

THE RELATIONSHIP BETWEEN NUMERICAL ABILITY, STUDENTS' ATTITUDE ON MATH LESSON, AND LEARNING CYLINES WITH MATHEMATICS LEARNING OUTCOMES

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ABSTRACT

Low student learning outcomes are associated with many factors. The relationship between numerical ability, students' attitudes on a math lesson, and learning lines is possibly related to learning outcomes. This research aims to determine the presence or absence of a positive and significant relationship between numerical ability, students' attitudes on a math lesson, and learning lines to mathematics learning outcomes in students class VIII of Junior High School (SMP) Muhammadiyah 9 Yogyakarta in Even Semester in Academic Year of 2016/2017. The population in this research was the students of VIII of SMP Muhammadiyah 9 Yogyakarta in 2016/2017, consisting of class VIII A, VIII B, VIII C, VIII D, VIII E, totaling 162 students. Class VIII E was selected as a class of research sample with a random sampling technique. The writer uses the questionnaire method to collect students' attitudes on math lessons and learning lines. The test method to get numerical ability data and math is resulting in learning. The research instrument: validity test, different power test, and reliability test. Test requirement analysis includes a test of normality, a test of linearity, and independence. The writer uses product-moment correlation analysis and multiple linear regression analysis to analyze the data. The results showed a positive and significant relationship between numerical ability, students' attitudes on a math lesson, and learning lines with mathematics learning outcomes in students class VIII of SMP Muhammadiyah 9 Yogyakarta in Even Semester in Academic Year of 2016/2017. It is showed by $F_{count} > F_{table}$ is $3,5767 > 2,99$ with $R = 0,5480$ and $R^2 = 0,3003$ with $\hat{Y} = -12,4124 + 0,3535X_1 + 0,2988X_2 + 0,1703X_3$, with $RC X_1 = 47,5006\%$, $RC X_2 = 36,6007\%$ and $RC X_3 = 15,8993\%$, $EC X_1 = 14,2650\%$, $EC X_2 = 10,9916\%$ dan $EC X_3 = 4,7747\%$.

Keywords: Numerical Ability, Students' Attitudes on Math Lesson, Learning Cylines, Mathematics Learning Outcomes.

INTRODUCTION

Education is a need that must be met in society, nation, and state. National education based on Pancasila and the 1945 Constitution of the Republic of Indonesia functions to develop capabilities and shape the character and civilization of a dignified nation to educate the life of the nation, aiming to develop the potential of students to become human beings who believe in and fear God Almighty, noble, healthy, knowledgeable, capable, creative, independent, and become citizens of a democratic and responsible. In this case, the government's obligation to implement a national education system that refers to the Pancasila and the Law is expected to form a generation of the nation's qualified and able to compete and adjust to the increasingly advanced era technological globalization.

Many factors can influence learning outcomes. These factors can be grouped into two, namely: external factors and internal factors. External factors affect learning outcomes outside the student, including the teacher, curriculum, environment, facilities, infrastructure, etc. At the same time, internal factors affect learning outcomes from within students themselves, including intelligence/intelligence, attitudes, interests, discipline, talent, motivation, etc.

Based on the observation that the VIII grade students of SMP Muhammadiyah 9 Yogyakarta are still low, this is seen from the average mathematics scores in the Mid-Semester Assessment (Midterm) class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year.

One internal factor that affects student learning outcomes is numerical ability. According to Jim Barrett and Geoff Williams (1996: 67), Numerical ability is the ability to think with numbers (numbers) rather than manipulate them. According to Slameto in Milatina, Atika (2007: 14), numerical abilities include standard abilities about numbers, numerical abilities that contain reasoning, and algebraic skills. The ability to operate numbers includes the operations of adding, subtracting, multiplying, and dividing. From some of the opinions and definitions above, it can be concluded that numerical ability is the ability to calculate reasoning with numbers, so numerical ability affects the ability of students to understand and solve mathematical problems, especially also, subtraction, multiplication, and division.

