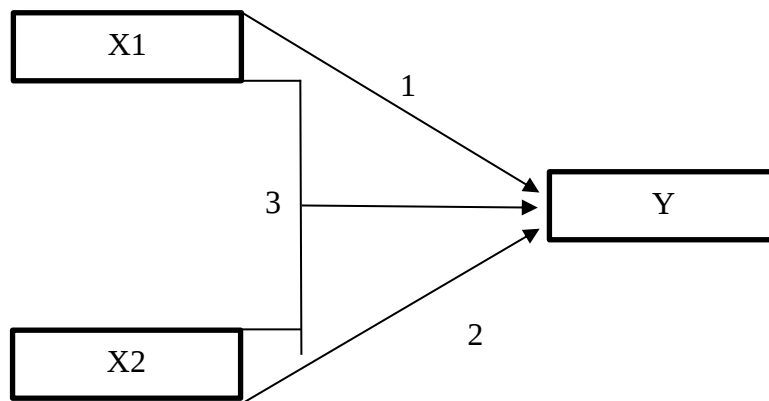


Figure 1. Research Paradigm

Description:

X1 : Interest in Learning

X2 : Learning Motivation

Y : Students' Mathematics Learning Achievement

1 : The influence of learning interest on students' mathematics learning achievement

2 : The effect of learning motivation on students' mathematics learning achievement

3 : The influence of interest and motivation on learning achievement

In testing the research hypothesis, it is necessary to conduct data analysis. The stages of data analysis include describing the data for each research variable, conducting analysis requirements tests, and testing hypotheses. The first hypothesis is that there is a significant influence of learning interest and learning motivation on students' mathematics learning achievement. The second hypothesis is that there is a significant influence of learning motivation on students' mathematics learning achievement. The third hypothesis is that there is a significant influence of learning interest and learning motivation on students' mathematics learning achievement.

The regression equations formed in this study are as follows:

$$Y = a + b_1X_1 + b_2X_2 + e$$

Description:

Y : Mathematics learning achievement variables

a : Constant price

b_1 : Learning interest regression coefficient

b_2 : Motivation regression coefficient of learning

X_1 : Learning interest variables

X_2 : Learning motivation variables

e : Element of interference (*Error*)

The application of the regression equation above is used to measure the intensity of influence between independent variables on dependent variables. Data processing uses the SPSS 25 program.

RESULTS AND DISCUSSION

Based on the results of data processing, the following results were obtained:

Prerequisite tests or classical assumption tests are used to perform hypothesis tests, namely simple linear regression tests and multiple linear regressions. The classical assumption test carried out was the linearity test, normality test, multicollinearity test, and heteroscedasticity test. The results of the classical assumption test are as follows.

Linearity Test

The linearity test aims to find out whether or not there is a linear relationship between the bound variables to each independent variable to be tested. The data processed are the variables X1 with Y and the variables X2 with Y as shown in table 1.

Table 1.
Linear Test of Learning Interest on Mathematics Learning Achievement

			Sum of Squares	df	Mean Square	F	Sig.
Mathematics Learning Achievement * Learning Interest	Between Groups	(Combined)	1297.792	15	86.519	2.450	.043
		Linearity	1086.120	1	1086.120	30.753	.000
		Deviation from Linearity	211.671	14	15.119	.428	.941
	Within Groups		565.083	16	35.318		
	Total		1862.875	31			

The output results in table 1 show a sig. value of $0.000 < 0.05$ so that the sig. value is in the H_0 area. So, it can be concluded that H_0 is accepted so that the variable of learning interest in mathematics learning achievement has a linear relationship.

Table 2.
Linear Test of Learning Motivation on Mathematics Learning Achievement

			Sum of Squares	df	Mean Square	F	Sig.
Mathematics Learning Achievement * Learning Motivation	Between Groups	(Combined)	1555.792	14	111.128	6.152	.000
		Linearity	1048.496	1	1048.496	58.044	.000
		Deviation from Linearity	507.296	13	39.023	2.160	.069
	Within Groups		307.083	17	18.064		
	Total		1862.875	31			

The output results in table 2 show a sig. value of $0.000 < 0.05$ so that the sig. value is in the H_0 area. So, it can be concluded that H_0 is accepted so that the variable of learning motivation to mathematics learning achievement has a linear relationship.

