

THE EFFECT OF THE USE OF AUDIO VISUAL MEDIA ON STUDENT LEARNING INTEREST IN THE CONCEPT OF THE PYTHAGOREAN THEOREM

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Abstract. This study aims to determine whether there is an effect of using audio visual media on student interest in the subject matter of the Pythagorean Theorem in Class VIII of Timika Adventist Junior High School and how the effect is. The population in this study were all students of class VIII SMP Advent Timika with a total of 124 students. This study uses a significance level of 5%. The results of the T-test statistic test using the Independent Sample Test technique to test the hypothesis "Is there any effect of using audio visual media on student interest in the subject matter of the Pythagorean Theorem for Class VIII of Timika Adventist Middle School." The test results show that the tcount value of audio visual media is 2,327 and the tcount value of student learning interest is 3,327, with a Sig value of 0.000. This shows that the tcount value is greater than the ttable value of 1.671 while the Sig value is smaller than 0.05. Thus Ha is accepted and Ho is rejected, meaning "there is a significant influence of the use of audio visual learning media on students' interest in learning the main material of the pythagorean theorem class VIII Timika Adventist Middle School".

Keywords: Learning Interest, Audio Visual Media, Pythagorean Theorem Material

Abstrak. Penelitian ini bertujuan untuk mengetahui adakah Pengaruh Penggunaan Media Audio Visual terhadap Minat Belajar Siswa Pada Materi Teorema Pythagoras Kelas VIII SMP Advent Timika dan bagaimanakah pengaruh tersebut. Populasi dalam penelitian ini yang dijadikan populasi adalah seluruh siswa kelas VIII SMP Advent Timika dengan jumlah 124 siswa. Penelitian ini menggunakan taraf signifikansi 5%. Hasil uji statistik Ttest menggunakan teknik Independent Sample Test untuk menguji hipotesis "Adakah Pengaruh Penggunaan Media Audio Visual terhadap Minat Belajar Siswa Pada Materi Pokok Teorema Pythagoras Kelas VIII SMP Advent Timika." Hasil ujinya menunjukkan bahwa nilai thitung media audio visual sebesar 2.327 dan nilai thitung minat belajar siswa sebesar 3.327, dengan nilai Sig sebesar 0,000. Hal ini menunjukkan bahwa nilai thitung lebih besar dari pada nilai ttable 1,671 sedangkan nilai Sig lebih kecil dari pada 0,05. Dengan demikian Ha diterima dan Ho ditolak, artinya "ada pengaruh yang signifikan dari penggunaan media pembelajaran audio visual terhadap minat belajar siswa pada materi pokok teorema pythagoras kelas VIII SMP Advent Timika".

Kata Kunci: Learning Interest, Audio Visual Media, Pythagorean Theorem Material

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INTRODUCTION

Learning media is a tool that can help the teaching and learning process so that the meaning of the message conveyed becomes clearer and learning objectives can be achieved effectively and efficiently. The problem that is often faced by the world of education is the weakness of the learning process. In the process of teaching and learning activities, students learn more in theory. Learning in the classroom is more directed at the child's ability to understand the subject matter. While the theory that students learn lacks application in everyday life. This causes students to understand less deeply than the material of a lesson.

The role of the media in the learning process is as a tool, assisting in teaching, influencing learning motivation, learning interest and attention of students in learning, and can assist in visualizing the abstract material being taught so as to make learning more interesting (*Joyful Learning*), messages and information become clearer and able to manipulate or present objects that are difficult to reach by students, thus the media also becomes an inseparable part of the learning process. The importance of the role of media in learning requires educators to be more creative and innovative in choosing and using various learning resources and media.

Milovanovi *et al* (2013) argue that "learning media can make it easier for students to understand learning and implement knowledge in problems or exercises in learning mathematics". Other research on the impact of using media in learning mathematics according to Arsyad, Azhar (2011:), shows that "audio-visual media that utilizes images and animations of educational games are very effective in motivating students to learn and improve their math learning skills". Based on this opinion, it shows that audio-visual learning media is able to attract students' interest in learning mathematics. The level of student interest in learning will have an impact on student behavior and the quality of the students themselves. Because interest in learning is a high heart tendency towards something or an interest in something that someone wants to achieve in an effort to obtain changes in behavior in the long term or relatively settled through training and student experience in learning mathematics.