In addition to numerical ability, students' attitudes toward mathematics affect students that affect learning outcomes. According to Slameto (2010: 188), attitude is learned, and attitude determines how individuals react to situations and determine what individuals look for in life. In Slameto (2010: 188-189), Attitudes are always about an object, and positive or negative feelings accompany attitudes toward an object. People who have a positive attitude toward an object that is valuable in their view will be negative about an object that is considered worthless and or detrimental. This attitude then underlies and leads to several activities that are related to one another. In Azwar, Saifuddin (2011: 5-6) some understanding of attitudes according to experts. According to La Pierre, attitude is a pattern of behavior, tendency or anticipatory readiness, predisposition to adapt to social situations, or attitude response to a social stimulus that has been conditioned. According to Secord and Backman, attitude is a certain regularity in terms of feelings (affection), thought (cognition), and predisposition to one's actions to an aspect in the surrounding environment. According to Pretty and Cacioppo, attitude is a general evaluation made by humans towards themselves, others, objects, or issues.

From the various opinions above, it can be concluded that attitude is an internal factor in a person's behavior patterns regarding feelings, thoughts, and actions instrumental in taking action against an object around it. Thus, mathematics's attitude is a student's behavior pattern in feelings, thoughts, and actions towards mathematics. Attitude tendencies can be subjective, namely, positive attitudes and negative attitudes. One internal factor that affects student learning outcomes is a student learning discipline. According to Wijaya, Cece, and A. Tabrani Rusyan (1994: 18), discipline lies in the heart and soul of a person, which encourages the person concerned to do something or not do something as determined by applicable norms and regulations. According to Nawawi H (1984: 128), discipline attempts to instill awareness in each person about his duties and responsibilities to become willing and assume responsibility for all his work. According to The Liang Gie in Imron, Ali (2011: 172), discipline is an orderly situation where people who are members of an organization are subject to the rules that have been there with pleasure.

From the opinions above, it can be concluded that the discipline of learning is the behavior and actions of students to carry out learning activities responsibly and obediently by the rules and norms that have been agreed to with pleasure. Student mathematics learning outcomes at Yogyakarta SMP Muhammadiyah 9 is still low. This is because mathematics in education in schools is a subject to be feared by students. Students consider mathematics difficult and quickly give up when assigned to solve math problems because they cannot.

This study's problems are: 1) Is there a positive and significant relationship between numerical ability and mathematics learning outcomes of class VIII students in the even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year? 2) Is there a positive and significant relationship between students' attitudes towards mathematics and mathematics learning outcomes for students of class VIII in the even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year? 3) Is there a positive and significant relationship between students' mathematics learning discipline and mathematics learning outcomes for class VIII students in the even semester of SMP Muhammadiyah 9 Yogyakarta in the 2016/2017 school year? 4) Is there a positive and significant relationship between numerical ability and students' attitudes toward mathematics with mathematics learning outcomes of students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year? 5) Is there a positive and significant relationship between numerical ability and student learning discipline

with mathematics learning outcomes for students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year? 6) Is there a positive and significant relationship between students' attitudes towards mathematics and student learning discipline with mathematics learning outcomes for students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year? 7) Is there a positive and significant relationship between numerical ability, students' attitudes toward mathematics, and student learning discipline with mathematics learning outcomes for students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year?

The purpose of this study is to find out: 1) The presence or absence of a positive and significant relationship between numerical ability and mathematics learning outcomes of students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 academic year, 2) The presence or absence of a positive and significant relationship between students' attitudes towards mathematics subjects with mathematics learning outcomes for students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 academic year, 3) Whether or not there is a positive and significant relationship between student discipline in mathematics learning with mathematics learning outcomes of students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta year 2016/2017 teaching, 4) Whether or not there is a positive and significant relationship between numerical ability and students' attitudes toward mathematics with mathematics learning outcomes for students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year, 5) Whether or not there is a relationship positive and significant antara the numerical ability and discipline of student learning with mathematics learning outcomes for students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 academic year, 6) Whether or not there is a positive and significant relationship between students' attitudes toward mathematics and student learning discipline with mathematics learning outcomes 8th grade students even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 academic year, 7) Whether or not there is a positive and significant relationship between numerical ability, students' attitudes towards mathematics, and student learning discipline with mathematics learning outcomes of students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year.

