

The effect of the teacher's teaching model and learning media on students' learning activities with motivation to learn as a moderating variable

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Abstract

This study aims to determine the effect of teachers' teaching methods and learning media on student learning activities and whether learning motivation moderates the impact of teachers' teaching methods and learning media on student learning activities. This research uses quantitative methods. This research data was obtained by distributing questionnaires to 76 students as respondents. The data obtained from the sample were analyzed using MRA (Moderated Regression Analysis). The results of this study indicate that the teachers' teaching method and learning media have a positive effect on students' learning activities by being reinforced by students' learning motivation variables. The R-square test results show that teaching methods and learning media explain 56.2% of the learning activity variables. In comparison, the remaining 43.8% are explained by other variables not examined in this study.

Keywords: Teachers' Teaching Method; Learning Media; Learning Activity; Learning Motivation.

1. Introduction

Online learning is a solution allowing learning to continue without face-to-face meetings. Over time, this online learning begins to show symptoms that may not have been considered, namely learning loss. Donelly and Patrionis (2021) explain that learning loss is declining students' academic knowledge and skills because of long-term home learning.

The World Bank (2021) found that during the pandemic, students in Indonesia experienced changes that caused learning loss with an estimated 0.9 or about nine months of learning and a 25–35-point decrease in competence in reading scores in the Program for International Student Assessment (PISA) test by June 2021. After the pandemic began to decline, schools began to apply face-to-face learning effectively. Thus, it is necessary to restore students' enthusiasm for learning. Teachers have a significant role in the process. They are the resources to learn, facilitators, managers, demonstrators, mentors, and evaluators.

Teachers must be able to generate students' learning activities so that students' learning outcomes in the learning process will be optimal. Hamalik (2014: 90) argues that learning activities are carried out to acquire knowledge, understanding, and skills, as well as other behaviors, including attitudes and values. Students can understand the material in learning through interactive, inspiring, and fun learning activities so that students' learning outcomes will be optimal.

An online learning process will affect the student's understanding of the material presented by the teacher. The main goal of the learning process is the student's learning process. Although the learning activities are carried out online, students must be active in the learning activity. The teacher is only a facilitator to create an atmosphere and environment that supports student learning.

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Based on the results of initial observations conducted at SMA Negeri 4 Gorontalo, it was found that aspects of learning activities, namely the number of students who often ask/have opinions are low, amounting to 47.55%. In contrast, students who often ask/have opinions are 52.45%. Therefore, it can be concluded that students' learning activities are relatively lacking. The data is also supported by the results of interviews with several teachers, where it was found that the low student learning activity can also be seen from the students' perseverance in facing assignments. Students often complain when they are given assignments. They see these assignments as a burden, so there is an element of coercion in finishing them. Students' independence in learning is also low. Students are not happy when they are given independent assignments. Students think that it is easier to do assignments in groups. In addition, students lack understanding of the material provided, as evidenced by students' inappropriate responses when asked by the teacher for clarification.

Lack of enthusiasm in the learning process can cause students' learning activities to decrease. If this is to happen continuously, it will inevitably affect the learning outcomes. In this case, the teacher has a significant role in creating a learning process that can lead students to the learning objectives. To create an exciting learning atmosphere, teachers must develop their creativity in the use of learning methods and media that will be used.

Learning media are part of the learning strategy. The benefit of learning media is to simplify the interaction between teachers and students to help students learn optimally. With learning media, the learning process becomes more exciting, which can increase students' motivation to learn. Motivation to learn is necessary to support the achievement of optimal learning outcomes.

Based on this description, the researcher conducted a study titled "The Effect of Teacher's Teaching Model and Learning Media on Students' Learning Activities with Motivation to Learn as a Moderating Variable." This study aims to analyze the effect of teacher's teaching methods and the use of learning media on students' learning activities.