Interest in learning is something that really needs to be considered in the learning process. Because without interest in learning, the learning process will not be able to take place optimally. Interest is the initial capital to achieve success in the learning process. Furthermore, with the interest, motivation emerges from students to take the learning process seriously from beginning to end so that good learning outcomes are achieved. According to (Rasul, 2020), said that interest is a sense of preference and a sense of interest in a thing or

activity, without anyone telling. Basically, interest is the acceptance of a relationship between oneself and something outside oneself. The stronger or closer the relationship, the greater the interest. Interest in learning is not only important for students but also an important problem that must be faced by teachers. The success or failure of the teacher in generating student interest in learning greatly affects the achievement of the desired learning outcomes competence. Without student interest in the subject being taught, the teacher must be prepared to experience disappointment when teaching. The same thing is also experienced by students, namely apathy, passiveness, not understanding the material and ultimately only value-oriented. In line with Very (2016) research, "Interest in certain subjects will motivate students to be more diligent in studying the field of study they are interested in."

Mathematics is a tool that can develop students' various abilities, including problem solving abilities and students' interests or motivations. Ahmad Susanto (2013) argues, mathematics is one of the disciplines that can improve the ability to think and argue, contribute to solving everyday problems and in the world of work. Meanwhile, Syahrir (2010) states that mathematics is a basic science to connect, compile and develop human thinking strategies. Based on the results of initial observations and interviews with teachers at the Timika Adventist Middle School, students experience various problems in learning such as feelings of displeasure, dissatisfaction student involvement, and lack of attention when studying and less effective lesson hours. The problems that arise in the observations and interviews with one of the teachers at the school are: 1) Interest in learning is one of the major influences on learning activities. The learning process will run smoothly if accompanied by interest. Interest is the main motivational tool that can improve student learning so that the lessons given are easily accepted and understood by students. 2) Lack of human resources (HR) , which occurs from this phenomenon, it is hoped that in the future every school must be supported by competent teachers and have cadre souls who are always passionate about carrying out their professional duties in an innovative way to achieve a better national education. quality.

Improving the quality of education in Indonesia is not only the responsibility of the government, but also the responsibility of all levels of society. This also applies to the development of human resources, namely educators who play a major role in the implementation of learning in schools and are an inseparable part of education a nation, even the progress or decline of the quality of a nation can be measured through progress or not in the education sector. If you want to advance a nation, the first thing to do is to improve the quality of existing education. 3) Learning media plays a very important role in the success of

the teaching and learning process. The role of learning media is mainly to help deliver material to students. In this case, it can be seen that the level of quality or learning outcomes is also influenced by the quality of the appropriate learning media. To get good quality learning media in order to have a significant influence in the teaching and learning process, it is necessary to select and plan the use of good and appropriate learning media. The selection of the right learning media makes learning media effectively used and not in vain if applied.

4) The result of statistical evaluation on interest and learning media applied by the research was 89%. The objectives to be achieved in this study to determine the differences in the use of audio visual learning media on student interest in the subject matter of the Pythagorean Theorem for Class VIII Adventist Junior High School Timika.

METHOD

This research is quantitative, which emphasizes more on numerical data (numbers) which are processed by statistical methods. This type of research uses quantitative research or survey research, namely research that uses questionnaire research as a research instrument. This research will examine the study data that are numerical/numerical which will later produce data interpretation. The approach in this study is a quantitative approach, namely a research approach based on the philosophy of *positivism*, used to examine certain populations or samples, data collection using quantitative or statistical data analysis research instruments, with the aim of testing predetermined hypotheses. The reason why researchers use a quantitative approach is because, quantitative is data in the form of numbers generated from observations, where in this study quantitative data is data from questionnaire answers that have been distributed to respondents and from the results of these respondents, researchers can test the results respondents' answers and find out.

