RELATIONSHIP BETWEEN INTERPERSONAL COMMUNICATION ABILITY AND LEARNING ENVIRONMENT WITH STUDENTS MATHEMATICS LEARNING OUTCOMES OF CLASS XI IPA

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ABSTRACT

Learning outcomes is the accomplishment of the learning process. Low mathematics outcomes are influenced by factors that come from within or outside the students' self. For example, a low ability of interpersonal communication makes the interaction of students with other people uncomfortable, and a less conducive learning environment can reduce the concentration of students during the learning process. The study aims to determine the relationship between the ability of interpersonal communication and learning environment with mathematics learning outcomes in student class XI Science (IPA), even semester of State Senior High School 9 Yogyakarta (SMA Negeri 9 Yogyakarta) in the academic year of 2016/2017. The population in this research was the students of class XI IPA, even semester of SMA Negeri 9 Yogyakarta in the academic year of 2016/2017, which consists of 5 classes with some 148 students. Samples were taken with a random sampling technique and derived class XI IPA 5 as a sample class with 28 students. Data collection techniques use a questionnaire method to collect data on the ability of interpersonal communication and learning environment and test method mathematics achievement test. Test instruments used for validity and reliability. Test requirements analysis was a normality test, a test of independence, and a linearity test. Analysis of the data for testing hypotheses used linear regression analysis and correlation analysis. The results showed a positive and significant relationship between the ability of interpersonal communication and learning environment with mathematics learning outcomes in student class XI IPA even semester of SMA Negeri 9 Yogyakarta in the academic year of 2016/2017. It is showed by $F_{count} > F_{table}$ is 7,6180 > 3,39 with R = 0,6154 and R^2 = 0,3787 with $\hat{Y}$ = -71,6983 + 0,7204X_1 + 0,9477X_2 with RC X_1= 53,9889% and RC X_2= 46,0111% with EC X_1= 17,3004% and EC X_2= 14,7440%.

Keywords: Ability of Interpersonal Communication, Learning Environment, Mathematics Learning Outcomes.

INTRODUCTION

Education is an activity that has a purpose. Education is needed for improving human resource competence. Through education, the Indonesian nation seeks to realize the nation's ideals in realizing the general welfare and intellectual welfare of the nation. Therefore, to create good and quality human resources, it must start with an increase in the quality of education itself. The quality of education is very closely related to student learning outcomes. Learning outcomes as an indication of the efforts made by students in the learning process. The learning outcomes of students of class XI IPA in the even semester of SMA Negeri 9 Yogyakarta in the 2016/2017 school year are low for some students. This can be seen from the results of the midterm results of the following odd semester 2016/2017 school year.

Table 1. List of Number of Students based on Completion of Mathematics Grade Students of Class XI Science SMA Negeri 9 Yogyakarta 2016/2017 Academic Year

MCC	Criteria	Class XI IPA					%
		1	2	3	4	5	
78	Complete	12	12	18	15	14	47,97
	Not complete	18	18	12	15	14	52,02
Total students		30	30	30	30	28	148

From the table above, it can be seen that the learning outcomes of Class XI Science students at SMA Negeri 9 Yogyakarta have a balance, meaning that there is no gap in learning outcomes between students who are declared complete and incomplete. The completeness of student mathematics learning outcomes is determined based on the MCC that has been determined by the school that is equal to 78.00. It can be seen that the learning outcomes of students of class XI Science in mathematics in the school can be said to be still low, with the total percentage of students who are incomplete at 52.02%. Thus from these results, it can be said there are still students who have difficulty learning in mathematics.

The results of interviews conducted at SMA Negeri 9 Yogyakarta show that the learning outcomes of students of class XI IPA are low due to influencing factors such as poor interpersonal communication skills and a learning environment that is not conducive. Information was obtained that some students of class XI IPA at Yogyakarta State High School 9 sometimes had difficulty communicating with others. Reinforced by the explanation of the mathematics teacher of class XI, namely that from the attitude of students who are shy and do not dare to express opinions during the discussion, students feel inferior and choose silence with friends who are considered not too close, students do not dare ask the teacher or friends when they do not understand math. Some students said that not all friends could be invited to discussion together, just greetings and added competition in the classroom so that students' interpersonal communication is less well established.