2. Methods

This research is a quantitative study using three kinds of variables, namely the variables of teacher teaching methods (X_1) and learning media (X_2) as independent variables, student learning activity variables (Y) as dependent variables, and student learning motivation variables as moderating variables. Data was collected using a questionnaire. The weighting of items in the questionnaire uses a Likert Scale as shown in Table 1. Data were analyzed using statistical analysis and Moderate Regression Analysis (MRA).

Table 1 Likert Scale

No.	Alternative Answer	Score
1	Always	5
2	Often	4
3	Sometimes	3
4	Rare	2
5	Never	1

3. Results

3.1. Classical Assumption Test

3.1.1. Normality test

The normality test was performed to determine whether the research data was distributed normally. The normality test in this study uses the one-sample Kolmogorov-Smirnov test method with a significance value of 5% or $\alpha = 0.05$. If the significance value is higher than $\alpha = 0.05$, the data are said to be normally distributed. The results of the normality test are shown in Table 2 and Table 3.

Table 2 Data Normality Test

One-Sample Kolmogorov-Smirnov Test					
		Learning Activity	Teaching Methods	Learning Media	Learning Motivation
N		76	76	76	76
Normal Parameters ^{a,b}	Mean	84.8026	84.4079	84.1974	82.1579
	Std. Deviation	3.74885	3.42998	3.65156	8.92644
Most Extreme Differences	Absolute	0.113	0.111	0.099	0.134
	Positive	0.082	0.076	0.099	0.085
	Negative	-0.113	-0.111	-0.075	-0.134
Test Statistic		0.113	0.111	0.099	0.134
Asymp. Sig. (2-tailed)		.077 ^c	0.062 ^c	0.063 ^c	0.056 ^c

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

Source: Processed data, 2023

Table 3 Residual Normality Test

One-Sample Kolmogorov-Smirnov Test		Unstandardized Residual
N		76
Normal Parameters ^{a,b}	Mean	0.0000000
	Std. Deviation	2.47064678
Most Extreme Differences	Absolute	0.092
	Positive	0.050
	Negative	-0.092
Test Statistic		0.092
Asymp. Sig. (2-tailed)		0.185 ^c

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

Source: Processed data, 2023

The results in Tables 2 and 3 show that each variable's significance value is higher than $\alpha = 0.05$. Therefore, it can be concluded that the research data is distributed normally.

3.1.2. Multicollinearity test

The multicollinearity test was performed by identifying the Variance Inflation Factor (VIF) value. The regression model is said to pass the multicollinearity test if the VIF value is less than 10. The results of the multicollinearity test are shown in Table 4.

Table 4 Multicollinearity Test

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.495	9.232		.270	0.788		
	Teaching Method	0.497	0.095	0.455	5.241	0.000	0.802	1.247
	Learning Media	0.453	0.090	0.442	5.044	0.000	0.787	1.271
	Learning Motivation	0.027	0.033	0.063	.799	0.427	0.962	1.039

a. Dependent Variable: Learning Activity

Source: Processed data, 2023

The results in Table 4 show that the VIF value for the teaching method variable is 1.247, the learning media variable is 1.271, and the learning motivation variable is 1.039. The three variables have VIF values lower than the required value, which is 10. Therefore, it can be concluded that the regression model passes the multicollinearity test.

3.1.3. Heteroscedasticity test

The heteroscedasticity test aims to test the possibility of differences in the variance of the residual data in a regression. The heteroscedasticity test in this study was conducted using the Glejser method. If the significance value is higher than $\alpha = 0.05$, it is said that there is no heteroscedasticity problem in the regression model. The results of the heteroscedasticity test are shown in Table 5.

Table 5 Heteroscedasticity Test

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.766	5.881		0.300	0.765
	Teaching Method	-0.196	0.060	-0.389	-3.248	0.094
	Learning Media	0.189	0.057	0.398	3.297	0.152
	Learning Motivation	0.008	0.021	0.041	0.374	0.174

a. Dependent Variable: ABS_RES

Source: Processed data, 2023

Based on the results presented in Table 5, the significance value for each variable is higher than $\alpha = 0.05$. Therefore, it can be concluded that there is no heteroscedasticity problem in the regression model.