The population is the entire research subject (Arikunjto, 2010). According to Sugiono (2017) population is a generalization area consisting of objects or subjects that have certain qualities and characteristics set by researchers to be studied and then drawn conclusions. So in this research, the population is all students of class VIII SMP Advent Timika with a total of 124 students. The sampling technique in this research is using *probability sampling technique* using *simple random sampling method*. *Simple random sampling* is said to be a simple sample because sample members from the population are taken randomly without regard to the existing strata in the population. So the sample in this study were students of class VIII.A and VIII.B, totaling 64 students, where there were 29 male students, while 35 female students.

The variables observed in this study were the independent variable and the dependent variable. This variable is symbolized as a variable (X), namely: The use of Audio Visual learning media. 2) The *dependent variable* is the variable caused or influenced by the independent variable. The existence of variables in quantitative research is as a variable described in the focus or topic of research. This variable is symbolized by a variable (Y), namely: Interest Student Learning. Research design involves a set of decisions regarding the topic to be studied, how the research population will be, the research methods to be used, and for the purpose of the research being conducted. The type of experimental research used is *Quasi Experiment Design*. According to Sugiyono (2015) this form of experimental design has a control group, but it cannot function fully to control external variables that affect the implementation of the experiment. While the form/type of *Quasi-experimental Design* used is the *Nonequivalent Control Group Design type*. This research was conducted on two classes, namely the experimental class and the control class. In the experimental class, treatment was given in the form of learning using audio-visual learning media, while in the control class it was carried out on students' interest in learning. The two groups were then given a *pretest* to determine whether there was a difference between the experimental group and the control group at the start. And at the end of the study, a *posttest was conducted* to obtain final data for both classes.

The data collection techniques in this study are: 1) Learning interest questionnaire the tool is a number of questions that must be answered by respondents and used by researchers to find out how far students are interested in learning mathematics, 2) The observation sheet according to taniredja and mustafidah in the book quantitative research is an observation of a complex process that is directly (without tools) on the symptoms of the subject being investigated as the process of the problem being studied. Observation sheet used to assess individual behavior or the process of an activity being observed. The researchers prepared an observation sheet that was used as a guide to make observations or observations in order to obtain the desired data during the learning process, and 3) Documentation is a record of events that have passed. Documentation can be in the form of writing, pictures, or the works of someone. In this study, the documents in question are photos of observation sheets and photos during the study.

The instruments used in this study were questionnaires, observation sheets and documentation. The indicators in question are feelings of pleasure, curiosity, and attention, towards learning mathematics. While the aspects are in the form of doing assignments, regularly learning mathematics, and asking the teacher if they have difficulties. Questionnaire

sheets were administered twice during the study, namely at the beginning (*pretest*) and at the end (*posttest*) of the study. The questionnaire item instrument uses a *Likert scale* with four alternative choices from 4 categories, namely always, often, rarely, and never. Questionnaire items are expressed in two forms, namely positive and negative statements. Student interest in learning is measured based on the grid of student interest in learning as follows:

Table 1. Student interest questionnaire grid

No.	Indicator	Aspect		
		Math	Learning	Task
1.	Attention	Learn math at home	Pay attention to the teacher's explanation	Doing math assignments
	No. Questionnaire	1(+), 2(+), 3(+)	4(-), 5(-), 6(+)	7 (-), 8 (-)
2.	Curiosity	Curiosity to learn more about the lesson Mathematics	Ask about lessons mathematics	Doing practice questions mathematics
	No. Questionnaire	9(+), 10(+), 11(+)	12(+), 13(+)	14 (+), 15 (+), 16 (-)
3.	Happiness	Happy with math	Happy in following math lessons	Enjoy doing maths
	No. Questionnaire	17(+), 18(-), 19(+), 20(-)	21(+), 22(-), 23(-)	24(+), 25(+)

The data analysis carried out were descriptive analysis, analysis prerequisite testing, and hypothesis testing. Descriptive analysis is used to describe the data. The data described in this study are the results of observations, *pretest*, *posttest*, and student interest in learning in both groups, namely the experimental group and the control group. The descriptions are as follows: 1) Observational data were obtained from the experimental and control classes. Observational data will be analyzed with a score of 1 for the "yes" answer choice and a score of 0 for the "no" answer choice.

