

THE RELATIONSHIP AMONG LEARNING INDEPENDENCE, THE LOGICALLY THINKING ABILITY AND LEARNING ENVIRONMENT AT HOME WITH MATHEMATICS LEARNING OUTCOMES OF STUDENTS GRADE XI OF AUDIO VIDEO MECHANICAL DEPARMENT IN SMK NEGERI 1 PUNDONG BANTUL YOGYAKARTA

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ABSTRACT

The lack of seriousness and independence of student learning, logically thinking ability of students who have not undeveloped, and learning environment at home that is not conducive are factors which affect the results of learning mathematics. This research aims to determine whether there is a positive and significant relationship among learning independence, logically thinking ability and learning environment at home with mathematics learning outcomes of students grade XI of audio video mechanical (AVM) department in SMK Negeri 1 Pundong Bantul Yogyakarta in even semester in academic year of 2015/2016. The population in this research is a class XI AVM student of SMK Negeri 1 Pundong. Samples were taken using the techniques random sampling and obtained a class XI AVM as a sample. The data collection was conducted by questionnaire and tests. Testing instrument using validity test, different power test and reliability test. Data were analyzed using analysis prerequisite test including normality test and independently using Chi-square formula, linearity test using the formula F-test and hypothesis testing using t-test. The results showed a positive and significant correlation between: (1) learning independence with mathematics learning outcomes, with $(r^2) = 0,1534$ and $\hat{Y} = 5,1558 + 0,7750 X_1$; (2) the ability to think logically with mathematics learning outcomes, with $(r^2) = 0,3524$ and $\hat{Y} = (-33,5748) + 1,3700 X_2$; (4) learning and the ability to think logically with mathematics learning outcomes, with $(R^2) = 0,4276$ and $\hat{Y} = (-70,6106) + 0,5545 X_1 + 1,2354 X_2$; (6) the ability to think logically and learning environment at home with mathematics learning outcomes, with $(R^2) = 0,3628$ and $\hat{Y} = (-44,7768) + 1,3135 X_2 + 0,1796 X_3$; (7) learning independent, the ability to think logically and learning environment at home with mathematics learning outcomes, with $(R^2) = 0,4276$ and $\hat{Y} = (-71,3491) + 0,5469 X_1 + 1,2310 X_2 + 0,0197 X_3$.

Keywords: Learning Independence, Logically Thinking Ability , Learning Environment at Home, Mathematics Learning Outcomes.

INTRODUCTION

The implementation of education in Indonesia is carried out through formal education, non-formal education and informal education. Formal education is a structured and tiered educational path consisting of basic education, secondary education and higher education. One of the subjects studied by students in each field of expertise is mathematics. As a basic science, mathematics has an important role in supporting the development of science and technology. However, mathematics is different from social lessons that can be learned only by memorizing. To understand mathematical concepts in depth must first understand the basic concepts of mathematics. In general, the characteristics of mathematics are having an object of study that is abstract, related to ideas, processes and reasoning and is related to concepts and logical proof (Suherman, Erman et al, 2003: 16-17). So that requires students to be more careful, thorough and diligent so that success in learning mathematics can be achieved.

One factor that comes from within students (internal) which plays a role in the learning process is learning independence. Independence of learning is a situation where a child tries to learn independently with his abilities, is able to learn on his own initiative or without help from other parties in terms of determining learning goals, learning methods, and evaluating learning outcomes and having

the spirit that arises from oneself without any coercion from other parties. A student who has the desire to learn independently means that he has realized the importance of improving learning outcomes.

According to Ali, Mohammad et al. (2012: 110), independence is the third essential element of morality that comes from people's lives. Independence grows and develops because of two factors that are prerequisites for independence, namely (1) discipline, namely the rules of action and authority, (2) commitment to the group. Therefore, independent individuals are those who dare to make decisions based on understanding of the consequences of their actions. "According to Mu'tadin in Nurhayati, Eti (2011: 132) states that independence means: (a) a condition in which a person have the desire to compete to advance for the good of himself, (b) be able to take decisions and initiatives to overcome the problem at hand, (c) have confidence in doing the tasks and are responsible for what is done.

Another factor that comes from within students (internal) is the ability to think logically. The ability to think logically is the ability to understand concepts - concepts that are quantity, time and causality, determine new relationships to get answers, methods, and new ways of solving problems, especially problems in mathematics. Students who are able to develop the ability to think logically in themselves during math lessons tend to be able to achieve success in learning.

Suryabrata, Sumadi (1987: 54) states that thinking is a dynamic process that can be described according to the process or path. Thinking logically is a process of thinking using logic, rational and reasonable. By logical thinking, a student will be able to process phenomena that are received by the sensory system so that they can raise questions that are related and intriguing to find answers.