Normality Test

The normality test aims to test whether a variable is normally distributed or not. The data of a variable can be said to be representative of the population and is suitable for use if it is normally distributed.

Table 3.
Normality Test Results

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		32
Normal Parameters ^{a,b}	Red	.0000000
	Std. Deviation	3.63872701
Most Extreme Differences	Absolute	.106
	Positive	.090
	Negative	-.106
Test Statistic		.106
Asymp. Sig. (2-tailed)		.200 ^{c,d}

- a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

The acceptance criterion of H_0 is if the value of sig. obtained in the One Kolmogorov Smirnov test > 0.05 . In the results of table 3, the value of sig. by $0.200 > 0.05$ so that H_0 is accepted and H_a is rejected. It can be concluded that the assumption of normality has been fulfilled and the data can be said to be distributed normally.

Multicollinearity Test

The multicollinearity test aims to test whether the regression model finds a correlation between independent variables and other independent variables. Good data is data that does not occur multicollinearity.

Table 4.
Multicollinearity Test Results

		Coefficient					Collinearity Statistics	
		Unstandardized Coefficients		Standardized Coefficients			Tolerance	VIF
Models		B	Std. Error	Beta	t	Sig.		
1	(Constant)	-13.961	8.987		-1.554	.131		

	Interest in Learning	.581	.109	.528	5.342	.000	.779	1.283
	Learning Motivation	.663	.130	.502	5.087	.000	.779	1.283

a. Dependent Variable: Mathematics Learning Achievement

It can be seen that the results of the calculation of the multicollinearity test table 4 show a *Tolerance* value of $0.779 > 0.10$ and a VIF value of $1.283 > 10$ so that H_0 is rejected and H_a is accepted. So, it can be concluded that there is no multicollinearity or it can be called that the variables of learning interest and learning motivation are not found to be correlated and mutually free.

Heteroscedasticity Test

The heteroscedasticity test has the purpose of testing whether there is an inconsistency in *residual variance* from one observation to another. Good data is data that does not have heteroscedasticity.

Table 5.
Heteroscedasticity Test Results

		Coefficient		Standardized Coefficients	t	Sig.
Models		Unstandardized Coefficients	Std. Error			
		B		Beta		
1	(Constant)	8.455	5.445		1.553	.131
	Interest in Learning	-.063	.066	-.197	-.960	.345
	Learning Motivation	-.015	.079	-.038	-.184	.856

a. Dependent Variable: Abs_RES

From table 5 for the Glejser test, it can be seen that the significance value of learning interest is $0.355 > 0.05$ and the significance of learning motivation is $0.856 > 0.05$. So it can be concluded that H_0 is rejected and H_a is accepted. So, it can be concluded that there is no heteroscedasticity or homogeneity, in other words, residual variance data is homogeneous.

Furthermore, the hypothesis tests carried out include correlation coefficient tests, determination coefficient tests, partial tests (t tests), and simultaneous tests (F tests).

Correlation Coefficient Test

The correlation coefficient aims to find out how strong the relationship between independent variables is and dependent variables.

Table 6.
Correlation Coefficient Results

		Interest in Learning	Learning Motivation	Mathematics Learning Achievement
Interest in Learning	Pearson Correlation	1	.470**	.764**
	Sig. (2-tailed)		.007	.000
	N	32	32	32
Learning Motivation	Pearson Correlation	.470**	1	.750**
	Sig. (2-tailed)	.007		.000
	N	32	32	32
Mathematics Learning Achievement	Pearson Correlation	.764**	.750**	1
	Sig. (2-tailed)	.000	.000	
	N	32	32	32

** . Correlation is significant at the 0.01 level (2-tailed).

From the results in table 6, it is known that *the overall sig.* value is $0.000 < 0.05$ which means that H_a is accepted which means that learning motivation is correlated or has a significant relationship with mathematics learning achievement. The correlation value between learning interest and mathematics learning achievement is 0.764 which means that it correlates with the degree of strong relationships and the form of relationships is positive. So, the higher the interest in learning, the higher the achievement of learning mathematics and vice versa. For the correlation between learning motivation and mathematics learning achievement is 0.750 which means that it is correlated with the degree of strong relationship and the form of the relationship is positive. So, the higher the motivation to learn, the higher the achievement of learning mathematics and vice versa.