Meanwhile, the criteria for the implementation of learning can be calculated by taking into account the indicators of learning activities. There are indicators that have no effect on the learning process, meaning that if some of these indicators are not implemented, they will not affect the learning process. Learning in this study is said to be carried out well if the implementation of learning is at least 75% achieved. 2) Data on the results of early learning interest (*pretest*) were analyzed to determine normality, determination, and simple linear regression analysis before being treated . a) The normality test of the data was carried out for the final test (*posttest*). The test is intended to determine whether the initial test (*pretest*) and the final test (*posttest*) is whether the research data are normally distributed or not. The

normality test used in this study is *the chi square test* . Data can be said to be normally distributed if $\chi^2_{\text{count}} < \chi^2_{\text{table}}$ at a significance level of 5% and $db = n-1$, where k is the number of class intervals. The *chi square* formula:

$$\chi^2 = \sum \frac{(f_0 - f_h)^2}{f_h}$$

Information:

χ^2 = Chi squared

f_h = Expected frequency

f_0 = Frequency obtained/observed

The coefficient of determination is a measure to determine the suitability or accuracy between the estimated value or the regression line with the sample data. If the value of the correlation coefficient is known, then the coefficient of determination can be obtained by squaring it. The magnitude of the coefficient of determination can be calculated using the following formula:

$$KD = r^2 \times 100\%$$

Where:

Kd = Coefficient of determination

r^2 = Correlation coefficient

The analysis in this study uses simple linear regression analysis. Simple regression analysis was used to determine the use of audio-visual learning media on students' interest in learning. To simplify the calculation process, in this study assisted with *SPSS 22.0 for windows* in the calculation process. The formulation of a simple linear regression statistical model is:

$$Y = a + bX$$

Where:

a = Constant

b = Regression coefficient

Y = Student's interest in learning

X = Use of audio visual learning media

The detailed hypothesis testing is carried out with the following stages: F . test Used to test the significance of all independent variables simultaneously or together on the dependent variable. From the results of data processing using *SPSS 22.0 software for windows* will produce a calculated F_{value} , which is then compared with the F_{table} . If the calculated $F_{\text{value}} > F_{\text{table}}$, then simultaneously all independent variables in the model significantly affect the

dependent variable. On the other hand, if the calculated $F_{\text{value}} < F_{\text{table}}$, then not simultaneously all the independent variables in the model significantly affect the dependent variable.

RESULTS

Data Description

The research was conducted from March 2 to April 2, 2021 at the Timika Adventist Middle School for the 2020/2021 academic year, with the research sample consisting of 64 students in grades VIII.A and VIII.B. The research results that have been obtained by researchers will be described for each variable. The discussion of variables is carried out using quantitative data, namely data that is processed in the form of numbers or scores which are then interpreted descriptively. The validity test related to the effect of using audio visual learning media on students' interest in the subject matter of the Pythagorean Theorem for Class VIII of the Timika Adventist Middle School is as follows. Reliability test is used to find out whether the statements in the questionnaire are consistent or not. A variable is said to be reliable if it has an Alpha coefficient greater than 0.90. In this case the reliability test was carried out by the researcher using the Croanbach's Alpha formula.

Tabel 2. Reliability Statistics

Cronbach's Alpha	N of Items
.925	25
.954	25

From table 4.8 above, the reliability test can be seen that the standard value of Croanbach's alpha is 0.60 while the acquisition data in this study for each variable has above 0.90. The experimental class got Croanbach's alpha of 0.925, while the control class got Croanbach's alpha of 0.954. So the conclusion in this study is that the research questionnaire data is reliable or reliable.

Normality test

Table 3. Normality test results for experiment class and control class

CLASS	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistics	Df	Sig.	Statistics	df	Sig.
RESULTS Experiment Class	.145	34	.069	.965	34	.345
control class	.155	30	.064	.907	30	.013

Based on table 4.3 above, for all experimental and control group data as well as pretest and posttest shows that the Kolmogorov-Smirnov and Shapiro-Wilk sig values are > 0.05 . So the conclusion from the normal distribution is declared normal. Because the research data are normally distributed, the research can be continued by using parametric statistics.