3.2. Multiple Linear Regression Analysis

Multiple linear regression analysis is used to see the effect of independent variables on the dependent variable and to predict the value of the dependent variable using the independent variables. The results of the regression analysis using SPSS are shown in Table 6.

Table 6 Multiple Linear Regression Test

Coefficients ^a						
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	5.903	8.167		0.723	0.472
	Teaching Methods (X ₁)	0.493	0.094	0.451	5.219	0.000
	Learning Media (X ₂)	0.443	0.089	0.431	4.993	0.000

a. Dependent Variable: (Y) Learning Activity

Source: Processed data, 2023

Based on the regression equation model, it can be interpreted as follows:

- The constant value of 5.903 indicates that the consistent value of the learning activity variable is 5.903.
- The regression coefficient value of the teaching method variable is positive (+) of 0.493, which means that when the teaching method variable increases, the learning activity variable also increases.
- The regression coefficient value of the learning media variable is positive (+) of 0.443, which means that when the learning media variable increases, the learning activity variable also increases.

3.3. Determination Coefficient Test

The coefficient of determination (R^2) is a value that ranges from 0% to 100%. The results of the coefficient of determination test are shown in Table 7. Based on the results in Table 7, we can see that the R^2 value is 0.562. This value indicates that 56.2% of the variables of learning activities in SMA Negeri 4 Gorontalo can be explained by teaching methods and learning media, while the remaining 43.8% is influenced by other variables not examined in this study.

Table 7 Determination Coefficient Test

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.750 ^a	0.562	0.550	2.51533

a. Predictors: (Constant), (X₂) Learning Media, (X₁) Teaching Method

Source: Processed data, 2023

The calculation of effective contribution is used to define the influence of the independent variables on the dependent variable partially. The result is shown in Table 8.

Table 8 Calculation of the Effect of Independent Variables on Dependent Variables Partially

Variables	Regression Coefficient (beta)	Correlation Coefficient	R Square
X ₁	0.451	0.642	0.562
X ₂	0.431	0.631	

Source: Processed data, 2023

The effect of the teaching methods on the learning activities can be calculated with the formula $0.451 \times 0.642 \times 100 = 29\%$. This means that the teachers' teaching method has an effect of 29%. The effect of learning media on learning activities can be calculated with the formula $0.431 \times 0.631 \times 100 = 27.2\%$. This means that the effect of learning media on learning activities is 27.2%.

3.4. Hypothesis Test

3.4.1. The F-test

The F-test aims to analyze the effect of independent variables on the dependent variable simultaneously. The results of the F-test are shown in Table 9.

Table 9 The F-Test Results

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	592.175	2	296.088	46.798
	Residual	461.864	73	6.327	
	Total	1054.039	75		

a. Dependent Variable: (Y) Learning Activity
b. Predictors: (Constant), (X₂) Learning Media, (X₁) Teaching Method

Source: Processed data, 2023

Based on the results in Table 9, it is known that the significance value is 0.000, which is smaller than $\alpha = 0.05$. Therefore, it can be concluded that both independent variables, namely teaching methods and learning media, simultaneously affect learning activities.

3.4.2. The t-test

The t-test aims to test the effect of each independent variable individually on the dependent variable. The results of the t-test are presented in Table 10.

Table 10 The t-Test Results

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	5.903	8.167		0.723
	Teaching Method (X ₁)	0.493	0.094	0.451	5.219
	Learning Media (X ₂)	0.443	0.089	0.431	4.993

a. Dependent Variable: Learning Activity (Y)

Source: Processed data, 2023

Based on the results in Table 10, the following interpretations can be made:

- Teaching method on learning activity

The significant value for the variable teaching method is 0.000, which is smaller than $\alpha = 0.05$. Therefore, it can be concluded that the hypothesis is accepted, or it can be said that the teacher's teaching method partially affects the students' learning activities.

