

THE RELATIONSHIP BETWEEN PEERS AND NUMERICAL ABILITY WITH STUDENT LEARNING OUTCOMES CLASS XI IPA

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ABSTRACT

This study aims to determine whether or not a positive and significant relationship between peers and numerical ability with the results of mathematics learning students of class XI IPA State Senior High School 1 Girimulyo (SMA Negeri 1 Girimulyo) Kulon Progo District odd Semester of the academic year 2017/2018. The population used in this study is all students of class XI IPA odd Semester SMA Negeri 1 Girimulyo Kulon Progo regency academic year 2017/2018, which amounts to 46 students and is divided into two classes. Sampling class using a random sampling technique to the class, so that I obtained class XI IPA 2 as class trial and class XI Science class 1(IPA 1) as a research class. Data collection techniques used questionnaires and tests. The data collection instrument uses peer questionnaires, numerical ability tests, and mathematics learning outcomes. The instrument test analysis uses validity, a test of different power, and a reliability test. Test prerequisite analysis using normality test, independent test, linearity test. Data analysis using simple correlation analysis and multiple regression analysis. The results showed that there was a positive and significant relationship between peers and numerical ability with mathematics learning result with multiple regression equation $\hat{Y} = -16,723 + 0,428X_1 + 0,632X_2$ and double correlation coefficient (R) equal to 0,628, and obtained $F_{count} = 6,824$ and $F_{tabel} = 3.47$, so $F_{count} > F_{tabel}$. The relative contribution (X_1) = 46,281% and (X_2) = 53,719% with double determination coefficient 0,394 and effective contribution (X_1) = 18,230% and (X_2)=21,160%.

Keywords: peers, numerical abilities, mathematics learning outcomes.

INTRODUCTION

Education can be interpreted as a way of realizing human culture that is full of development and change. The development and change of education aim at improving education at the level. Better. In realizing success in education, mastery of subjects in schools is crucial, especially in mathematics. According to Sujono (1988: 4), defining Mathematics is the exact branch of science, the part of knowledge about numbers and calculations, logical reasoning and problems related to numbers, about quantitative facts and problems about space and form. Therefore, mathematics is taught to students starting from elementary school. According to Suherman et al. (2003: 55-56) School, mathematics is mathematics taught in primary education (elementary and junior high) and secondary education (high school and vocational school).

Based on the results of data collection, the low student learning outcomes can be seen from the value of the Even Semester Final Examination (UAS) on mathematics subjects that have been achieved by students. Here are the results of the UAS students obtained at SMA Negeri 1 Girimulyo obtained grades from 98 students, with the number of students who complete there are five students with a percentage of 18.6%. That the average value of the Final Examination Semester for mathematics subjects in class X of SMA Negeri 1 Girimulyo is still low because the MCC (Minimum Completion Criteria) of schools is 75. Students' ability to learn mathematics can be measured through mathematics learning outcomes. According to Suprijono (2015: 5), learning outcomes are patterns of actions, values, understandings, attitudes, appreciation, and skills. Two factors affect student learning outcomes, namely, internal and external factors. Based on information obtained from some of the students of class XI IPA of SMA Negeri 1 Girimulyo, it is known that some students think that mathematics is complicated and less attractive, so it is difficult to understand. Students said that their peers gave many

positive things such as inviting extracurricular activities at school, sometimes also asking to talk while the lesson was taking place.