Coefficient of Determination Test

The coefficient of determination (R^2) measures how far the influence of the use of audio-visual learning media on students' interest in learning on the subject matter of the Pythagorean Theorem for class VIII of Timika Adventist Middle School. The value of the coefficient of determination is between 0 and 1. The value of R^2 which is close to one means that the independent variable of the study provides almost all the information needed to predict the variation of the influence of the use of audio-visual learning media on students' interest in learning on the subject matter of the Pythagorean Theorem. The results of the coefficient of determination can be seen in table 4.4 below:

Table 4. Coefficient of determination test results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.761 ^a	.579	.547	1,538

a. Predictors: (Contant), MEDIA and INTEREST

From table 3 above, the results of the coefficient of determination can be seen that the correlation coefficient (R) is 0.761. This means that the relationship between the independent variable and the dependent variable is 76.1%. From these figures, it can be concluded that the relationship between the independent variable and the dependent variable is very strong. The amount of Adjust R Square (R^2) is 0.579. The results of this statistical calculation mean that the ability of the independent variable to explain the variation in the dependent variable change is 57.9%, while the remaining 42.1% (100-98%) is explained by other factors outside the analyzed regression model.

Simple Linear Regression Analysis

Simple linear regression analysis is an analysis to measure the magnitude of the influence between one independent variable and one dependent variable and predict the dependent variable using the independent variable. The relationship between variable Y and variable X can be linear or non-linear.

Table 5. Simple linear regression test results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.761	.579	.547	1,538	2,732

a. Predictors: (Constant), MEDIA

b. Dependent Variable: INTEREST

From table 4.5 above, the results of a simple linear regression test explain the magnitude of the correlation/relationship (R) value of 0.761. From the output, the coefficient of determination (R Square) is 0.579. This means that the effect of the variable using audio-visual learning media (X) on Student Interest (Y) is 57.9% and the rest is influenced by other variables outside of this study.

Table 6. ANOVA ^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	24,391	1	24,391	.746	.000 ^b
	Residual	6387,476	33	228,124		
	Total	6411,867	29			

a. Dependent Variable: INTEREST

b. Predictors: (Constant), MEDIA

Calculated F value = 0.746 with a significance level of 0.000 < 0.05, a simple linear regression model can be used to predict the variables of using audio-visual learning media or in other words, there is a variable effect of using audio-visual learning media. (X) on students' interest in learning (Y).

Table 7. Coefficients ^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	70,319	21,427		3.282	.003
	MEDIA	.087	.267	.062	2,327	.000

a. Dependent Variable: INTEREST

From the explanation above in the Coefficients, it is known that the value of Coefficients is 70.319, while the value of audio-visual learning media (b/simple linear regression coefficient) is 0.087, so the regression equation can be written $Y = a + bX$ or $Y = 70.319 + 0.087X$

The equation can be translated:

- The spread constant is 70.319, meaning that the consistent value of the variable using audio-visual learning media (X) is 70.319

- The simple linear regression coefficient of Student Learning Interest Y of 0.087 states that for every 1% addition to the value of Student Interest in Learning, the value of Student Interest in Learning increases by 0.087. The simple linear regression coefficient is positive, so it can be said that the direction of using audio-visual learning media (X) on student learning interest (Y) is positive.

Hypothesis Testing

Hypothesis testing was carried out using the average difference test or t-test (independent sample t test) because the data were homogeneous and normally distributed and independent. The calculation of the t coefficient on the independent sample t-test uses the SPSS 22.0 program. There are several things that must be considered in interpreting the results of the t-test on the SPSS 22.0 output, in addition to the t_{value} , there is also an F_{value} . The F test is useful for checking in advance whether the two variances are the same or different. The results if the F test shows that the two variances are the same, then the t-test test must also use the assumption that the variance is equal (Equal Variance Assumed), but the F test shows that the variance is not the same or different, then the t test must also use the results data assuming the variance is not the same or different (Equal Variance not Assumed).