Based on the results of interviews with several students of class XI IPA of SMA Negeri 9 Yogyakarta, obtaining information about the learning environment's condition is one of the external factors in the learning and learning process. They say that sometimes the atmosphere and conditions of the learning environment in schools make learning mathematics less conducive. One of the factors is the placement of hours of less effective subjects, such as during the daytime and after sports hours. The students interviewed said that if the mathematics learning process was carried out after the sports subjects, the students had difficulty concentrating because the body condition was tired and uncomfortable because of the uncomfortable body that was sweating. Also, the delivery of subject matter that is less interesting and monotonous makes students feel bored and difficult to understand the material described. Some conditions in the learning environment cause students to feel disturbed. A healthy learning environment is needed to arouse students' enthusiasm for learning and to anticipate the emergence of feelings of discomfort in students.

The purpose of this study is to:

1. Knowing a positive and significant relationship between interpersonal communication skills with learning outcomes in mathematics.
2. Knowing a positive and significant relationship between student learning environments and mathematics learning outcomes.
3. Knowing a positive and significant relationship between interpersonal communication skills and the learning environment with learning outcomes in mathematics

METHODS

Research is included in quantitative research, so the type of research is quantitative research. The research design used is as follows:

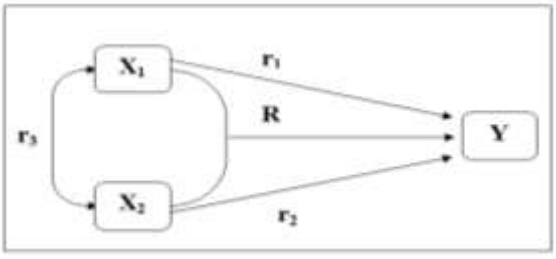

Figure I. Research designs X_1, X_2, and Y

Information:
X_1: Interpersonal Communication Ability
X_2: Learning Environment
Y: Mathematics Learning Outcomes
This research was conducted in SMA Negeri 9 Yogyakarta in the even semester of the 2016/2017 school year, namely in May 2017. The population in this study were students of class XI IPA in the even semester of SMA Negeri 9 Yogyakarta in the 2016/2017 school year, which amounted to 148 students, and consisted of 5 classes. The data of students of class XI IPA in the even semester of SMA Negeri 9 Yogyakarta can be seen in Table 2 below.

Table 2. Data of Class XI Science Students Even Semester SMA Negeri 9 Yogyakarta 2016/2017 School Year

Class	XI IPA 1	XI IPA 2	XI IPA 3	XI IPA 4	XI IPA 5	Total
Total students	30	30	30	30	28	148

(source: SMA Negeri 9 Yogyakarta)

The sampling technique in this study was a random sampling technique for class. Sampling is done by lottery class. The class taken as a sample class is Class X_1 Science 5, which consists of 28 students. In this study, three variables are consisting of two independent variables, namely interpersonal communication skills (X_1), learning environment (X_2), and one dependent variable, namely mathematics learning outcomes (Y). Data collection techniques in this study were the test and non-test methods. At the same time, the data collection instruments in this study were questionnaires and mathematics test results. The questionnaire is used to obtain data on interpersonal communication skills and the learning environment, and test methods to obtain data on mathematics learning outcomes. Before being used to collect data, the learning achievement test instrument was tested in class XI IPA 4 even semester of SMA Negeri 9 Yogyakarta in the 2016/2017 school year. The test instrument of this research was the validity test, distinguishing power, and reliability test.

Data analysis technique

1. Descriptive Data Analysis
2. Testing the Analysis Prerequisites
   a. Normality test
   b. Independent Test
   c. Linearity Test
3. Hypothesis Test

RESULTS AND DISCUSSION

The interpersonal communication skills of students of class XI IPA in the even semester of SMA Negeri 9 Yogyakarta in the 2016/2017 school year are included in the medium category because the frequency is mostly located at intervals of $102{,}7018 \leq X_1 \leq 115{,}1553$, as many as 17 students or 60.71%. The learning environment of students of class XI IPA in the even semester of SMA Negeri 9 Yogyakarta in the 2016/2017 school year is included in the medium category because the frequency is mostly located at intervals of $57{,}0920 \leq X_2 \leq 66{,}8366$, which is 21 students or 75%. Mathematics learning outcomes of students of class XI IPA in the even semester of SMA Negeri 9 Yogyakarta in the 2016/2017 school year are included in the low category because the frequency is mostly located in the interval X <78, which is as many as 22 students or 78.57%. Based on the normality test results, it was found that the variable interpersonal communication skills, learning environment, and mathematics learning outcomes were usually distributed. The normality test results of the three variables can be seen in Table 3 as follows.