METHODS

This research is classified as quantitative research. The research subjects were carried out at SMP Yogyakarta Muhammadiyah 9 with research subjects in class VII even semester 2016/2017 academic year. This study's population was students of class VIII, even the SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year, amounting to 162. Consisting of classes VIII A, VIII B, VIII C, VIII D, and VIII E. While the samples in this study were determined samples randomly to class, that is, by lottery class. Classes taken as a sample class are VIII B with 29 students. The variables used in this study include the independent variables and the dependent variable. The independent variable consists of Numerical Ability (X_1), students' attitudes toward mathematics (X_2), and learning discipline (X_3). In contrast, the dependent variable is mathematics learning outcomes (Y).

In this study, the data collection techniques used were questionnaires and tests. The questionnaire technique was used to obtain data on students' attitudes toward mathematics and learning discipline. The test technique was to obtain data on numerical abilities and student mathematics learning outcomes. The questionnaire test uses the reviewers' content validity test and the instrument reliability test with the alpha formula. In contrast, the test instrument questions use the content validity test by the reviewers and the product-moment correlation technique, the difference power test, and the reliability test with the KR-20 formula.

Analysis prerequisite test with normality test with Chi-squared formula, linearity test of the F-test formula, and independent test of Chi-squared formula. Research hypothesis testing uses a simple correlation test, multiple regression analysis tests, and multiple linear regression tests with three independent variables. The research hypothesis test uses a simple correlation test performed to determine the presence or absence of positive and significant relationships between 1) numerical ability

with student mathematics learning outcomes, 2) students' attitudes towards mathematics with student mathematics learning outcomes, 3) disciplined learning with student learning outcomes in mathematics. Furthermore, the research hypothesis test uses multiple regression analysis tests carried out to determine the presence or absence of a positive and significant relationship between 1) numerical ability and student attitudes towards mathematics subjects with student mathematics learning outcomes, 2) numerical ability and disciplined learning with learning outcomes student mathematics, 3) students' attitudes towards mathematics and discipline of learning with student mathematics learning outcomes. Whereas the multiple linear regression test with three independent variables was conducted to determine the presence or absence of a positive and significant relationship between numerical ability, students' attitudes towards mathematics, and learning discipline with student mathematics learning outcomes.

RESULTS AND DISCUSSION

The summary of normality test results can be seen in Table 1.

Table 1. The summary of the normality test

Variable	χ^2_{count}	χ^2_{table}	df	Info.
X ₁	2,3933	7,8147	3	Normal
X ₂	0,4098	5,9915	2	Normal
X ₃	2,7920	7,8147	3	Normal
Y	2,0932	5,9915	2	Normal

From the normality test at a significant level of 5%, it is seen $\chi^2_{\text{count}} \leq \chi^2_{\text{table}}$. This means that the distribution of data obtained on each variable is normally distributed.

As for the summary of independence, test results can be seen in Table 2.

Table 2. Independent Test Results

Variable	χ^2_{count}	χ^2_{table}	df	Info.
X ₁ and X ₂	29,6473	37,6525	25	Independent
X ₁ and X ₃	22,4060	37,6525	25	Independent
X ₂ and X ₂	35,3622	37,6525	25	Independent

From the independence test at a significant level of 5% ($\alpha = 0.05$) and the degree of freedom (df) = (k-1) (b-1), it is seen that $\chi^2_{\text{count}} \leq \chi^2_{\text{table}}$, this means that the distribution of data obtained at each - each variable is independent.

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

Table 3. Linearity Test Results

Variable	F _{count}	F _{table}	Info.
X ₁ and Y	-1,432	2,48	Linear
X ₂ and Y	1,1109	3,16	Linear
X ₃ and Y	1,5256	3,16	Linear

From the linearity test at the 5% significance level and $v_1 = k - 2$ and $v_2 = n - k$, we can see $F_{\text{count}} \leq F_{\text{table}} (1-\alpha) (k-2, n-k)$, this means that there is a linear relationship between independent variables (X) and the dependent variable (Y).