Coefficient Determination Test

The determination coefficient or called R^2 aims to measure the percentage of influence of learning interest variables and learning motivation together on mathematics learning achievement variables.

Table 7.
Determination Coefficient Results

Model Summary				
Models	R	R Square	Adjusted R Square	Std. Error of the Estimate

1	.883a	.780	.764	3.762
---	-------	------	------	-------

a. Predictors: (Constant), Learning Motivation, Learning Interest

From table 7, it is known that the magnitude of *the Adjusted R Square* value is 0.764. This shows that 76.4% of mathematics learning achievement variables are influenced by learning interest and learning motivation variables. As for the rest, namely (100% - 76.4% = 23.6%) it is influenced by other variables.

Partial Test (t-test)

The partial test or t-test is used to find out whether there is an influence of each independent variable, namely learning interest and learning motivation on the dependent variable, namely mathematics learning achievement.

Table 8.
Partial Test Results (t-test)
Coefficient

Models		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-13.961	8.987		-1.554	.131
	Interest in Learning	.581	.109	.528	5.342	.000
	Learning Motivation	.663	.130	.502	5.087	.000

a. Dependent Variable: Mathematics learning achievement

From the results of table 8, it is known that the value t_{hitung} for the variable of learning interest is 5.342 while the value is 2.045 which means that . The sig value for the learning interest variable was $0.000 < 0.05$. This shows that $H_t t_{hitung} > t_{tabel}$ is rejected and the *value sig.* located in the H_a area, in other words, the variable of learning interest has a significant positive effect on the variable of mathematics learning achievement. It is known that the value t_{hitung} for the learning motivation variable is 5.087 while the value is 2.045 which means that . The value $t_{hitung} > t_{tabel}$ of *sig.* For the variable learning motivation was $0.000 < 0.05$. This shows that H_0 is rejected and the *value sig.* located in the H_a area, in other words, the learning motivation variable has a significant positive effect on the mathematics learning achievement variable.

Simultaneous Test (F Test)

The simultaneous test or F test aims to determine the significance of the role simultaneously or jointly between independent variables, namely learning interest and learning motivation against dependent variables, namely mathematics learning achievement.

Table 9.

Simultaneous Test Results (F test)

NEW ERA

Models		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1452.425	2	726.212	51.310	.000b
	Residual	410.450	29	14.153		
	Total	1862.875	31			

a. Dependent Variable: Mathematics Learning Achievement

b. Predictors: (Constant), Learning Motivation, Learning Interest

From table 8 it is known that F_{hitung} it is 51.310 while the value is 3.32 which means that the value . The value $F_{tabel} F_{hitung} > F_{tabel} of sig.$ is $0.000 < 0.05$. This shows that H_0 is rejected and H_a is accepted, in other words, the variables of learning interest and learning motivation simultaneously or together have a significant effect on the variables of mathematics learning achievement.

Multiple linear regression analysis is used to determine the influence of learning interest and learning motivation on mathematics learning achievement, the results of multiple linear regression analysis can be described as follows:

Table 10.
Multiple Linear Regression Results

Coefficient

Models		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-13.961	8.987		-1.554	.131
	Interest in Learning	.581	.109	.528	5.342	.000
	Learning Motivation	.663	.130	.502	5.087	.000

a. Dependent Variable: Mathematics Learning Achievement

The results of table 10 regarding multiple linear regression analysis can be formed a regression equation, namely $\hat{Y} = -13.961 + 0.581X_1 + 0.663X_2$ which can be interpreted as a coefficient of X_1 of 0.581 which is meaningful if the variable of learning interest (X_1) increases by 1% while the other independent variable is learning motivation (X_2)) still, then the mathematics learning achievement (Y) will increase by 0.581. This shows that the variable of learning interest has a positive effect on mathematics learning achievement. So, if the interest in learning is higher, the mathematics learning achievement obtained will also be higher. The effective contribution percentage of the influence of learning interest on mathematics learning achievement is 40.3%. The coefficient of X_2 is 0.663 which means that if the variable of learning motivation (X_2) increases by 1% while the other independent