In addition to internal factors, external factors that influence student learning outcomes are learning environments at home. The environment at home plays a very important role in creating a conducive learning atmosphere. In order to create a conducive learning atmosphere, the environment at home should be comfortable, safe, calm, adequate learning facilities, and interaction between harmonious family members and parents care about children's learning activities.

According to Walgito, Bimo. (2004: 154-155), a good learning environment can be created if: 1) The place of learning is good, 2) The learning tools are complete, 3) The learning atmosphere supports, 4) The learning time is right, and 5) The interaction with children who like learn. Seandgkan According to Slameto (2010: 60-64), students who learn will receive relationships from parents, among others in the form of: 1) The way parents educate, 2) The atmosphere of the house, and 3) Attention parents.

The problems in this research are is there a positive and significant relationship between learning independence, logical thinking skills and the learning environment of students at home with the mathematics learning outcomes of class XI AVM in the SMK N 1 Pundong Bantul in the academic year of 2015/2016. And the purpose of this research is to find out whether there is a positive and significant relationship between learning independence, logical thinking skills and the learning environment of students at home with the results of mathematics learning in class XI AVM of SMK 1 Pundong, Bantul Regency in even semester in the academic year of 2015/2016.

METHODS

This type of research used the form of experimental design in the form of a model of the relationship between the three independent variables with bound variables (Sugiyono, 2013: 69). In this study using one class, namely the sample class. The population in this study were all students of class XI AVM of SMK Negeri 1 Pundong, Bantul Regency in the academic year of 2015/2016, which amounted to 68 students. If the sample in this study is class XI AVM A, the sampling technique used is Random Sampling of the class. Data collection techniques used were questionnaire techniques with instruments in the form of questionnaires and test techniques in the form of objective questions of multiple choice forms. Prerequisite test analysis by testing the normality of the Chi-squared formula, testing the independence of the Chi-square formula and the linearity test of the F-test formula. The research hypothesis test used a simple correlation test, multiple regression analysis and multiple linear regression tests with three independent variables. The research hypothesis test used a simple correlation

test to find out whether there is a positive and significant relationship between: 1) learning independence with students' mathematics learning outcomes, 2) the ability to think logically with students' mathematics learning outcomes and 3) a learning environment at home with learning outcomes student mathematics. Furthermore, the research hypothesis test using a multiple regression analysis test was conducted to determine whether or not there is a positive and significant relationship between: 1) learning independence and logical thinking skills learning with students' mathematics learning outcomes, 2) learning independence and learning environment at home with mathematics learning outcomes students and 3) logical thinking skills and learning environments at home with student mathematics learning outcomes. As a double linear regression test with three independent variables is done to determine whether there is a positive and significant relationship between learning independence, logical thinking skills and the learning environment at home with student mathematics learning outcomes.

RESULT AND DISCUSSION

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

Table 1. Summary of Normality Test Results

Research variable	χ^2_{count}	Dk	χ^2_{table}
X ₁	2,111	4	9,488
X ₂	0,953	2	5,591
X ₃	1,267	3	7,815
Y	7,203	3	7,815

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

The summary results of the independent test of the initial ability can be seen in Table 2.

Table 2. Independent Test Result Summary

Var. Research	χ^2_{count}	χ^2_{table}
X ₁ and X ₂	14,356	37,652
X ₁ and X ₃	21,795	37,652
X ₂ and X ₃	30,049	37,652

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

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

Table 3. Summary of Linearity Test Results

Variable	F _{count}	F _{table}
X ₁ and Y	0,3521	2,6358
X ₂ and Y	1,9304	2,3201
X ₃ and Y	0,5320	2,7541

From the linearity test at a significant level of 5% ($\alpha = 0.05$) and the degree of freedom v_1 numerator $k - 2$ and v_2 denominator $n - k$ seen $F_{count} \leq F_{table(1-\alpha)(k-2, N-k)}$, this means that there is a linear relationship between the independent variable (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
2,4079	2,0369	32	H ₀ rejected, H ₁ accepted

From the first hypothesis test at a significant level of 5% and $df = 32$, it can be seen that $t_{count} = 2,4079$ and $t_{table} = 2,0369$ so that $t_{count} > t_{table}$ which means that there is a positive and significant relationship between learning independence and the mathematics learning outcomes of class XI AVM students of SMK 1 Pundong, Bantul district, even semester in the academic year of 2015/2016.

