

## THE RELATIONSHIP BETWEEN LEARNING MOTIVATION, LEARNING ENVIRONMENT AND LEARNING INTENSITY WITH MATHEMATICS LEARNING OUTCOMES

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### ABSTRACT

Low students' learning outcomes are related to many factors. Learning motivation, learning environment at home, and learning intensity are among them. This study aims to determine whether there are positive and significant relations between learning motivation, learning environment at home, and learning intensity and mathematics learning outcomes of grade VIII students of SMP Muhammadiyah 2 Yogyakarta in the even semester academic year of 2016/2017. This study's population were grade VIII students of Junior High School (SMP) Muhammadiyah 2 Yogyakarta in the academic year of 2016/2017, consisting of grade VIII students class G and H with a total number of 66 students. A random sampling technique was applied to take the sample of this research, which is grade VIII students class G. The data on learning motivation, learning environment at home, and learning intensity were obtained through questionnaires. At the same time, the data of the mathematics learning outcomes were obtained through the test. The research instruments were tested using a validity test, differential test, and reliability test. Analysis prerequisite tests include normality, linearity, and independence test. Product moment and multiple linear regression analysis were used to analyze the data. The results show positive and significant relations between learning motivation, learning environment at home, learning intensity, and mathematics learning outcomes of grade VIII students of SMP Muhammadiyah 2 Yogyakarta in the even semester of the academic year of 2016/2017. The results are evident in  $F_{\text{count}} > F_{\text{table}}$  which is  $4.8 > 2.9$  with  $R = 0,6$  dan  $R^2 = 0,3$  with  $\hat{Y} = 73,1 + 0,5X_1 + 0,4X_2 + 0,2X_3$ , with  $RC X_1 = 55,7\%$ ,  $RC X_2 = 23,3\%$  and  $RC X_3 = 21,1\%$ ,  $EC X_1 = 18,0\%$ ,  $EC X_2 = 7,5\%$  and  $EC X_3 = 6,8\%$ .

**Keywords:** Learning Motivation, Learning environment at home and Learning intensity, Mathematics learning outcomes

### INTRODUCTION

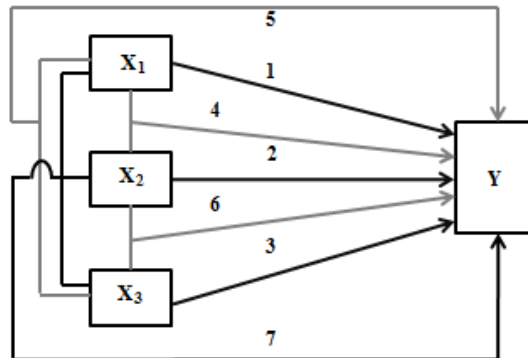
Learning is a process that lasts a lifetime. Learning is a process of activity and is a fundamental element in implementing every type and level of education. The success or failure of achieving educational goals is highly dependent on the learning process experienced by students both at school and in the home or family environment. From the data of the odd semester midterm scores of SMP Muhammadiyah 2 Yogyakarta 2016/2017 Academic Year, it appears that the average grade of mathematics of the eighth-grade students as a whole is 64.58, which is still far below the Minimum Completeness Criteria (MCC), which is 75. This proves that the mathematics of the lesson is still complicated for students to understand. Learning mathematics becomes difficult because the lesson already feels difficult for students.

Some factors influence the process and learning outcomes, including internal and external factors. Internal factors that come from students include physiology and psychological factors. In contrast, external factors are factors that come from outside themselves. Students include social environment and nonsocial environment. Learning intensity is a state of seriousness in students' efforts, especially in learning mathematics. In addition to memorization, studying mathematics is needed also requires understanding, accuracy, and exercises continuously. The more often students practice math problems, the easier it will be for students to solve math problems. Mathematics is taught not only to know and understand what is contained in mathematics itself. However, the more active students are in

learning mathematics, it can help train students' mindset in order to solve problems, including mathematical story problems critically, logically, precisely, and quickly.

**METHODS**

This type of research used in this research is quantitative research. The design of the interrelationship between the independent variable and the dependent variable is organized as follows Figure 1.