- Learning media on learning activities

The significance value for the variable learning media is 0.000, which is smaller than $\alpha = 0.05$. Therefore, it can be concluded that the hypothesis is accepted, or it can be said that learning media partially affects students' learning activities.

- Moderating variable test

Moderate regression analysis was performed to identify whether the moderating variable strengthens or weakens the relationship between the independent and the dependent variables. The results of the moderating variable test are shown in Table 11.

Table 11 Moderating Variable Test

Coefficients ^a						
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	
	B	Std. Error	Beta			
1	(Constant)	14.592	60.252		0.242	0.809
	(X ₁) Teaching Method	3.366	0.942	3.079	3.573	0.001
	(X ₂) Learning Media	-2.258	0.858	-2.199	-2.631	0.010
	(M) Learning Motivation	0.232	0.760	.552	0.305	0.761
	Moderating_X ₁	0.035	0.012	7.225	3.037	0.003
	Moderating_X ₂	0.033	0.011	6.629	3.162	0.002

a. Dependent Variable: (Y) Learning Activity

Source: Processed data, 2023

Based on the results in Table 11, the following interpretations can be made:

- The constant value of 14.592 indicates that the consistent value for the learning activity variable is 14.592.
- The regression coefficient value of the teaching method variable is positive (+) of 3.366, so it can be interpreted that as the teaching method variable increases, the learning activity variable will also increase.
- The regression coefficient value of the learning media variable is negative (-) of 2.258, so it can be interpreted that as the learning media variable increases, the learning activity variable decreases.
- The regression coefficient value of the learning motivation variable is positive (+) of 0.232, so it can be interpreted that as the learning motivation variable increases, the learning activity variable will also increase.
- The interpretation results of the hypothesis can be described as follows:
- Learning motivation moderates the effect of teachers' teaching methods on learning activities

The significance value of moderating_X₁ is 0.003, which is smaller than $\alpha = 0.05$, so it is concluded that it is significant. This means that learning motivation is a moderating variable for teaching methods to influence learning activities. The standard value of B is positive (+) of 0.035, which means that the motivation variable strengthens the effect of teaching methods on learning activities by 0.035.

- Learning motivation moderates the effect of learning media on learning activities

The significance value of moderating_X₂ is 0.002, which is smaller than $\alpha = 0.05$, so it is concluded that it is significant. This means that learning motivation is a moderating variable for learning media to influence learning activities. The standard value of B is positive (+) of 0.033, which means that the motivation variable strengthens the effect of learning media on learning activities by 0.033.

4. Discussion

4.1. The Effect of Teachers' Teaching Methods on Students' Learning Activities

The role of the teacher in learning activities is significant. In addition to having academic skills appropriate to the field being taught, teachers must also be able to master teaching methods that align with the subjects taught to students in the classroom.

Based on the research results, it is found that the significance value is 0.000. This significance value is smaller than $\alpha = 0.05$, so it is concluded that teaching methods partially affect students' learning activities. This is consistent with the research of Lestiyani & Lestari (2021), whose research results show an influence of the teachers' teaching method on the development of students' learning activities in mathematics, which is 58.09%.

Based on these results, a teacher must pay attention to the learning methods used in teaching students. The use of online learning methods is expected not to be boring for learners and able to overcome the problems that teachers face in certain situations or conditions in teaching and learning activities. The learning method serves as one of the supports and carrying capacity for the effectiveness of the learning process, to increase the learning activities and make it easier for the students to follow the learning process, which in turn makes the students get satisfactory learning results.