Table 3. Normality Test Results

Research variable	χ^2_{count}	χ^2_{table}	df	Status
Interpersonal Communication Skills (X_1)	6,6883	7,8147	3	Normal
Learning Environment (X_2)	1,9035	7,8147	3	Normal
Mathematics Learning Outcomes (Y)	4,5485	9,4877	4	Normal

Based on the results of the independence test, results show that interpersonal communication skills (X_1) with learning environment variables (X_2) are independent. The independence test results can be seen in Table 4 as follows:

Table 4. Independence Test Results

Research variable	χ^2_{count}	χ^2_{table}	df	Status
X_1 with X_2	24,912	37,652	25	Independent

Based on the linearity test results, it was found that interpersonal communication skills with mathematics learning outcomes are linearly related, and the learning environment with mathematics learning outcomes is linearly related. The linearity test results can be seen in Table 5 as follows:

Table 5. Linearity Test Results

Research Variable	F^2_{count}	F^2_{table}	df		Status
			v_1	v_2	
X_1 with Y	0,936	2,64	14	12	Linear
X_2 with Y	0,919	2,53	12	14	Linear

First Hypothesis Testing. $t_{count} = 2{,}4581 > t_{table} = 1{,}706$, then $H_{0.1}$ is rejected, and $H_{1.1}$ is accepted, which means there is a positive and significant relationship between interpersonal communication skills with mathematics learning outcomes of students of class XI IPA even semester of SMA Negeri 9 Yogyakarta 2016/2017 school year.

Second Hypothesis Testing. $t_{count} = 2{,}7171 > t_{table} = 1{,}706$, then $H_{0.2}$ is rejected, and $H_{1.2}$ is accepted, which means there is a positive and significant relationship between the learning environment and mathematics learning outcomes of students of class XI IPA in the even semester of SMA Negeri 9 Yogyakarta in the 2016/2017 school year.

Third Hypothesis Testing. $F_{count} = 7{,}6180 \geq F_{table} = 3{,}39$, then H0.3 is rejected, and H1.3 is accepted, which means there is a positive and significant relationship between interpersonal communication skills and the learning environment with the mathematics learning outcomes of students of class XI IPA even semester of SMA Negeri 9 Yogyakarta in the 2016/2017 school year.

Based on the results of the research carried out, the following discussion is explained:

1. The first hypothesis is obtained correlation coefficient (r) 0.4342 at a significant level of 5%, meaning that the ability of interpersonal communication with mathematics learning outcomes has a strong enough relationship. This study also obtained a coefficient of determination (r^2) of 0.1886, which can explain 18.86% of learning outcomes influenced by interpersonal communication skills while other factors influence the rest. There are variations in mathematics learning outcomes (Y), which are explained by interpersonal communication skills (X_1) through linear lines $\hat{Y} = -19{,}7586 + 0{,}7856\, X_1$, with a coefficient of regression direction of 0.7856. This means that every increase of one unit X1 results in a 0.7856 increase in Y. The first hypothesis test result is that there is a positive and significant relationship between interpersonal communication skills with mathematics learning outcomes. In other words, the better the students' interpersonal communication skills, the higher the learning outcomes.
2. The second hypothesis is obtained correlation coefficient (r) of 0.4703 at a significant level of 5%, meaning that the learning environment with mathematics learning outcomes has a strong enough relationship. This study also obtained a coefficient of determination (r2) of 0.2212, which can

explain 22.12% of learning outcomes influenced by the learning environment while other factors influence the rest. There are variations in mathematics learning outcomes (Y), which are explained by the learning environment (X_2) through linear lines $\hat{Y} = 2{,}277 + 1{,}0188X_2$ with a coefficient of regression direction of 1.0188. This means that every increase of one unit X_2 increases 1.0188 Y. The second hypothesis test result is that there is a positive and significant relationship between the learning environment and mathematics learning outcomes. In other words, the more conducive to the learning environment, the results of learning mathematics become more improved.

3. The third hypothesis is obtained by the double correlation coefficient R-value of 0.6154 at a significant level of 5%. This means that interpersonal communication skills and the learning environment with mathematics learning outcomes have a healthy relationship. This study also obtained a coefficient of determination (R^2) of 0.3787, meaning that 37.87% of learning outcomes are influenced by interpersonal communication skills and the learning environment. In contrast, the rest is influenced by other factors. There are variations in mathematics learning outcomes (Y), which can be explained by interpersonal communication skills (X_1) and learning environments (X_2) through linear lines $\hat{Y} = -71{,}6983 + 0{,}7204X_1 + 0{,}9477X_2$. This means an increase in one unit X1 resulted in a 0.7204 increase in Y, and an increase in one unit X_2 resulted in an increase in 0.9477 Y. While for relative contributions, X_1 amounted to 45.66693% and X_2 amounted to 54.3307% and effective contribution X_1 amounted to 17.2934% and X_2 of 20.5731%.

