Utilization of Online Geographic Information System Learning Media towards Optimizing Geography Learning during the Pandemic Covid-19

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Abstract

This study aims to determine the effect of using online Geographic Information System learning media on student learning outcomes. This research method is a quantitative research with the type of experiment (Quasy Experiment Design). The population in this study were all students of class X consisting of X1 and X2 with a total of 62 students. The sample in this study was divided into two groups, namely the experimental group of 33 students and the control group of 29 students. This study uses data collection techniques using tests, interviews, documentation. The results showed that the calculation of the t-test obtained results Tcount = 4.853 with T table = 2.035. This means that Tcount > Ttable that H1 is rejected. Based on the results of the analysis calculation, it can be concluded that there is an influence of Geographic Information System media on student learning outcomes and students who receive learning with Geographic Information Systems media are better than before without using learning media.

Keywords: *Learning Media; Geographic Information System; Learning Outcomes*

Introduction

Education is basically an interaction between teachers and students, to achieve educational goals, which takes place in a certain environment. The teacher is one of the human components in the teaching and learning process, which plays a role in efforts to establish potential human resources in the field of education. Therefore, the teacher who is one of the elements in the field of education must participate actively and place his position as a professional, in accordance with the demands of a growing society.

The learning process as a part of education plays an important role. Quality learning integrates lesson materials, strategies, learning media, students, and teachers. The use of learning media is one of the main keys for teachers to achieve their learning goals in the classroom which has an impact on quality learning.

The whole world, especially in Indonesia, is experiencing the pandemic Corona Virus Disease (COVID-19), especially in the field of education which is changing face-to-face learning to online learning. The implementation of online learning does not necessarily run well, there are still many obstacles faced, ranging from technical to learning process problems, such as networks, unavailable quota

fees, application operations (*google meet, google classroom, whatsapp group, telegram group, zoom meeting*) with correct procedures, how to display PPT/documents, and low student participation in learning.

Learning media has an important role in learning and teaching activities. The use of learning media should get more attention from the teacher in every lesson. Media serves as an intermediary or teachers tool in conveying information to students. With the media can help teachers deliver students to achieve educational goals.

Geographic Information System is a geospatial based information system technology that can be used as a source of learning and learning media to recognize, observe, understand, and analyze conditions and characteristics of Geographical or environmental conditions that exist in students. Geographic Information System (GIS) learning media can be used for optimizing learning because it has the potential or ability to stimulate the learning process, which in turn will increase students absorption of the learning provided. Learning media Geographic Information System (GIS) as a tool or means of carrying messages from learning sources to recipients of messages (students) to enhance effectiveness and efficiency in achieving learning objectives.

Media if understood in broad terms, are humans, materials, or events that build conditions that enable students to acquire knowledge, skills, or attitudes. In this sense, teachers, textbooks, and the school environment are media. More specifically, the notion of media in the teaching and learning process tends to be interpreted as graphic, photographic, or electronic tools to capture, process, and rearrange visual or verbal information (Arsyad, 2014: 3). The six basic categories of media are text, audio, visual, video, manipulative, objects, and people. The purpose of the media is to facilitate communication and learning (Sharon, 2011:7).

Geographic information system is a form of information system that presents information in graphical form using a map as an interface. GIS is composed of the concept of several layers (layers) and relations (Pragusta, 2014). Geographic information system is a computer-based system for capturing, storing, checking, integrating, manipulating, and displaying data with digital maps (Turban, 2005). Geographic Information Systems (GIS) can be broken down into the following subsystems (Prahasta, 2014):

1. Data Input, This subsystem is tasked with collecting and preparing spatial and attribute data from various sources. This subsystem is responsible for converting or transforming the original data formats into a format that can be used by GIS.

2. Data Output, This subsystem displays or produces output in whole or in part of the database in both softcopy and hardcopy forms such as tables, graphs, maps and others.

3. Data Management, This subsystem organizes both spatial and attribute data into a database in such a way that it is easy to call, update, and edit.

4. Data Manipulation & Analysis, this subsystem determines the information that can be generated by GIS. In addition, this subsystem also performs data manipulation and modeling to produce the expected information.

