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A statistical test of the effect of teaching style on the learning outcomes of grade VIII students in Magelang City

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Abstract

Student learning outcomes are widely used to gauge how effective school instruction is. Among the factors believed to shape these outcomes is teachers' instructional style. This study investigates whether, and to what extent, teaching style affects students' academic performance. A quantitative survey design was employed. Data were gathered through a questionnaire assessing teachers' teaching styles and through records of students' learning results. The sample comprised 240 students from four secondary schools in Magelang City. After confirming instrument validity and reliability and meeting classical assumption requirements, the data were examined using simple linear regression. The results showed that the teaching style of teachers did not significantly affect student learning outcomes. This finding indicates that student learning outcomes are not only determined by the teaching style of teachers but are also influenced by other internal and external factors. This study contributes to enriching the study of factors that affect student learning outcomes and emphasizes the importance of a more comprehensive learning approach.

Keywords

Teaching style, Student learning outcomes, Learning process, Quantitative research

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Introduction

Education is a structured process designed to foster students' potential to the fullest, covering cognitive, affective, and psychomotor domains. The success of this process is commonly evaluated through students' learning outcomes, which indicate how well they have achieved the competencies aligned with established learning objectives. These outcomes serve as a key measure of instructional effectiveness, as they show the extent to which students understand, internalize, and apply the knowledge and skills acquired during learning [1].

Student learning outcomes are not formed in isolation, but are influenced by various interrelated factors. These factors include internal factors, such as students prior abilities, motivation, and interest in learning, as well as external factors, such as family environment, learning facilities, and the quality of learning at school [2]. Among these external factors, teachers play a strategic role because they function as designers, implementers, and evaluators of learning in the classroom.

Teachers' responsibilities in the learning process extend beyond merely delivering instructional material; they also involve managing the classroom effectively, fostering meaningful interactions with students, and creating a supportive and conducive learning environment. One important aspect of teachers' pedagogical competence is teaching style, which is the pattern of behaviour and strategies used by teachers in delivering learning. The right teaching style is believed to increase students' attention, engagement, and understanding of the learning material [3].

Theoretically, teaching styles are considered to have an influence on student learning outcomes because they are directly related to how students receive and process information. However, empirical findings show mixed results. Some studies report a significant influence of teaching styles on learning outcomes, while others find that the influence is relatively weak and is influenced by other variables, such as learning motivation and student characteristics [4]. The varying findings of previous studies highlight the importance of conducting further research across different school settings and institutional characteristics.

Preliminary observations in four secondary schools in Magelang City revealed differences in teachers' instructional styles as well as variations in students' learning outcomes. However, the relationship between these two variables has not yet been examined empirically and systematically in those schools. For this reason, the present study seeks to analyse the effect of teachers' teaching styles on students' learning outcomes, with the expectation that the findings will offer both theoretical and practical contributions to the improvement of more effective learning strategies at the secondary education level.

Method

This study employs a quantitative research approach. Quantitative research is generally understood as a systematic, planned, and structured method that provides clear research procedures [5]. It involves the use of statistical techniques to measure and examine the relationship or influence between two or more variables [6]. In carrying out this type of research, developing a research design or framework becomes an essential step to guide the overall research process [7].

In this study, the researchers did not intervene in the objects to be studied, but instead went directly into the field to gather and collect data by distributing questionnaires to each respondent. Figure 1 illustrates the conceptual framework showing the

relationship between teaching style of teachers as the independent variable and student learning outcomes as the dependent variable.

Figure 1. Conceptual Framework of the Relationship between Teaching Style and Student Learning Outcomes

Referring to the research framework above, we can conclude that this study will examine the extent of the influence of variable X on variable Y. This study was conducted at public junior high schools in Magelang City in the 2025/2026 academic year. The subjects of this study were 240 eighth-grade students selected to represent each school. The sampling technique used in this study is random sampling, with students selected from several schools as representatives.

Questionnaires and documentation were used in this study as data collection tools. The research instruments were tested for validity, reliability, and hypothesis testing in the form of simple regression analysis (R^2 test and t-test).