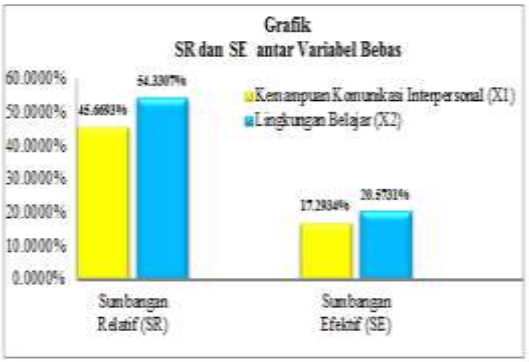

Figure II. Graph of Relative Donations and Effective Donations

Based on the graph above, it can be seen that the learning environment provides a more significant contribution to mathematics learning outcomes compared to interpersonal communication skills. The third hypothesis test result is that there is a positive and significant relationship between interpersonal communication skills and the learning environment with mathematics learning outcomes. With the existence of good interpersonal communication skills and a conducive learning environment, the learning outcomes of mathematics become more elevated.

CONCLUSION

Based on the results of the study, several research conclusions can be drawn as follows:

1. There is a positive and significant relationship between interpersonal communication skills with mathematics learning outcomes of students of class XI IPA in the even semester of SMA Negeri 9 Yogyakarta in the 2016/2017 school year. The simple correlation coefficient (r) between interpersonal communication skills and mathematics learning outcomes is 0.4343. Besides that, obtained by simple regression equation Y for X_1 is $\hat{Y}$ = -19,75856 + 0.78561X1.
2. There is a positive and significant relationship between the learning environment and mathematics learning outcomes of students of class XI IPA even semester SMA Negeri 9 Yogyakarta in the 2016/2017 school year. The simple correlation coefficient (r) between the learning environment

with mathematics learning outcomes of 0.4703. Besides that, obtained by simple regression equation Y for X_2 is $\hat{Y} = 2.2767. + 1.0188X_2$.

3. There is a positive and significant relationship between interpersonal communication skills and the learning environment on the mathematics learning outcomes of students of class XI IPA in the even semester of SMA Negeri 9 Yogyakarta in the 2016/2017 school year. The correlation coefficient (R) between interpersonal communication skills and the learning environment with mathematics learning outcomes of 0.6154 and the coefficient of determination (R^2) of 0.3787 with a linear line equation $\hat{Y}$= -71,6983 + 0.7204X_1 + 0, 9477X_2. The relative contribution of X_1 is 45.66693%, and X_2 is 54.3307%, and the effective contribution of X_1 is 17.2934%, and X_2 is 20.5731%.
4. There is a positive and significant relationship between interpersonal communication skills with mathematics learning outcomes of students of class XI IPA in the even semester of SMA Negeri 9 Yogyakarta in the 2016/2017 school year. The simple correlation coefficient (r) between interpersonal communication skills and mathematics learning outcomes is 0.4343. Besides that, obtained by simple regression equation Y for X_1 is $\hat{Y} = -19,75856 + 0.78561X_1$.
5. There is a positive and significant relationship between the learning environment with the learning outcomes of students of class XI IPA in the even semester of SMA Negeri 9 Yogyakarta in the 2016/2017 school year. The simple correlation coefficient (r) between the learning environment with mathematics learning outcomes of 0.4703. Besides that, obtained by simple regression equation Y for X_2 is $\hat{Y} = 2.2767. + 1.0188X_2$.
6. There is a positive and significant relationship between interpersonal communication skills and the learning environment on the mathematics learning outcomes of students of class XI IPA in the even semester of SMA Negeri 9 Yogyakarta in the 2016/2017 school year. The correlation coefficient (R) between interpersonal communication skills and the learning environment with mathematics learning outcomes is 0.6154, and the coefficient of determination (R^2) is 0.3787 with a linear line equation $\hat{Y}$ = -71.6983 + 0.7204X1 + 0.9477X_2. The relative contribution of X_1 is 45.66693%, and X_2 is 54.3307%, and the effective contribution X_1 is 17.2934%, and X_2 is 20.5731%.

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