Other information was obtained from a mathematics subject teacher in class XI IPA of SMA Negeri 1 Girimulyo on Wednesday, July 19, 2017, saying that some students still had difficulty understanding mathematical concepts, so they had to repeatedly repeat lessons and exercises so that the concepts were well embedded. Also, the teacher recognizes that some students still find it difficult to count or operate numbers. Also, when lessons are taking place, many students do not pay attention / concentrate less on following the lessons so that many students do not record the material presented. When students study, many interactions with peers sometimes talk with peers or tablemates. As a subject teacher, I often invite students to play an active role in the classroom, such as working on the questions given—internal factors of numerical ability that affect student learning outcomes. Fudyartanta (2004: 68) numerical ability is the ability to understand numbers' relationships and solve problems related to number concepts. In addition to internal factors, there are external factors that affect student learning outcomes, namely peers, according to Santrock (2014: 92) Peers are children around the same age or maturity level. Meanwhile, according to A. Ryan in Woolfolk (2009: 12), peers influence member motivation and achievement in school. Based on the background of the problem can be formulated problems that can be taken in this study are: 1) Is there a positive and significant relationship between numerical ability on mathematics learning outcomes of students of class XI IPA of SMA Negeri 1 Girimulyo, Kulon Progo Regency, Odd Semester of Academic Year 2017/2018? 2) Is there a positive and significant relationship between peers to the mathematics learning outcomes of students of class XI IPA of SMA Negeri 1 Girimulyo, Kulon Progo Regency, Odd Semester of Academic Year 2017/2018? 3) Is there a positive and significant relationship between peers and numerical ability on mathematics learning outcomes of students of class XI IPA 1 Girimulyo, Kulon Progo, Odd Semester, Academic Year 2017/2018?

In the first study above is a quantitative study. This study has one independent variable (X) relevant to researchers, namely, peers, and has one dependent variable (Y) relevant to researchers, namely mathematics learning outcomes. Furthermore, the second study is quantitative. This study has one independent variable (X) relevant to researchers that is the numerical ability and has one dependent variable (Y) that is relevant to researchers that is mathematics learning outcomes. Based on the problem formulation, the objectives of this study are to 1) whether there is a positive and significant relationship between numerical ability and mathematics learning outcomes of students of class XI IPA of SMA Negeri 1 Girimulyo, Kulon Progo Regency, Odd Semester, Academic Year 2017/2018. 2) There is a positive and significant relationship between peers to the mathematics learning outcomes of students of class XI IPA of SMA Negeri 1 Girimulyo, Kulo Progo, Odd Semester, Academic Year 2017/2018. 3) Whether or not there is a positive and significant relationship between peers and numerical ability to the mathematics learning outcomes of students of class XI IPA 1 Girimulyo, Kulon Progo, Odd Semester, Academic Year 2017/2018.

METHODS

This type of research is quantitative research. This research aims to determine whether there is a relationship between peers and numerical ability with the mathematics learning outcomes of class XI IPA Odd Semester 1 Girimulyo, Kulon Progo District, Academic Year 2017/2018. Then the research design is as follows:

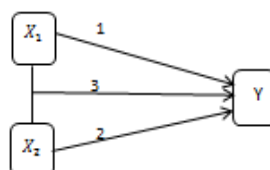


Figure 1. Research Design

Information:

X_1 : Friends of the same age

X_2 : Numerical Ability

Y: Student learning outcomes in class XI Science

The study was conducted at SMA Negeri 1 Girimulyo, Kulon Progo Regency, and the research subjects were students of class XI Science. The time of this research is in the Odd Semester of Academic Year 2017/2018. The population in this study were all students of class XI IPA of SMA Negeri 1 Girimulyo, Kulon Progo Regency, Odd Semester of Academic Year 2017/2018, amounting to 46 students. The sampling technique is to use simple random sampling, taking class samples obtained by lottery. After the draw was selected for the sample class, that is class XI IPA 1 with a total of 24 students. This research variable has three variables consisting of two independent variables and one dependent variable. The independent variables are peers (X_1) and numerical ability (X_2) for the dependent variable, namely mathematics learning outcomes (Y). Data collection methods are needed in researching so that the data obtained is relevant to the objectives and subject matter. The data collection method used was a questionnaire and a test. The questionnaire was used to obtain data about peers in class XI IPA of SMA Negeri 1 Girimulyo, Kulon Progo district, Odd Semester, Academic Year 2017/2018. At the same time, the test is used to obtain numerical ability data and mathematics learning outcomes. The test used is multiple choice with four alternative answers, namely a, b, c, or d, and if the correct answer is one and wrong is 0. Analysis of the questionnaire instrument trials and tests using content validity tests by reviewers and product-moment correlation techniques (Arikunto, 2013: 213) with item validity and distinguishing features on numerical ability tests and mathematics learning achievement tests are as follows, shown in Table 1 and Table 2.