Based on the results, the teaching methods used by teachers affect students' learning activities in SMA Negeri 4 Gorontalo. Thus, the better the teachers' teaching method, the students' learning activities will increase. The teaching method must also be able to place students in active involvement in learning, promote and develop learning interests, and invigorate the ongoing teaching process.

4.2. The Effect of Learning Media on Student Learning Activities

Media plays a significant role in the teaching and learning process. The ambiguity of the learning message/material delivered by the teacher can be helped by presenting the media as an intermediary. Based on the results of data analysis, it is found that the significance value is 0.000. This significance value is smaller than $\alpha = 0.05$, so it is concluded that learning media partially affects students' learning activities. The results of this study are consistent with the research conducted by Nurhayati (2018), whose results show that the use of learning media in SMKN 1 Gowa is categorized as good with a percentage level of 76.55%.

The role of media in learning is to reduce barriers in the learning process so that optimal learning outcomes are achieved. In learning process, the media act as carriers from the source (teacher) to the receiver (student). Using online learning media can increase the quality of the teaching and learning process, which, in turn, can increase students' learning activities. Another important aspect of using media is to help clarify learning messages.

Teachers must choose learning media according to learning styles and interests, as long as the learning media are aligned with the material to be taught. An exciting and diverse learning medium makes students more interested in the learning activities; it will be very different if the teacher uses only one medium for each learning activity. The teacher's ability to use different learning media is also necessary to increase students' learning activities.

Based on the results, the learning media affects students' learning activities at SMA Negeri 4 Gorontalo. The teacher's ability to use online learning media and present engaging learning media plays a significant part in improving student learning activity. Therefore, before the teacher determines the learning media to be used during the learning activities, the teacher must pay attention to the learning objectives, the suitability of the media with the material, the suitability with the learning style and interests of the students, as well as the suitability with the environmental conditions, supporting facilities, and the time available.

4.3. The Effect of Teachers' Teaching Methods and Learning Media on Students' Learning Activities

Student learning activities can grow because they are influenced by a variety of factors, both internal and external. Learning activities can be enhanced through appropriate and various teaching methods and learning media adapted to learning objectives, student characteristics, situations, teacher skills, allocated time, and existing facilities. Based on the results of the data analysis, it is found that the significance value is 0.000. This significance value is smaller than $\alpha = 0.05$, so it is concluded that teaching methods and learning media simultaneously affect students' learning activities. From the results of the coefficient of determination test, it is found that the R2 value is 0.562. This means that teaching methods and learning media simultaneously influence students' learning activities by 0.562 or 56.2%, while the remaining 43.8% is influenced by other variables not examined in this study. Based on the results of this study, it is confirmed that online teaching methods and online learning media have a significant influence on students' learning activities in SMA Negeri 4 Gorontalo.

The application of proper teaching methods and learning media must be as fascinating as possible while still being appropriate to the material being taught. The aim is to overcome student passivity so that students enjoy participating in these online learning activities. Therefore, several principles must be considered when selecting the use of teaching methods and learning media. The more appropriate teaching methods and learning media used, the better the students' learning activities will be.

Student Learning Motivation as a Moderating Variable to Strengthen the Effect of Teachers' Teaching Methods on Students' Learning Activities

Motivation is an activity or driving force within a person that can cause a feeling related to emotion thus, it can influence a person to take an action. In relation to learning, motivation is a drive from within students so that students feel moved to carry out learning activities. High motivation in students can influence students to be more active in learning activities.

Based on the MRA calculation, it is known that the significance value is 0.003. This value is smaller than $\alpha = 0.05$, so following the basis of decision-making in the test, it can be concluded that it is significant. This means that learning motivation is a moderating variable for teaching methods to influence learning activities. The standard B-value of 0.035 means that the motivation variable strengthens the effect of teaching methods on learning activities by 0.035.