The summary of the results of the first hypothesis test can be seen in table 4.

Table 4. Summary of First Hypothesis Test Results

t _{count}	t _{table}	df	Information
2,8269	1,7033	27	H ₀ rejected, H ₁ accepted

From the first hypothesis test at a significant level of 5%, it was seen $t_{\text{count}} > t_{\text{table}}$, which means a positive and significant relationship between numerical ability and mathematics learning outcomes of VIII grade students even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year.

The summary of the results of the second hypothesis test can be seen in table 5.

Table 5. Summary of Second Hypothesis Test Results

t_{count}	t_{table}	df	Information
2,6550	1,7033	27	H_0 rejected, H_1 accepted

From the second hypothesis test at a significant level of 5%, it is seen $t_{\text{count}} > t_{\text{table}}$, which means that there is a positive and significant relationship between students' attitudes toward mathematics with mathematics learning outcomes for students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year.

The summary of the results of the third hypothesis test can be seen in table 6.

Table 6. Summary of Third Hypothesis Test Results

t_{count}	t_{table}	df	Information
7,2134	1,7033	27	H_0 rejected, H_1 accepted

The third hypothesis test at a significant level of 5% is seen $t_{\text{count}} > t_{\text{table}}$, which means a positive and significant relationship between learning discipline and mathematics learning outcomes of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 academic year.

The summary of the results of the fourth hypothesis test can be seen in table 7.

Table 7. Summary of Fourth Hypothesis Test Results

F_{count}	F_{table}	df	Information
5,2759	3,37	$v_1 = 2$ $v_2 = 26$	H_0 rejected, H_1 accepted

From the fourth hypothesis test at a significant level of 5%, $F_{\text{count}} > F_{\text{table}}$ which means there is a positive and significant relationship between numerical ability and students' attitudes towards mathematics learning subjects with mathematics learning outcomes of VIII grade students even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year.

The summary of the results of the fifth hypothesis test can be seen in table 8.

Table 8. Summary of Fifth Hypothesis Test Results

F_{count}	F_{table}	df	Information
4,6151	3,37	$v_1 = 2$ $v_2 = 26$	H_0 rejected, H_1 accepted

From the fifth hypothesis test at a significant level of 5%, $F_{\text{count}} > F_{\text{table}}$, there is a positive and significant relationship between numerical ability and disciplined learning with mathematics learning outcomes of students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year.

The summary of the results of the sixth hypothesis test can be seen in table 9.

Table 9. Summary of Sixth Hypothesis Test Results

F_{count}	F_{table}	df	Information
4,0588	3,37	$v_1 = 2$ $v_2 = 26$	H_0 rejected, H_1 accepted

From the sixth hypothesis test at a significant level of 5%, $F_{\text{count}} > F_{\text{table}}$, which means there is a positive and significant relationship between students' attitudes toward mathematics and learning discipline with mathematics learning outcomes of VIII grade students even semester of SMP

Muhammadiyah 9 Yogyakarta 2016/2017 school year. The summary of the results of the seventh hypothesis test can be seen in Table 10.

Table 10. Summary of Seventh Hypothesis Test Results

F_{count}	F_{table}	df	Information
3,5767	2,99	$v_1 = 3$ $v_2 = 25$	H_0 rejected, H_1 accepted

From the seventh hypothesis test at a significant level of 5%, $F_{\text{count}} \geq F_{\text{table}}$ There is a positive and significant relationship between numerical ability, students' attitudes toward mathematics and learning discipline with mathematics learning outcomes for students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016 / 2017.