**Figure 1.** Research Design

Information:

X<sub>1</sub>: Motivation to learn

X<sub>2</sub>: Learning Environment at Home

X<sub>3</sub>: Learning intensity

Y: Mathematical Learning Outcomes

This research was conducted at SMP Muhammadiyah 2 Yogyakarta in class VIII Even Semester 2016/2017 Academic Year. This study's population were all students of class VIII SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 academic year consisting of 8 classes with 225 students. Samples were carried out using random sampling techniques. The sample of this research is students of class VIII G with 34 students. Data collection techniques using non-test instruments and test instruments. Non-test instruments in the form of a questionnaire determine learning motivation, learning environment at home, and learning intensity. Test instrument to find out the results of learning mathematics with Trigonometry material. A validity test using item analysis is done using the product-moment formula. Reliability test using the Cronbach Alpha formula. The analysis prerequisite test with the normality test and independence test use the chi Square formula. The linearity test uses the F-Test formula. The research hypothesis testing uses a simple correlation test, multiple regression analysis tests, and multiple linear regression test with three independent variables.

**RESULTS AND DISCUSSION**

This study uses the chi-square statistical test ( $\chi^2$ ). Decision-making criteria used are the distribution of data obtained on each variable normally distributed if  $\chi^2_{count} \leq \chi^2_{table}$  with a significance level of 5% and degrees of freedom ( $k-1$ ) where k is many interval classes. The normality test results for the four variables can be seen in Table 1 as follows Table 1.

**Table 1.** Normality Test Results

Variable	$\chi^2_{count}$	$\chi^2_{table}$	df	Info.
Motivation to learn (X <sub>1</sub> )	0,1	6	2	Normal
Learning Environment at Home (X <sub>2</sub> )	0,4	6	2	Normal
Learning Intensity (X <sub>3</sub> )	0,6	7,8	3	Normal
Mathematics learning outcomes (Y)	1,9	7,8	3	Normal

From Table 1, it is known that each variable is normally distributed.

The linearity test is used for the F Test. The decision-making criteria are the relationship between the variable X and the linear Y variable if  $F_{\text{count}} \leq F_{\text{table}}$ , with a significant level of 5% and the degree of freedom of the numerator ( $v_1 = k - 2$ ) and the degree of denominator freedom ( $v_2 = n - k$ ). In this study, for X<sub>1</sub> concerning Y with  $v_1 = 15$  and  $v_2 = 13$ , for X<sub>2</sub> concerning Y with  $v_1 = 18$  and  $v_2 = 14$ , and X<sub>3</sub> concerning Y with  $v_1 = 16$  and  $v_2 = 16$ . The summary of the linearity test results can be seen in Table 2 as follows:

**Table 2.** Linearity Test Results

Variable	F <sub>count</sub>	F <sub>table</sub>	Info.
X <sub>1</sub> and Y	1,6	2,4	Linear
X <sub>2</sub> and Y	0,5	2,3	Linear
X <sub>3</sub> and Y	0,7	2,6	Linear

From Table 2, it is known that the relationship of each independent variable with linearly dependent variables.

An Independent test is used to determine the relationship between independent variables, whether independent or not. The formula used for independent testing is as follows.

$$\chi^2 = \sum_{i=1}^B \sum_{j=1}^K \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

By category:

X<sub>1</sub>: Motivation to learn

X<sub>2</sub>: Learning Environment at Home

X<sub>3</sub>: Learning Intensity

The summary of independent test results can be seen in Table 3.

**Table 3.** Independent Test Results

Variable	$\chi^2_{\text{count}}$	$\chi^2_{\text{table}}$	df	Info.
X <sub>1</sub> and X <sub>2</sub>	27,9	37,7	25	Independent
X <sub>1</sub> and X <sub>3</sub>	32,1	37,7	25	Independent
X <sub>2</sub> and X <sub>2</sub>	24	37,7	25	Independent

From Table 3, it is known that each independent variable is mutually independent.

With simple correlation analysis obtained by the simple correlation coefficient (r) between learning motivation and mathematics learning outcomes of 0.5. Tests on the correlation coefficient's significance using the t-test obtained  $t_{\text{count}} = 3.2$  while  $t_{\text{table}} = 2$  at a significant level of 5% and  $v = n - 2 = 32$ . The rejection area used is  $t_{\text{count}} > t_{\text{table}}$ . Obtained  $3.2 > 2$ , so  $H_{0,1}$  is rejected, and  $H_{1,1}$  is accepted. So there is a positive and significant relationship between learning motivation and mathematics learning outcomes for students of class VIII of SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 academic year. A simple regression equation of Y over X<sub>1</sub> is also obtained  $\hat{Y} = 0.5 + 0.8 X_1$ .