Table 1. Test Results of Validity and Distinguishing Power of Numerical Ability Test

Bullet	Test Type				Information
	Validity test		Differential Power Test		
1	0,455	Valid	0,364	Good	Used up
2	0,477	Valid	0,364	Good	Used up
3	0,477	Valid	0,273	Enough	Used up
4	0,528	Valid	0,455	Good	Used up
5	0,544	Valid	0,273	Enough	Used up
6	0,324	Fall	-	-	-
7	0,373	Fall	-	-	-
8	0,616	Valid	0,636	Good	Used up
9	0,505	Valid	0,545	Good	Used up
10	0,48	Valid	0,545	Good	Used up
11	0,467	Valid	0,273	Enough	Used up
12	0,402	Fall	-	-	-
13	0,546	Valid	0,455	Good	Used up
14	0,543	Valid	0,545	Good	Used up
15	0,29	Fall	-	-	-
16	0,479	Valid	0,364	Enough	Used up
17	0,494	Valid	0,455	Good	Used up
18	0,543	Valid	0,545	Good	Used up
19	0,476	Valid	0,364	Enough	Used up
20	0,522	Valid	0,364	Enough	Used up
21	0,59	Valid	0,727	Good	Used up
22	0,59	Valid	0,364	Enough	Used up
23	0,561	Valid	0,455	Good	Used up
24	0,483	Valid	0,364	Enough	Used up
25	0,315	Fall	-	-	-

Table 2. Test Results of Validity and Differences in Learning Outcomes Tests

Bullet	Test Type				
	Validity test		Differential Power Test		Information
1	0,455	Valid	0,364	Good	Used up
2	0,477	Valid	0,364	Good	Used up
3	0,477	Valid	0,273	Enough	Used up
4	0,528	Valid	0,455	Good	Used up
5	0,544	Valid	0,273	Enough	Used up
6	0,324	Fall	-	-	-
7	0,373	Fall	-	-	-
8	0,616	Valid	0,636	Good	Used up
9	0,505	Valid	0,545	Good	Used up
10	0,48	Valid	0,545	Good	Used up
11	0,467	Valid	0,273	Enough	Used up
12	0,402	Fall	-	-	-
13	0,546	Valid	0,455	Good	Used up
14	0,543	Valid	0,545	Good	Used up
15	0,29	Fall	-	-	-
16	0,479	Valid	0,364	Enough	Used up
17	0,494	Valid	0,455	Good	Used up
18	0,543	Valid	0,545	Good	Used up
19	0,476	Valid	0,364	Enough	Used up
20	0,522	Valid	0,364	Enough	Used up
21	0,59	Valid	0,727	Good	Used up
22	0,59	Valid	0,364	Enough	Used up
23	0,561	Valid	0,455	Good	Used up
24	0,483	Valid	0,364	Enough	Used up
25	0,315	Fall	-	-	-

While the reliability test of peer questionnaire instruments uses the Alpha Cronbach formula (Arikunto, 2010: 239). The reliability tests of numerical ability tests and mathematics learning achievement tests use the KR-20 formula (Sugiyono, 2015: 186). After the data has been collected, a descriptive data analysis is then performed, testing the hypothesis. After the data has been collected, a descriptive data analysis is then performed, testing the hypothesis. Analysis prerequisite tests that must be met include normality tests using Chi-squared. (Khasanah, Uswatun, 2014: 8). Independent test and linearity test. To test the hypothesis used t-test and F-test. for the t-test (Sudjana, 2005: 377) using the formula:

$$t_{count} = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

With :

r : Correlation coefficient

n : Number of Samples

RESULTS AND DISCUSSION

1. Description of Research Results

- a. Peer to peer grade XI IPA 1 SMA Negeri 1 Girimulyo Kulon Progo Semester Odd academic year 2017/2018 is included in the high category because the most significant frequency is located at intervals of $95.343 \leq X < 84.448$, which is as much as nine students or 37.5%.