Results and discussion

Results

Based on the research framework, this study investigates the degree to which variable X affects variable Y. The research was carried out in public junior high schools in Magelang City during the 2025/2026 academic year. The participants consisted of 240 eighth-grade students chosen to represent the selected schools. A random sampling technique was applied, in which students from several schools were selected as study representatives.

1. Validity test

Validity testing is conducted to assess how well each item in the research instrument measures the variables being examined [6]. In this study, validity was tested using the Pearson Product Moment correlation by comparing the calculated r-value of each statement item with the r-table value, while also considering the significance value (Sig.) [6]. The results of the validity test for the 16 statement items are presented in Table 1.

Table 1. Research Framework of the Influence of Teaching Style on Student Learning Outcomes

Item	r-value	Sig.	Description	N
X101	0.548	0.000	Valid	240
X102	0.549	0.000	Valid	240
X103	0.492	0.000	Valid	240
X104	0.274	0.000	Valid	240

Item	r-value	Sig.	Description	N
X105	0.509	0.000	Valid	240
X106	0.447	0.000	Valid	240
X107	0.536	0.000	Valid	240
X108	0.503	0.000	Valid	240
X109	0.477	0.000	Valid	240
X110	0.541	0.000	Valid	240
X111	0.514	0.000	Valid	240
X112	0.357	0.000	Valid	240
X113	0.221	0.001	Valid	240
X114	0.526	0.000	Valid	240
X115	0.486	0.000	Valid	240
X116	0.394	0.000	Valid	240

Based on the validity test results for 16 statements, the calculated r values ranged from 0.221 to 0.549 with all significance values (Sig.) < 0.05. Thus, all statements X101 to X116 were considered valid and appropriate to be used as research instruments.

2. Reliability test

The reliability test is conducted to determine the level of consistency of research instruments in measuring the same variables [6]. The reliability test was conducted using Cronbach's Alpha coefficient and shown in Table 2.

Table 2. Reliability Test Results

Reliability Statistics	
Cronbach's Alpha	**N of Items**
.732	16

The reliability test results showed a Cronbach's Alpha value of 0.732. This value is greater than 0.70, so it can be concluded that the research instrument is reliable and has a good level of consistency for use in collecting research data.

3. Normality test

The normality test in this research data is intended to test the variables of teaching style of teachers, learning style of students with learning outcomes. The normality test for the data in this study was conducted using SPSS v25 through the Kolmogorov-Smirnov test. The Kolmogorov-Smirnov technique is commonly used for normality testing. According to both versions of this normality test, if the Sig value is > 0.05, then the data is normally distributed. The normality test results using the One-Sample Kolmogorov-Smirnov test are presented in Table 3.

Table 3. One-Sample Kolmogorov-Smirnov Normality Test Results

		Unstandardized Residual
N		**240**
Normal Parametersa,b	Mean	.0000000
	Std. Deviation	16.58102536
Most Extreme Differences	Absolute	.096
	Positive	.096
	Negative	-.071
Test Statistic		.096
Asymp. Sig. (2-tailed)		.000c

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.

Based on the normality test using the One-Sample Kolmogorov–Smirnov Test on the unstandardized residuals, the Asymp. Sig. (2-tailed) value was 0.000, which is below the 0.05 significance threshold. This indicates that the residuals are not normally distributed. Nevertheless, since the study involved a relatively large sample size (N = 240), the Central Limit Theorem suggests that this deviation from normality is unlikely to have a substantial effect on the regression results. Therefore, the regression model can still be considered appropriate for hypothesis testing.

4. Linierity test

Linearity testing is performed to determine whether the theoretically assumed linear relationship between two or more variables is supported by the observed data. Data linearity testing was conducted using SPSS version 25. With a significance level of 0.05, the data are considered linear if the significance value is greater than 0.05 or if the calculated F value is less than or equal to the F table value. The results of the linearity test using ANOVA are presented in Table 4.