A simple correlation analysis was obtained by the simple correlation coefficient (r) between the learning environment at home with mathematics learning outcomes of 0.3. Tests on the correlation coefficient's significance using the t-test obtained  $t_{\text{count}} = 2.039$  while  $t_{\text{table}} = 2.037$  at a significant level of 5% and  $v = n - 2 = 32$ . The rejection area used is  $t_{\text{count}} > t_{\text{table}}$ . Then obtained  $2.039 > 2.037$ , so  $H_{0,2}$  is rejected, and  $H_{1,2}$  is accepted. So there is a positive and significant relationship between the learning environment at home with the mathematics learning outcomes of VIII grade students of SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 academic year. Also obtained a simple regression equation Y over X<sub>2</sub> is  $\hat{Y} = 18.2 + 0.6$ .

With a simple correlation analysis, the simple correlation coefficient value (r) is obtained between the intensity of learning and mathematics learning outcomes of 0.4. Tests on the correlation

coefficient's significance using the t-test obtained  $t_{count} = 2.4$  while  $t_{table} = 2$  at a significant level of 5% and  $v = n - 2 = 32$ . The rejection area used is  $t_{count} > t_{table}$ . Obtained  $2.4 > 2$ , so  $H_{0,3}$  is rejected, and  $H_{1,3}$  is accepted. So there is a positive and significant relationship between learning intensity and mathematics learning outcomes of VIII grade students of SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 academic year. Also obtained a simple regression equation Y over  $X_3$  is  $\hat{Y} = 20,5 + 0,5 X_3$ .

The multiple correlation analysis was obtained by the simple correlation coefficient (R) between learning motivation and learning environment at home with mathematics learning outcomes of 0.5. Tests on the significance of the correlation coefficient using the F-test obtained  $F_{count} = 6.6$  while  $F_{table} = 3.3$  at a significant level of 5% and  $v_1 = 2$  and  $v_2 = 31$  to obtain  $F_{count} > F_{table}$ . Thus  $H_{0,4}$  is rejected, and  $H_{1,4}$  is received. So there is a positive and significant relationship between learning motivation and learning environment at home with mathematics learning outcomes of students of class VIII of SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 academic year. Also obtained by the multiple linear regression equation Y over  $X_1$  and  $X_2$  is  $\hat{Y} = 42.3 + 0.7 X_1 + 0.4 X_2$ .

The multiple correlation analysis was obtained by the simple correlation coefficient (R) between learning motivation and learning intensity with mathematics learning outcomes of 0.5. Tests on the significance of the correlation coefficient using the F-test obtained  $F_{count} = 5.9$  while  $F_{table} = 3.3$  at a significant level of 5% and  $v_1 = 2$  and  $v_2 = 31$  to obtain  $F_{count} > F_{table}$ . Thus  $H_{0,5}$  is rejected, and  $H_{1,5}$  is received. So there is a positive and significant relationship between learning motivation and learning intensity with mathematics learning outcomes of students of class VIII of SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 academic year. Obtained also the multiple linear regression equation Y over  $X_1$  and  $X_3$  is  $\hat{Y} = 36.8 + 0.6 X_1 + 0.3 X_3$ .

The simple correlation coefficient (R) was obtained with the multiple correlation analysis between the learning environment at home and the intensity of learning with mathematics learning outcomes of 0.5. Tests on the significance of the correlation coefficient using the F-test obtained  $F_{count} = 4.5$  while  $F_{table} = 3.3$  at 5% significance level and  $v_1 = 2$  and  $v_2 = 31$  to obtain  $F_{count} > F_{table}$ . Thus  $H_{0,6}$  is rejected, and  $H_{1,6}$  is received. So there is a positive and significant relationship between the learning environment at home and the intensity of learning with mathematics learning outcomes of eighth-grade students of SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 academic year. Also obtained by the multiple linear regression equation Y over  $X_2$  and  $X_3$  is  $\hat{Y} = 68.3 + 0.5 X_2 + 0.5 X_3$ .