variable, namely learning interest (X_1) remains, then mathematics learning achievement (Y) will increase by 0.663. This shows that the variable of learning motivation has a positive effect on mathematics learning achievement. So, if the motivation to learn is higher, the mathematics learning achievement obtained will also be higher. The percentage of effective contribution of the influence of learning motivation on mathematics learning achievement is 37.7%. The constant value of mathematics learning achievement (Y) is -13.961 which means that if the learning interest (X_1) and learning motivation (X_2) are equal to 0, then the learning achievement will be negative. In order for constants to have a positive value, there are other factors that can affect mathematics learning achievement.

Learning interests include students' feelings of likeness, focus, interest, and participation. The multiple linear regression equation model shows that the X_1 coefficient for learning interest is 0.581, which means that if the learning interest variable (X_1) increases by 1%, then the mathematics learning achievement of students (Y) will increase by 0.581. To show the significance of the correlation coefficient, we continue with the t-test with a result of $5.342 > 2.045$ with a value of sig. $0.000 < 0.05$ which indicates that H_0 is minus and the value sig. located in area H_a . In other words, the variable of learning interest has a significant positive effect on the variable of mathematics learning achievement. This is in line with Sirait (2016) that A large interest in learning tends to result in high achievements, while a lack of interest in learning will result in low learning achievement. This is also strengthened by the results of the research Islamiah (2019) that students who have an interest in learning contribute 50% to student learning achievement. So that students who have an interest in learning will find it easier to improve their mathematics learning achievement. It is also in line with the research of Tambunan (2018), Asanre et al. (2024), and Tambunan et al. (2021) which explains that learning motivation positively affects the improvement of student achievement and learning outcomes.

Learning motivation includes having a desire to succeed, an encouragement to learn, a passion for learning, and never giving up. The multiple linear regression equation model shows a coefficient of X_2 for learning motivation of 0.663 which means that if the learning motivation variable (X_2) increases by 1%, then the mathematics learning achievement of students (Y) will increase by 0.663. To show the significance of the correlation coefficient, we continue with the t-test with a result of $5.087 > 2.045$ with a value of sig. $0.000 < 0.05$ which indicates that H_0 is minus and the value sig. located in area H_a . In other words, the variable of learning motivation has a significant positive effect on the variable of mathematics learning achievement. This is in line with the statement Lomu & Widodo (2018) that motivation has a great influence on student learning activities, especially those that aim to achieve high learning achievements. This is reinforced by the results of the research Silfitriah & Mailili (2020) that students who have learning motivation have an effect of 67.42% on student learning achievement. So that students who have high learning motivation will find it easier to improve their mathematics learning achievement.

Learning interest and learning motivation simultaneously affect students' mathematics learning achievement. The hypothesis test of the F test shows that the value of that F_{hitung} is 51.310 while the value is 3.32 which means that the value of . The value of sig. is $0.000 < 0.05$. This shows that $H_{F_{tabel}F_{hitung}} > F_{tabel}$ is rejected and H_a is accepted, in other words, the variables of learning interest and learning motivation are simultaneously associated with a significant effect on the variables of mathematics learning achievement. The magnitude of the influence of learning interest and learning motivation on mathematics learning achievement is explained in the determination coefficient which shows that the Adjusted R Square value is 0.764. This shows that 76.4% of mathematics learning achievement variables are influenced by learning interest and learning motivation variables. As for the rest, namely $(100\% - 76.4\% = 23.6\%)$ it is influenced by other variables.

CONCLUSION

Based on the results of quantitative analysis on the data obtained, it can be concluded that learning interest has a significant positive effect on mathematics learning achievement. The higher the interest in learning, the higher the achievement of learning mathematics. Learning motivation has a significant positive effect on mathematics learning achievement. The higher the motivation to learn, the higher the achievement of learning mathematics. And vice versa, the lower the motivation to learn, the lower the achievement of learning mathematics. The percentage of effective contribution of the influence of learning motivation on mathematics learning achievement is 37.7%. Learning interest and learning motivation have a significant effect on mathematics learning achievement. The higher the interest in learning and motivation to learn, the higher the achievement of learning mathematics. And vice versa, the lower the interest in learning and motivation to learn, the lower the achievement of learning mathematics. The effective contribution percentage of the influence of learning interest and learning motivation on mathematics learning achievement is 76.4%.