F Test (Simultaneous)

Simultaneous F test is used to measure the effect of independent variables together on the dependent variable by using the probability value (sig). The criteria for simultaneous testing in this thesis is if $F_{count} < F_{table}$, then there is no simultaneous effect between the independent variables on the dependent variable, while if $F_{count} > F_{table}$, then there is a simultaneous effect on this thesis using SPSS for windows 22.0. The results of the F test can be seen in the ANOVA output.

Table 8. Simultaneous F Test Results

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24,391	1	24,391	.746	.000 ^b
	Residual	6387,476	33	228,124		
	Total	6411,867	29			

a. Dependent Variable: INTEREST

b. Predictors: (Constant), MEDIA

From the explanation above in the ANOVA table above, in column F above the calculated F_{value} is 0.746, while in F_{table} it is obtained $F_{\text{table}} = F(k: nk) = F = (1:33)$ and produces an F_{table} of 3.28 then This value explains that $F_{\text{value}} > F_{\text{table}}$, so it can be concluded that there is no simultaneous effect between the independent variable (X) on the dependent variable (Y). t test (Partial). This test is used to determine whether the regression model on the use of audio visual learning media partially has a positive and significant effect on student learning interest.

Table 9. t test (Partial)

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	Std. Error	Beta		
1 (Constant)	70,319	21,427		3.282	.003
(Constant)	76,297	10,490		7.274	.000
MEDIA	.087	.267	.062	2,327	.000
INTEREST	.096	.385	.062	3,327	.000

a. Independent Variable: MEDIA

b. Dependent Variable: INTEREST

Based on the regression results, it can be seen that the t_{value} for audio visual media is 2,327 and the t_{value} for student learning interest is 3.327, with a Sig value of 0.000. This shows that the calculated t_{value} is greater than the t_{table} of 1.671 and the Sig value is smaller than 0.05. Thus H_a is accepted and H_0 is rejected, meaning that there is a significant effect of the use of audio visual learning media on students' interest in learning the pythagorean theorem for class VIII of Timika Adventist Middle School. Based on the regression results, it can be seen that the t value for audio visual media is 2,327 and the t_{value} for student learning interest is 3.327, with a Sig value of 0.000. This shows that the calculated t_{value} is greater than the t_{table} of 1.671 and the Sig value is less than 0.05. Thus H_a is accepted and H_0 is rejected, meaning that there is a significant effect of the use of audio visual learning media on students' interest in learning the pythagorean theorem for class VIII of Timika Adventist Middle School.

CONCLUSION

Based on the results of the research that the researchers have done, it can be concluded that there is an influence of using audio visual learning media on students' interest in learning the main material of the pythagorean theorem for class VIII Adventist Middle School Timika. This is evidenced from the results of hypothesis testing with the t-test (ttest) with the test criteria, namely, if $t_{\text{count}} > t_{\text{table}}$ then H_0 is rejected and H_a is accepted. Student interest in the

pythagorean theorem the t-test of the post-test of the experimental class and control class students based on the regression results showed that the t_{count} of audio-visual media was 2.327 and the t-count value of student interest in learning was 3.327, with a Sig value of 0.000. This shows that the tcount value is greater than the ttable value of 1.671 and the Sig value is less than 0.05. Thus H_a is accepted and H_0 is rejected, meaning that there is a significant effect of the use of audio visual learning media on students' interest in learning the pythagorean theorem for class VIII Timika Adventist Middle School.

RECOMMENDATIONS

Based on the above conclusions that have been obtained from the results of the study, the researchers can provide the following suggestions: 1) Principals. It is hoped that it can direct teachers to take advantage of existing methods or media in learning that are varied and educational in nature to increase students' interest in learning in the teaching and learning process. 2) For Teachers. It is hoped that the teacher will be able to see the condition of students' interest in learning so that it is adapted to various methods and media. So that students' interest in learning increases. 3) For Students Students are expected to be more active and enthusiastic in participating in the teaching and learning process. Students' interest in the teaching and learning process can affect the attractiveness of students to mathematics subjects on the Pythagorean theorem material so that it affects students' higher interest in learning. 4) Further Research. It is hoped that further research will examine the factors that influence the use of audio-visual media on student interest in learning, so that it can increase the treasures to increase student interest in learning.

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