The double analysis was obtained by the simple correlation coefficient (R) between learning motivation, learning environment at home, and learning intensity with mathematics learning outcomes of 0.6. Tests on the significance of the correlation coefficient using the F-test is obtained  $F_{count} = 4.8$  while  $F_{table} = 2.9$  at a significant level of 5% and  $v_1 = 3$  and  $v_2 = n - m - 1 = 30$  so that  $F_{count} > F_{table}$  is obtained. Thus  $H_{0,7}$  is rejected, and  $H_{1,7}$  is accepted. So there is a positive and significant relationship between learning motivation, the learning environment at home, and the intensity of learning with mathematics learning outcomes for students of class VIII of SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 academic year. A double linear regression equation Y for  $X_1$ ,  $X_2$  and  $X_3$  is  $\hat{Y} = 73.1 + 0.6 X_1 + 0.4 X_2 + 0.2 X_3$ .

## CONCLUSION

1. There is a positive and significant relationship between learning motivation with mathematics learning outcomes of VIII grade students of SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 academic year. This is indicated by the t-test that is  $t_{count} > t_{table}$  or  $3.2 > 2$ . The simple regression equation for Y over  $X_1$  is  $\hat{Y} = 0.5 + 0.8 X_1$ .
2. There is a positive and significant relationship between the learning environment at home with the mathematics learning outcomes of VIII grade students of SMP Muhammadiyah 2 Yogyakarta even

- semester 2016/2017 academic year. This is indicated by the t-test that is  $t_{\text{count}} > t_{\text{table}}$  or  $2.039 > 2.037$ . The simple regression equation for Y over  $X_2$  is  $\hat{Y} = 18.2 + 0.6 X_2$
3. There is a positive and significant relationship between the intensity of learning with mathematics learning outcomes of VIII grade students of SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 academic year. This is indicated by the t-test, which is  $t_{\text{count}} > t_{\text{table}}$  or  $2.4 > 2.0$ . The simple regression equation for Y over  $X_3$  is  $\hat{Y} = 20,5 + 0,5 X_3$ .
  4. There is a positive and significant relationship between learning motivation and the learning environment at home with the mathematics learning outcomes of VIII grade students of SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 academic year. This is indicated by the F-test, which is  $F_{\text{count}} > F_{\text{table}}$  or  $6.6 > 3.3$ . Linear equation  $\hat{Y} = 42.3 + 0.7 X_1 + 0.4 X_2$ .
  5. There is a positive and significant relationship between learning motivation and learning intensity with mathematics learning outcomes of VIII grade students of SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 academic year. This is indicated by the F-test, which is  $F_{\text{count}} > F_{\text{table}}$  or  $5.9 > 3.3$ . Linear equation  $\hat{Y} = 36.8 + 0.6 X_1 + 0.3 X_3$
  6. There is a positive and significant relationship between the learning environment at home and the intensity of learning with mathematics learning outcomes of students of class VIII of SMP Muhammadiyah 2 Yogyakarta even semester 2016/2017 academic year. This is indicated by the F-test, which is  $F_{\text{count}} > F_{\text{table}}$  or  $4.5 > 3.3$ . Linear equation  $\hat{Y} = 68.3 + 0.5 X_2 + 0.5 X_3$ .
  7. There is a positive and significant relationship between learning motivation, learning environment at home, and the intensity of learning with mathematics learning outcomes of eighth-grade students of SMP Muhammadiyah 2 Yogyakarta even semester of the 2016/2017 school year. This is indicated by the F-test, which is  $F_{\text{count}} > F_{\text{table}}$  or  $4.8 > 2.9$ . The linear line equation  $\hat{Y} = 73.1 + 0.6X_1 + 0.4 X_2 + 0.2 X_3$ . The relative contribution of  $X_1$  is 55.7%,  $X_2$  is 23.3%, and  $X_3$  is 21.1%. The effective contribution is 18.0%,  $X_2$  is 7.5%, and  $X_3$  is 6.8%. This shows that the learning motivation variable ( $X_1$ ) is more dominant than the learning environment variable at home ( $X_2$ ) and the learning intensity variable ( $X_3$ ).

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