All teaching methods have a good purpose. It is to enhance students' learning activities. However, when selecting and determining teaching methods, teachers must consider various factors, namely, learning objectives, learning materials, students' characteristics, teachers' abilities, situations, and the completeness of learning facilities. Inappropriate teaching methods may affect students' learning activities. Students tend to be bored, sleepy, and lazy to follow the learning process because the teaching methods are monotonous and lack variety. Conversely, if the teacher uses a proper teaching method, he will create an exciting learning activity. Therefore, he can arouse students' enthusiasm and motivation to learn.

Students who are highly motivated to learn may be better able to take full advantage of the instructor's online teaching methods. They tend to be more engaged, persistent, and eager to overcome obstacles that may arise during online learning. On the other hand, students with low learning motivation may face hurdles in getting the most out of online teaching methods. However, low learning motivation can be overcome or reduced by providing students with the correct support and incentives to increase student participation. Learning motivation is the key factor that influences the extent to which students engage and participate in learning. Students who are highly motivated to learn tend to be more proactive and diligent in their pursuit of knowledge.

4.4. Students' Motivation to Learn as a Moderating Variable to Strengthen the Effect of Learning Media on Students' Learning Activities

The role of learning motivation in learning activity is essential, especially for students. Proper learning media can overcome the passive attitude of students because students are required to do a lot of learning activities. They do not only listen to the teacher explain, but also do other learning activities such as observing, listening, and demonstrating. Therefore, it is necessary to improve the learning motivation in teaching and learning activities.

Based on the MRA calculation, the significance value is 0.002. This value is smaller than $\alpha = 0.05$, so according to the decision basis of the test, it can be concluded that it is significant. This means that learning motivation is a moderating variable for learning media to influence learning activities. The standard B-value of 0.033 means that the motivation variable strengthens the effect of learning media on learning activities by 0.33.

Different online learning media in the learning process will make the lessons more interesting and easier to understand. Thus, it can increase the learning activity. Conversely, if the teacher uses monotonous learning media in the learning process, it will make students feel bored and uninterested in learning, so students' learning activities will decrease. A positive perception of the use of learning media will increase students' learning activities through learning motivation.

Students with high learning motivation will make optimal use of online learning media. This learning motivation will encourage them to be more engaged and diligent in their learning activity, thus improving their overall learning activities. In contrast, students with low learning motivation will face obstacles in using online learning media. However, with the proper support and incentives, they can be encouraged to become more active in using online media and improve their learning motivation.

High learning motivation will increase students' interest in learning materials presented in the form of online media. When students are interested, they are more likely to follow and participate in the learning process. The use of online learning media offers a variety of interactive and innovative features, such as instructional videos, simulations, and educational games. High motivation will encourage students to explore these features and use technology more actively in learning.

5. Conclusion

Based on the research results, the following conclusions can be drawn:

- The teacher's teaching method has a significant effect on students' learning activities in SMA Negeri 4 Gorontalo. The regression results with a positive effect mean that the better the teacher's teaching method, the more students' learning activities will increase.
- Learning media has a positive and significant effect on students' learning activities in SMA Negeri 4 Gorontalo. Regression results with a positive influence mean that the better the learning media used by the teacher, the more the learning activities of the students will increase.
- Teachers' teaching methods and learning media have a positive and significant effect on students' learning activities in SMA Negeri 4 Gorontalo. Regression results with a positive influence mean that the better the teacher's teaching methods and the learning media used by the teacher, the more students' learning activities will increase.
- Student learning motivation is a moderating variable to strengthen the effect of teacher teaching methods on student learning activities in SMA Negeri 4 Gorontalo. The results of the analysis using MRA imply that the higher the student learning motivation coupled with the teacher using good teaching methods, the higher the student learning activities will be.
- Students' learning motivation is a moderating variable to strengthen the effect of learning media on students' learning activities in SMA Negeri 4 Gorontalo. The results of the analysis using MRA imply that the higher the student learning motivation coupled with the provision of appropriate learning media, the higher the student learning activity.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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