- b. The numerical capability of grade XI IPA 1 SMA Negeri 1 Girimulyo Kulon Progo Semester Odd doctrinal year 2017/2018 is including in the category of $91.462 \leq X < 84.118$ with 14 students at 58.333%.
 - c. Results of learning Mathematics grade XI IPA 1 SMA Negeri 1 Girimulyo Kulon Progo Odd Semester of school year 2017/2018 is included in the category height $X \leq 75$ with 13 students 54.167%.
2. Test result normality. The normality test found that the peer variables, numerical ability variables, and mathematics learning outcomes variables were normally distributed. The results of the normality test for the three variables can be seen in table 2.

Table 3. Normality Test Results

No	Variable	X_{count}^2	X_{table}^2	df	Info.
1	Peers (X_1)	5,261	7,8147	3	Normal
2	Numerical ability (X_2)	0,408	3,8415	1	Normal
3	Mathematics Learning Results (Y)	6,580	7,8147	3	Normal

3. Results of the linearity test. Based on the test interference, linearity obtained that peer variables, variable numerical ability, and Variabel learning results of linear mathematics. The linearity test results can be seen in table 3.

Table 4. Linearity Test Results

No.	Variable	F_{count}	F_{table}	Info.
1	X_1 and Y	0,897	3,92	Linear
2	X_2 and Y	1,363	2,93	Linear

4. Independent Test Results. Based on the independent test results, it was found that the peer and numerical ability variables were mutually independent. Independent test results can be seen in table 4.

Table 5. Independent Test Results

No	Variable	X_{count}^2	X_{table}^2	df	Info.
1	X_1 and X_2	35,333	37,6525	25	Independent

5. Hypothesis Testing

- a. Testing the first hypothesis. Testing the significance of the correlation coefficient by using the t-test results obtained $t_{count} = 1,900$ and $t_{table} = 1,7171$. at a significant level of 5% and $df = n - 2 = 22$, with $n = 24$. In order to obtain $t_{count} > t_{table}$, so $H_{0,1}$ is rejected, and $H_{1,1}$ is accepted. So there is a positive and significant relationship between peers with the learning outcomes of students of class XI IPA 1 in SMA Negeri 1 Girimulyo Odd Semester 2017/2018 Academic Year. It also obtained a simple regression equation Y for X_1 is $\hat{Y} = 45,398 + 0,331X_1$.
- b. Testing the second hypothesis. In testing the significance of the correlation coefficient by using t-test results obtained $t_{count} = 2,115$ and $t_{table} = 1,7171$. at a significant level of 5% and $df = n - 2 = 22$, with $n = 24$. In order to obtain $t_{count} > t_{table}$, so $H_{0,2}$ is rejected, and $H_{1,2}$ is accepted. So there is a positive and significant relationship between numerical ability and mathematics learning outcomes of students of class XI IPA 1 SMA Negeri 1 Girimulyo Odd Semester 2017/2018 Academic Year. It also obtained a simple regression equation for Y over X_2 is $\hat{Y} = 27.943 + 0.505X_2$.
- c. Third hypothesis testing. In testing the significance of the correlation coefficient using the F-test obtained $t_{count} = 2,115$ and $t_{table} = 1,7171$ at a significant level of 5%, the degree of freedom of the numerator $V_1 = 2$ and the degree of freedom of the denominator $V_2 = 21$. To obtain $F_{count} > F_{table}$, the third hypothesis was tested with $H_{0,3}$ rejected and $H_{1,3}$ accepted.

So there is a positive and significant relationship between peers and numerical ability with mathematics learning outcomes of students of class XI IPA 1 SMA Negeri 1 Girimulyo Odd Semester Academic Year 2017/2018. It also obtained the double linear regression equation X_1 and X_2 is $\hat{Y} = -16,723 + 0,428X_1 + 0,632X_2$.