REFERENCES

- Asanre, A. A., Sondlo, A., & Abiodun, T. (2024). Impact of interest and motivation on academic achievement of junior secondary school students in mathematics. *Journal of Mathematics Instruction, Social Research and Opinion*, 3(3), 275-284. <https://doi.org/10.58421/misro.v3i3.269>
- Asri, S. A., Tayeb, T., Mardiah, M., Kamal, S. I. M., & Suaidah, I. (2021). The Influence of Learning Interest and Learning Motivation on the Mathematics Learning Achievement of Grade VIII Students of SMP Negeri 22 Sinjai. *Islamic Management: Journal of Islamic Education Management*, 4(01), 210-222. <https://doi.org/10.30868/im.v4i01.1067>
- Islamiah, I. D. (2019). The Influence of Students' Learning Interests on Mathematics Learning Achievement at SMKN 1 Cihampelas. *Journal on Education*, 1(2), 451-457.
- Lase, S. (2018). The relationship between motivation and learning habits on the mathematics learning achievement of junior high school students. *Journal of Journalism Edition*, 5(6), 1-829.
- Lomu, L., & Widodo, S. A. (2018). The influence of learning motivation and learning discipline on students' mathematics learning achievement. *Proceedings of the National Seminar on Ethnomatnesian Mathematics Education*, 1(2), 745-751.

- Ningsih, R., & Nurrahmah, A. (2016). The Effect of Learning Independence and Parental Attention on Mathematics Learning Achievement. *Formative: Scientific Journal of Mathematics and Natural Sciences Education*, 6(1), 73–84. <https://doi.org/10.30998/formatif.v6i1.754>
- Pratiwi, N. W. D., Asri, I. A. S., & Kristiantari, M. R. (2018). The relationship between motivation and student learning achievement. *International Journal of Elementary Education*, 2(3), 192-201. <https://doi.org/10.23887/ijee.v2i3.15958>
- Rahmah, N. (2018). The Essence of Mathematics Education. *Al-Khwarizmi: Journal of Mathematics and Natural Sciences Education*, 1(2), 1-10. <https://doi.org/10.24256/jpmipa.v1i2.88>
- Silfitrah, S., & Mailili, W. H. (2020). The influence of learning interest and learning motivation on the mathematics learning outcomes of grade VII students of SMP Negeri 4 Sigi. *Old Teachers: Journal of Education and Learning*, 3(1), 53-60. <https://doi.org/10.31970/gurutua.v3i1.39>
- Sirait, E. D. (2016). The Influence of Learning Interest on Mathematics Learning Achievement. *Formative: Scientific Journal of Mathematics and Natural Sciences Education*, 6(1), 35–43. <https://doi.org/10.30998/formatif.v6i1.750>
- Syafi'i, A., Marfiyanto, T., & Rodiyah, S. K. (2018). The study of student learning achievement in various aspects and influencing factors. *Journal of Educational Communication*, 2(2), 115-123.
- Syaputra, I. (2020). The Influence of Learning Interest and Motivation on Mathematics Learning Achievement. *ALFARISI: Journal of MIPA Education*, 2(1), 16–21.
- Tambunan, H. (2018). The Dominant Factor of Teacher's Role as a Motivator of Students' Interest and Motivation in Mathematics Achievement. *International Education Studies*, 11(4), 144-151. <https://doi.org/10.5539/ies.v11n4p144>
- Tambunan, H., Sinaga, B., & Widada, W. (2021). Analysis of Teacher Performance to Build Student Interest and Motivation towards Mathematics Achievement. *International Journal of Evaluation and Research in Education*, 10(1), 42-47. <https://doi.org/10.11591/ijere.v10i1.20711>
- Winata, R., & Friantini, R. N. (2019). The effect of learning motivation on the learning achievement of mathematics students in grade VIII of SMP Negeri 1 Kuala Behe. *Nusantara Math Educator Journal: A Vehicle for Publication of Scientific Papers in the Field of Mathematics Education*, 5(01), 43-50. <https://doi.org/10.29407/jmen.v5i01.12810>