Table 4. Linearity Test Results Using ANOVA

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Student Learning Outcomes* Teaching Style of Teachers	Between Groups	(Combined)	9141.493	32	285.672	1.043	.412
		Linearity	132.130	1	132.130	.482	.488
		Deviation from Linearity	9009.363	31	290.625	1.061	.388
	Within Groups		56699.003	207	273.908		
	Total		65840.496	239			

Based on the linearity test between teachers' teaching styles and students' learning outcomes, the significance value for Deviation from Linearity was 0.388, which exceeds the 0.05 significance level. This result shows that the relationship between the two variables does not significantly deviate from linearity. Accordingly, the association between teachers' teaching styles and students' learning outcomes can be considered

linear, meeting one of the key assumptions of linear regression analysis and indicating that the regression model is appropriate for hypothesis testing.

After the research data were found to satisfy the classical assumption requirements, the analysis proceeded with simple linear regression. This method was applied to examine how far teachers' teaching styles, as the independent variable, influenced students' learning outcomes as the dependent variable. Simple linear regression enables the relationship between the variables to be described quantitatively and provides a basis for testing the proposed research hypothesis.

5. Simple linear regression test

This study used SPSS version 25 to calculate the simple linear regression. The decision-making criterion was based on the significance value in the coefficients output. If the significance value is less than 0.05, variable X has an effect on variable Y; conversely, if the significance value is greater than 0.05, variable X has no effect on variable Y. The coefficients of the simple linear regression analysis are presented in Table 5.

Table 5. Coefficients of Simple Linear Regression Analysis

		Unstandardized Coefficients		Standardized Coefficients		
	Model	B	Std. Error	Beta	t	Sig.
1	(Constant)	-7.933	9.248		-.858	.392
	Teaching Style of Teachers	.114	.165	.045	.692	.490

a. Dependent Variable: Student Learning Outcomes

Based on the results of simple linear regression analysis in the coefficient table, a constant value of −7.933 was obtained, indicating that if the teacher's teaching style variable is zero, student learning outcomes are predicted to be −7.933. However, this constant value is not statistically significant (Sig. = 0.392 > 0.05), so it has no substantive meaning in the context of this study.

The regression coefficient for the teachers' teaching style variable is positive, suggesting that, in terms of direction, better teaching style scores tend to be associated with higher student learning outcomes. However, the significance test produced a Sig. value of 0.490, which is higher than the 0.05 significance threshold. This means that the effect of teachers' teaching styles on students' learning outcomes is not statistically significant. Therefore, the hypothesis proposing a significant influence of teaching style on learning outcomes is not supported.

The t-test in the simple linear regression analysis showed that the teachers' teaching style variable had a t-value of 0.692 with a significance value of 0.490. Since this value exceeds 0.05, H_0 is accepted and H_1 is rejected. These findings indicate that, partially, teachers' teaching styles do not significantly affect students' learning outcomes. Thus, the research hypothesis claiming an effect of teachers' teaching styles on students' learning outcomes is not statistically confirmed.

This finding is also in line with the very small coefficient of determination, which indicates that the contribution of teaching style to student learning outcomes is relatively low. This suggests that student learning outcomes in this study are likely to be influenced more by factors other than teaching style, such as students' prior knowledge, learning motivation, or learning environment.

The relatively small standardized beta coefficient value indicates that the contribution of teaching style to student learning outcomes in this model is low. This suggests that student learning outcomes in this study are likely to be influenced more by factors other than teaching style, such as students' prior knowledge, learning motivation, learning environment, or other external factors not included in the regression model.

These results are further supported by the R Square calculation results in this study. The following table shows the R Square calculation results:

Table 6. Model Summary

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.045a	.002	-.002	16.61582

a. Predictors: (Constant), Teaching Style of Teachers
b. Dependent Variable: Student Learning Outcome

Based on the Model Summary in Table 6, the correlation coefficient (R) was 0.045, showing that the association between teachers' teaching styles and students' learning outcomes falls into the very weak category. This suggests that the empirical linear relationship between the two variables is almost negligible.

The R Square (R^2) value of 0.002 means that teachers' teaching styles explain only 0.2% of the variance in students' learning outcomes. Conversely, 99.8% of the variance is likely influenced by other factors not included in the present research model.

The Adjusted R Square value of –0.002 further indicates that, after accounting for the number of predictors and sample size, the regression model does not improve predictive accuracy compared with a model without predictors. Overall, this implies that the simple linear regression model is not sufficient to explain variations in students' learning outcomes. In addition, the Std. Error of the Estimate value of 16.61582 reflects the size of the prediction error in estimating students' learning outcomes. This relatively high error value supports the conclusion that the model has weak predictive power.