CONCLUSION

Based on the analysis of the experimental data and its discussion, this activity concludes the following:

1. There is a positive and significant relationship between numerical ability and mathematics learning outcomes for class VIII students in the even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year. This is indicated by the t-test that is $t_{\text{count}} > t_{\text{table}}$ or $2.8269 > 1.7033$. The simple correlation coefficient (r) between numerical ability and mathematics learning outcomes is 0.4779. And the simple regression equation Y for X_1 is $\hat{Y} = 19.8235 + 0.5629$.
2. There is a positive and significant relationship between students' attitudes towards mathematics and mathematics learning outcomes of class VIII students in the even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year. This is indicated by the t-test, namely $t_{\text{count}} > t_{\text{table}}$ or $2.6550 > 1.7033$. The simple correlation coefficient (r) between students' attitudes toward mathematics with mathematics learning outcomes was 0.4550. In addition, a simple regression equation for Y over X_2 is also obtained $\hat{Y} = -1.9117 + 0.5627X_2$.
3. There is a positive and significant relationship between learning discipline and mathematics learning outcomes for class VIII students in the even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year. This is indicated by the t-test that is $t_{\text{count}} > t_{\text{table}}$ or $7.2134 > 1.7033$. The simple correlation coefficient (r) between learning discipline with mathematics learning outcomes of 0.8114. Also, a simple regression equation of Y for X_3 is obtained as well as $\hat{Y} = 0.1146 + 0.5153X_3$.
4. There is a positive and significant relationship between numerical ability and students' attitudes towards mathematics learning subjects with mathematics learning outcomes of students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year. This is indicated by the F test that is $F_{\text{count}} > F_{\text{table}}$ or $5.2759 > 3.37$. The multiple correlation coefficient (R) between numerical ability and students' attitudes towards mathematics with mathematics learning outcomes is 0.5373. The coefficient of determination (R^2) is 0.2887 with linear line equations $\hat{Y} = -3.3891 + 0.3917X_1 + 0.3551X_2$. The relative contribution of X_1 is 54.7519%, and X_2 is 45.2480%, and the effective contribution of X_1 is 15.8063%, and X_2 is 13.0636%.
5. There is a positive and significant relationship between numerical ability and discipline of learning with mathematics learning outcomes for students of class VIII in the even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year. This is indicated by the F test that is $F_{\text{count}} > F_{\text{table}}$ or $4.6151 > 3.37$. The correlation coefficient (R) between numerical ability and learning discipline with mathematics learning outcomes is 0.5119. The coefficient of determination (R^2) is 0.2620 with a linear line equation $\hat{Y} = -0.8039 + 0.4573X_1 + 0.2762X_3$. The relative contribution of X_1 was 70.4402%, and X_3 was 29.5612%, and the effective contribution of X_1 was 18.4553%, and X_3 was 7.7447%.
6. There is a positive and significant relationship between students' attitudes towards mathematics and the discipline of learning with mathematics learning outcomes of students of class VIII even

semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year. This is indicated by the F test, which is $F_{\text{count}} > F_{\text{table}}$ or $4.0588 > 337$. The correlation coefficient (R) between students' attitudes towards mathematics and discipline of learning with mathematics learning outcomes of 0.4878 and the coefficient of determination (R^2) of 0.2380 with linear line equations $\hat{Y} = -16.4614 + 0.4417X_2 + 0.2691X_3$. The relative contribution of X_2 was 68.2899% , and X_3 amounted to 31.7101%, and the effective contribution of X_2 amounted to 16.2462%, and X_3 amounted to 7.5438%.

7. There is a positive and significant relationship between numerical ability, students' attitudes towards mathematics, and discipline of learning with mathematics learning outcomes of students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 academic year. This is indicated by the F test, which is $F_{\text{count}} > F_{\text{table}}$ or $3.5767 > 2.99$. The correlation coefficient (R) between numerical ability, students' attitudes toward mathematics, and discipline of learning with mathematics learning outcomes is 0.5480. The coefficient of determination (R^2) is 0.3003 with a linear line equation $\hat{Y} = -12.4124 + 0.3535X_1 + 0.2988X_2 + 0.1703X_3$. The amount of relative contribution X_1 is 47,5006%, X_2 is 36,6007% and X_3 is 15,8993% and effective contribution is X_1 of 14.2650%, X_2 of 10.9916% and X_3 of 4.7747%.

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