Learning outcomes are the result of a person efforts to obtain a new behavior change as a whole as a result of his own experience, as a result of changes in interaction with the environment (Slameto, 2010: 2). Learning outcomes are results that are influenced by the experience of the subject of learning with the physical world and its environment, a person learning outcomes depend on what is already known, the subject of learning, goals, motivations that affect the process of interaction with the material being studied (Sardiman, 2006:38).

Research Methods

This research uses a quantitative approach method with the type of experiment to determine whether there is an effect of the use of online Geographic Information System learning media on student learning outcomes. Experimental research used in this study is a quasi-experimental (Quasy Experiment Design).

The population in this study were all students of class X consisting of X1 and X2 with a total of 62 students. The sample in this study was divided into two groups, namely the experimental group of 33 students and the control group of 29 students. The experimental group was the group that received treatment in this study, namely in the Geography learning activity using GIS learning media. While the control group is a group that does not use GIS learning media. The control group as a baseline for comparison with the experimental treatment group. This study uses data collection techniques using tests, interviews, documentation.

This research consists of two variables, namely the independent variable and the dependent variable. The independent variable is the GIS learning media (X) in this study and the dependent variable is the optimization of Geography learning outcomes (Y).

Result

A. Variable Data Description

Data on the use of geographic information system learning media on student learning outcomes of class X SMA Al-Huda Lampung Selatan, obtained by using a test with items that have been valid. The test questions were given to respondents in class X SMA Al-Huda Lampung Selatan who had been used as samples. The data will be used as a benchmark to answer the hypothesis in this study.

1. Normality Test

The normality test was conducted to determine whether the dependent variable and the independent variable in the model had a normal distribution or not. The method used in this study is the *kolmogrovsmirnov* method to determine whether the data used is normal or not.

1) If Sig > 0.05 then the data is normally distributed.
2) If Sig < 0.05 then the data is not normally distributed.

Table 1. *One-Sample Kolmogorov-Smirnov Test*

		Unstandardize d Residual
N		62
Normal Parameters[a]	Mean	.0000000
	Std. Deviation	2.54909220
Most Extreme	Absolute	.101
Differences	Positive	.101
	Negative	-.099
Kolmogorov-Smirnov Z		.795
Asymp. Sig. (2-tailed)		.553

Source: Data Processing 2021

Based on table 1, the *Kolmogorov-Smirnov* value is known as the Asymp value. Sig. (2-tailed) of 0553 is greater than 0.05. So it cannot reject H0 which says that the residuals are normally distributed or in other words the residuals are normally distributed.

2. Linearity Test

Linearity test to determine whether two variables have a significant linear relationship or not. Good data should have a linear relationship between the independent variable (X) and the dependent variable (Y). The basis for decision making in the linearity test is if the significance value is greater than 0.05, then the conclusion is that there is a linear relationship between the variable (X) and the variable (Y), on the contrary, if the significance value is less than 0.05, then the conclusion is that there is no linear relationship between variable (X) with variable (Y).

Table 2. Linearity Test Results

ANOVA Table			Sum of Squares	df	Mean Square	F	Sig.
Y * X Between Groups	(Combined)		224.135	12	18.678	2.792	.006
	Linearity		155.565	1	155.565	23.254	.000
	Deviation from Linearity		68.570	11	6.234	.932	.519
Within Groups			327.800	49	6.690		
Scale			551.935	61			

Source: Data Processing 2021

Based on table 2, the deviation from linearity value has a sig value. of 0.519 > 0.05), thus indicating that the relationship between variables can be said to be linear.

3. Multicollinearity Test

Multicollinearity test is intended whether the regression model found a correlation between the independent variables (independent). This test is carried out whether there is a problem. The results of the Multicollinearity Test can be seen in Table 3 as follows:

Table 3. Multicollinearity Test

Coefficients^a							
Model	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1 (Constant)	23.354	3.863		6.046	.000		
X	.497	.102	.531	4.853	.000	1.000	1.000

a. Dependent Variable: Y

Source: Data Processing 2021

Based on the table above, it can be seen that the calculation results of Tolerence 1.00>0.10 and the results of the calculation of Variance Inflation Factor (VIF) of 1,000 <10, it can be concluded firmly that there is no multicollinearity problem.