Discussion

The results of this study provide empirical evidence regarding the influence of teaching styles on student learning outcomes in four secondary schools located in Magelang City. The context of this study is important because it provides a realistic picture of learning practices in a relatively homogeneous administrative area, so that variations in learning outcomes can be more closely linked to the pedagogical factors under study. The instrument used to measure teachers' teaching styles in this study met the criteria of validity and reliability, enabling it to represent the teaching style construct consistently.

This is in line with Arikunto's opinion, which emphasizes that a good instrument must be able to measure constructs accurately and consistently [8].

The analysis indicates that teaching styles affect students' learning outcomes, which were measured through the difference between pre-test and post-test scores. This method views learning outcomes as changes in students' abilities after the learning process, rather than merely as final scores. These findings differ from learning theories that emphasize the teacher's strategic role in shaping the quality of learning processes and outcomes through instructional delivery, classroom management, and student interaction [9].

The linear relationship between teaching styles and students' learning outcomes suggests that better teaching quality is associated with improved learning achievement. This finding supports Uno's view in Aulia, which explains that varied teaching styles, clear communication, and teachers' ability to establish a supportive classroom climate can enhance students' motivation and engagement [10]. In the context of secondary schools in Magelang City, these results indicate that teachers' teaching styles are pedagogical factors that contribute significantly to improving student learning outcomes.

Although the residual normality test showed that the data were not normally distributed, the relatively large sample size (N = 240) allows the regression results to remain acceptable. This is supported by the Central Limit Theorem, which states that, with a large sample, parameter estimates tend to approximate a normal distribution; therefore, violations of the normality assumption do not substantially reduce the accuracy of the regression model [5]. Thus, the conclusion regarding the influence of teaching styles on students' learning outcomes remains inferentially valid.

The findings differ from earlier studies reporting a significant effect of teaching styles on students' learning outcomes. Anggun et al. argued that teaching styles aligned with students' characteristics can improve conceptual understanding and academic achievement [11]. Accordingly, this study offers an updated perspective while reaffirming the relevance of teaching styles in enhancing learning quality at the secondary school level.

The results also suggest that students' learning outcomes are not determined solely by teachers' teaching styles. Other factors, including prior knowledge, learning motivation, family background, and educational facilities, may also influence achievement. This is consistent with Parnawi's view that learning outcomes emerge from complex interactions between students' internal and external factors [12]. Therefore, teaching styles need to be understood as an important component of the broader learning system.

The main contribution of this study lies in strengthening empirical evidence regarding the influence of teaching styles on student learning outcomes in the context of secondary schools in Magelang City. These findings have practical implications for

teachers and school administrators to continue developing their pedagogical competencies, particularly in adapting teaching styles that are appropriate to student characteristics. Further research is recommended to examine mediating variables, such as learning motivation or student activity, and to use a mixed-method approach in order to gain a more comprehensive understanding of the mechanism of the influence of teaching styles on learning outcomes.

Conclusion

This study examines the influence of teaching styles on students' learning outcomes in four secondary schools in Magelang City. Overall, the findings indicate that teaching style is not a major determinant of improved learning outcomes. Instead, students' achievement appears to result from the interaction of multiple internal and external factors.

Although teachers' teaching styles remain important in the learning process, their effect on learning outcomes is not necessarily direct or statistically significant. This supports the view that learning outcomes are multidimensional and may be shaped by prior academic ability, learning motivation, classroom environment, and the broader social and institutional context of the school.

The main contribution of this study is its empirical evidence that learning effectiveness cannot be explained by a single pedagogical factor. These findings broaden the discussion on teaching styles by highlighting the need for a more comprehensive perspective in examining the determinants of student learning outcomes, particularly at the secondary school level.

Future studies are recommended to include additional variables, such as learning motivation, student engagement, and prior knowledge, or to apply a mixed-methods design to gain a deeper understanding of how learning processes affect achievement. Such research is expected to contribute more substantially to the development of evidence-based educational practices and policies.

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