The results of the research obtained is there is a relationship between peers and numerical ability towards learning Outcomes Mathematics student Grade XI IPA Negeri 1 Girimulyo Regency Kulon Progo Semester Odd school year 2017/2018. Here is a discussion of research results:

1. The first hypothesis test result is that there is a positive and significant relationship between the peer-to-peer learning Mathematics student XI IPA 1 SMA Negeri 1 Girimulyo Semester odd doctrinal year 2017/2018. In other words, when peers are high, the results of mathematics learning will be increased. The simple correlation coefficient (r) between peers and math learning results of 0.376 with a linear regression equation Y over X_1 is $\hat{Y} = 45,398 + 0,331 X_1$. Consequently, any increase in X_1 increased \hat{Y} .
2. The second hypothesis test result is a positive and significant relationship between numerical ability with learning outcome of students mathematics grade XI IPA 1 SMA Negeri 1 Girimulyo Odd Semester school year 2017/2018. If the numeric capability is high, then the math learning results will be increased. The simple correlation coefficient (r) between numerical ability and mathematical learning results of 0.169 with a linear regression equation Y over X_2 is $\hat{Y} = 27,943 + 0,505X_2$; consequently, each increase of X_2 increased \hat{Y} .
3. The result of the third hypothesis test is there is a positive and significant relationship between peers, and numerical ability with learning outcomes of student Mathematics grade XI IPA 1 SMA Negeri 1 Girimulyo Semester Odd school year 2017/2018. In other words, increasingly, when peers have a high numerical ability, the results of mathematics learning will increase. The double correlation coefficient (R) between peers and numerical ability of the math learning results of 0.628 with a linear regression equation Y over X_1 and X_2 is $\hat{Y} = -16,723 + 0,428X_1 + 0,632X_2$. With a relative donation of 46.281% from X_1 , 53.719% of X_2 as well as an effective donation of 18.230% from X_1 , 21.160% from X_2 .

Table 6. relative donation and effective donation between variables freely

Variable	Relative donation	Effective donations
Peers (X_1)	46,281%	18,230%
Numerical ability (X_2)	53,719%	21,160%
Amount	100%	39,390%

This suggests that numerical ability gives the most significant relationship to mathematical learning results compared to peers. Once known, peers and numerical abilities are influential and significant towards students' mathematical learning outcomes. This means the rise and fall of student math learning outcomes relate to good peers and numerical abilities. The high.

It can be seen that the relative donation generated by a peer-free variable (X_1) is the Sebasar 46.281%, as well as previous research conducted by Astuti (2014), which suggests that the relative contributions produced by Peer of 13.7081%. This means that peers give less influence over learning outcomes, and other factors influence the rest. While the relative contributions generated by the variable-free numeric capability (X_2) amounted to 53.719% as well as the previous research was done by Gusrindadewi (2016), which suggests that the relative contributions produced by Numeric capability of 60, 3584%. This means that numerical capabilities have a greater influence on learning outcomes than other factors.

CONCLUSION

Based on the research results, it can be taken some research conclusions as follows:

1. There is a positive and significant relationship between peers with learning outcomes Mathematics student Grade XI IPA 1 SMA Negeri 1 Girimulyo Odd Semester school year 2017/2018. It is

- demonstrated with the T-Test, that is, so $t_{count} > t_{table}$ or $1,900 > 1,7171$. Also, it is acquired linear regression equation $\hat{Y} = 45,398 + 0,331 X_1$.
2. There is a positive and significant relationship between numerical ability with the outcome of learning mathematics student grade XI IPA 1 SMA Negeri 1 Girimulyo Odd Semester school year 2017/2018. It is demonstrated with the T-Test, that is, so $t_{count} > t_{table}$ or $2,115 > 1,7171$. Also, it is an acquired regression equation $\hat{Y} = 27,943 + 0,505X_2$.
 3. There is a positive and significant relationship between peers and numerical ability with learning outcomes of students of the Mathematics class XI IPA 1 Odd Semester SMA Negeri 1 Kulon Progo school year 2017/2018. It is shown with the F test, i.e. $F_{count} = 6,824$ and $F_{table} = 3,47$, so that $F_{count} > F_{table}$ or $6,824 > 3,47$. Also, it is obtained equations linear line $\hat{Y} = -16,723 + 0,428X_1 + 0,632X_2$. Large donations were relative to X_1 of 46.281% and X_2 by 53.719%, as well as an effective donation of X_1 of 18.230% and X_2 of 21.160%.

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