4. F Test

The F test is used to show whether all the independent variables included in the model have a joint effect on the dependent variable. Statistical F-test was used at the 95% confidence level ($\alpha = 0.05$). The F test in this study uses the following hypothesis:

a. H0, it is assumed that together, at least one of the independent variables (GIS media has no significant effect on learning outcomes)

b. H1, it is assumed that together, at least one of the independent variables (GIS media has a significant effect on learning outcomes).

Table 4. ANOVA Test Results

	Model	Sum of Squares	df	Mean Square	F	Sig.
			ANOVA^b			
1	Regression	155.565	1	155.565	23.548	.000^a
	Residual	396.370	60	6.606		
	Scale	551.935	61			

Source: Data Processing 2021

Based on table 4, the results of F-statistics are 23,548 with a significance of 0.000 (0.000 <0.05). Because the significant probability is much less than 0.05, the regression model can be used, which means it can be said that GIS media has a significant effect on learning outcomes.

5. T Test

The t-test was conducted to see the significance of the influence of individual independent variables on the dependent variable by assuming the other independent variables were constant. This statistical t-test uses a 95% confidence level ($\alpha = 0.05$).

Hypothesis:

H0 : 0 ; there is no significant positive effect between the independent variable and the dependent variable

Ha : > 0 ; there is a significant positive effect between the independent variable and the dependent variable if:

1) tcount > ttable: then H0 is rejected and Ha is accepted, meaning that the independent variable has a significant positive effect on the dependent variable.

2) tcount ttable: then H0 is accepted and Ha is rejected, meaning that the independent variable has no significant positive effect on the dependent variable.

Table 5. t test results

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	23.354	3.863		6.046	.000
	X	.497	.102	.531	4.853	.000

Source: Data Processing 2021

Based on the results of the t-test, the results of the t-statistical test of the GIS media variable have a t-statistical value (4.853) > t-table (2.035) with a significance value of 0.000 <0.05 so that H0 is rejected. Thus, statistically GIS media has a positive and significant effect on learning outcomes.

Discussion

The results of hypothesis testing are used to answer the objectives of the study to determine the effect of GIS media on the learning outcomes of Al Huda High School students. From the results of the hypothesis test, the results of the t-statistical test of the GIS media variable have a t-statistic value (4.853) > t-table (2.035) with a significance value of 0.000 <0.05 so that H0 is rejected. Thus, statistically GIS media has a positive and significant effect on learning outcomes. From the results of the hypothesis test, it indicates that the use of GIS media can improve learning outcomes in Geographic subjects. Learning using GIS media provides more opportunities for students to learn and gain an understanding of the knowledge needed directly so that what they learn is more meaningful for themselves.

The development of information and communication technology at this time has developed very quickly so that without realizing it has greatly affected every aspect of human life and the most popular among students is learning media as one of the GIS media. Media System Information Geographic (SIG) or also known as Geographic Information System (GIS) was first in 1960 which aims to solve Geographical problems. Education and media are two fields that cannot be separated in terms of learning. Utilizing GIS as a learning medium in supporting the geographical learning process can make it easier for students. The basic capability of GIS is to integrate various database operations such as queries, analyze them and display them in the form of mapping based on their geographic location. GIS is able to provide the desired convenience. With GIS, it will be easier for us to see earth phenomena with a better perspective. GIS is able to accommodate the storage, processing, and display of digital spatial data and even the integration of various data, ranging from satellite images, aerial photos, maps and even statistical data. GIS also accommodates data dynamics, making updating data easier.

Conclusion

Based on the results of the hypothesis test, the results of the t-statistical test of the GIS media variable have a t-statistic value (4.853) > t-table (2.035) with a significance value of 0.000 <0.05 so H0 is rejected. The results of data analysis showed that learning by using the Geographic Information System learning media had a positive and significant effect on student learning outcomes.

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