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

Table 5.Summary of Results of the Second Hypothesis Test

t_{count}	t_{table}	df	Information
2,4079	2,0369	32	H ₀ rejected, H ₁ accepted

From the second hypothesis test at a significant level of 5% and $df = 32$, it can be seen that $t_{count} = 2,4079$ and $t_{table} = 2,0369$ so that $t_{count} > t_{table}$ which means that there is a positive and significant relationship between the ability to think logically and the mathematics learning outcomes of class XI TAV students of SMK 1 Pundong, Bantul district, even semester in the academic year of 2015/2016.

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_{hcount}	t_{table}	Df	Information
1,3848	2,0369	32	H ₀ accepted, H ₁ rejected

From the third hypothesis test at a significant level of 5% and $df = 32$, it can be seen that $t_{count} = 1,3848$ and $t_{table} = 2,0369$ so that $t_{count} < t_{table}$ which means there is no positive and significant relationship between the home learning environment and the mathematics learning outcomes of class XI AVM students of SMK 1 Pundong Bantul district in the even semester in the academic year of 2015/2016.

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

Table 7.Summary of Test Results for the Fourth Hypothesis

F_{count}	F_{table}	Df	Information
11,5756	3,3048	$v_1 = 2$ $v_2 = 31$	H ₀ rejected, H ₁ accepted

From the fourth hypothesis test at a significant level of 5%, v_1 numerator = 2 and v_2 numerator = 31 so that it can be obtained $F_{count} = 11,5756$ and $F_{table} = 3,3048$ so that $F_{count} \geq F_{table}$ which means that there is a positive and significant relationship between independence of learning and the ability to think logically with the mathematics learning outcomes of class XI TAV students of SMK 1 Pundong Bantul Regency even semester 2015/2016 academic year.

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

Table 8.Summary of Test Results for the Fifth Hypothesis

F_{count}	F_{table}	Df	Information
3,0311	3,3048	$v_1 = 2$ $v_2 = 31$	H ₀ accepted, H ₁ rejected

From the fifth hypothesis test at a significant level 5%, v_1 numerator = 2 and v_2 numerator = 31 so that it can be obtained $F_{count} = 3,0311$ and $F_{table} = 3,3048$ so that $F_{count} \leq F_{table}$ which means that there is no positive and significant relationship between learning independence and the home learning environment with the mathematics learning outcomes of class XI AVM students of SMK 1 Pundong Bantul Regency in even semester in the academic year of 2015/2016.

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

Table 9.Summary of Results of the Sixth Hypothesis

F_{count}	F_{table}	Df	Information
8,8246	3,3048	$v_1 = 2$ $v_2 = 31$	H ₀ rejected, H ₁ accepted

From the sixth hypothesis test at a significant level 5%, v_1 numerator = 2 and v_2 numerator = 31 so that it can be obtained $F_{count} = 8,8246$ $F_{table} = 3,3048$ so that $F_{count} \geq F_{table}$ which means there is a positive and significant relationship between logical thinking skills and home learning environment with the results of mathematics learning in class XI AVM of SMK 1 Pundong Bantul Regency in even semester in the academic year of 2015/2016.

The summary of the results of the seventh hypothesis test can be seen in Table 10.

Table 10.Summary of the Seventh Hypothesis Test Results

F_{count}	F_{table}	Df	Information
7,4715	2,9223	$v_1 = 3$ $v_2 = 30$	H ₀ rejected, H ₁ accepted

From the seventh hypothesis test at a significant level of 5%, v_1 numerator = 3 and v_2 numerator = 30 so that it can be obtained $F_{count} = 7,4715$ and $F_{table} = 2$, so that $F_{count} \geq F_{table}$ which means that there is a positive and significant relationship between independence of learning, logical thinking skills and home learning environment with the results of mathematics learning in class XI AVM of SMK 1 Pundong Bantul Regency in even semester in the academic year of 2015/2016.

CONCLUSION

Based on the analysis of the experimental data and the discussion, this activity concludes several things as follows: Based on the analysis of the experimental data and the discussion, this activity concludes the following there is a positive and significant relationship between learning independence, logical thinking skills and home learning environment with the results of mathematics learning in class XI TAV of SMK 1 Pundong, Bantul Regency, even semester in the academic year of 2015/2016. This is indicated by the F test, which is $F_{count} = 7,4715 \geq F_{table} = 2,9223$. Correlation coefficient (R) between learning independence, logical thinking ability and home learning environment with mathematical learning outcomes of 0.6539 and coefficient of determination (R^2) of 0.4276 with linear line equation $\hat{Y} = -71,3491 + 0,5469X_1 + 1,2310 X_2 + 0,0197X_3$. The relative contribution amount X_1 is 25.3129%, X_2 is 74.0469% and X_3 is 0.6402% and the effective contribution is X_1 is 10.8248%, X_2 is 31.6653 % and X_3 of 0.2738%.

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