EM 14 (2) 105 - 121

Educational Management

http://journal.unnes.ac.id/sju/index.php/eduman

The Influence of Academic Supervision and Infrastructure on Teacher Performance Through Motivation in Public Elementary Schools in Sirampog District

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Article Info

Article History:
Received July 2025
Accepted July 2025
Published August 2025

Keywords:
Academic Supervision, Infrastructure, Motivation, Teacher Performance.

Abstract

This study aims to analyze the effect of academic supervision and school infrastructure on teacher performance through motivation as an intervening variable in public elementary schools in Sirampog District. Using a quantitative approach and path analysis method, the study involved 207 elementary school teachers selected through proportionate stratified random sampling. Data were collected using a validated and reliable questionnaire and analyzed using regression analysis, Sobel test, and path analysis. The results showed that academic supervision and infrastructure had a significant and positive effect on motivation and teacher performance. Moreover, motivation partially mediated the influence of both academic supervision and infrastructure on performance. These findings highlight the importance of strengthening academic supervision and improving infrastructure to foster teacher motivation and enhance performance.

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p-ISSN 2252-7001
e-ISSN 2502-454X

INTRODUCTION

Education is a crucial component of national development and human resource advancement. It provides individuals with essential knowledge, skills, and attitudes to contribute meaningfully to society. Education not only serves to educate but also to develop character, reduce poverty, and foster sustainable economic growth. In the 21st century, education systems must address increasing demands for critical thinking, collaboration, and digital literacy. While developed countries focus on innovation and the integration of technology in education, developing countries, such as Indonesia, continue striving to improve the quality of education through reforms in policy, teaching quality, and infrastructure.

In Indonesia, basic education comprising elementary and junior high school is foundational

to developing students' basic competencies in literacy and numeracy. However, the implementation of basic education still faces numerous challenges, including disparities in quality across regions, limited facilities, and insufficient academic supervision. These issues affect teacher performance, which is a critical determinant of education quality. Teachers are responsible for delivering effective learning and supporting student achievement. According to Indonesia's National Education System Law No. 20 of 2003, teachers are professionals with a vital role in achieving national education goals.

Teacher performance includes planning, implementing, and evaluating learning processes. It is influenced by multiple factors, such as pedagogical competence, teaching experience, motivation, and academic supervision from school principals. Academic supervision helps improve teacher performance by offering professional guidance and constructive feedback. Tools such as Ruang GTK (formerly Merdeka Mengajar Platform) support teachers and principals through performance management features that align performance targets with school needs.

Various studies offer mixed findings on the effectiveness of academic supervision. Research by Nunik Dwi Astuti et al. (2024) and Yuli Sudarti (2022) shows a positive effect, while Wiwik Lestari et al. (2023) found no significant effect. This indicates the need for further research, particularly focused on elementary school teachers in the Sirampog Subdistrict of Brebes Regency. Another significant factor in teacher performance is the availability of school infrastructure. Adequate infrastructure such as proper classrooms, technological resources, and teaching materialssupports effective learning. However, many schools in rural areas of Indonesia still lack these essentials, creating a learning gap between urban and rural students. While some studies show that infrastructure positively influences teacher performance (Sumarno, 2022), others report minimal effects, suggesting the role of other variables such as motivation.

Motivation is a vital internal factor that influences teacher performance. Motivated teachers are more likely to perform well, engage students, and pursue professional development. Theories such as Maslow's Hierarchy of Needs, Need Theory, Cognitive Theory, and Reinforcement Theory support the idea that motivation acts as a bridge between inputs (like supervision or infrastructure) and teacher performance. Motivation is driven by both internal desires and external conditions, such as recognition, achievement, and support. Studies by Astuti et al. (2024), Lestari et al. (2023), Zulkarnaen Z. (2020), and Rofifah et al. (2019) confirm that motivation has a consistent and significant positive influence on teacher performance.

Recent interviews conducted with the Chair of the School Principals Working Group (K3S) in Sirampog revealed several pressing issues affecting teacher performance in the area. Approximately 12 schools currently lack principals due to retirement or resignation, leading to a system where one principal oversees multiple schools. This has reduced the effectiveness of academic supervision due to logistical challenges, heavy workloads, and difficult terrain. Poor internet access and lack of physical resources, such as libraries, further contribute to low teacher performance. Supervision schedules are inconsistent, often conducted only once per semester.

Given this context, this study aims to examine the influence of academic supervision and infrastructure on teacher performance in elementary schools in Sirampog Subdistrict. What distinguishes this study is the introduction of teacher motivation as a mediating variable, based on the findings and gaps in previous research. The objective is to analyze whether motivation can strengthen or mediate the impact of academic supervision and infrastructure on teacher performance. The findings from this study are expected to contribute to better educational strategies and policies to enhance teacher performance and overall education quality in rural Indonesian schools.

METHOD

The research design used in this study is quantitative research that is causal or multiple variable in nature. According to Sugiyono (2017), "quantitative research is a research method based on the philosophy of positivism, which is used to study a population or a specific sample, quantitative or statistical research, with the aim of determining or testing previously determined hypotheses. Referring to the SEM procedure, which is:

a) the causal relationship that occurs is structural and serial using regression equations
b) the causal relationship can be arranged in the form of a diagram so that it is easy to understand. (Sugiyono: 2017: 69).

The type of research used is ex post facto, which aims to test the cause-and-effect relationship between variables that have already occurred without providing treatment or manipulation of those variables. This type of research was chosen because it aims to analyze the extent of the influence between the selected variables, namely academic supervision, infrastructure, and work motivation on teacher performance, as well as the causal relationship between those variables.

The analytical tool used in this study is path analysis, which aims to test the direct and indirect effects between academic supervision and infrastructure as independent variables, work motivation as a mediating variable, and teacher performance as a dependent variable. Path analysis was chosen as the analytical tool because it can explain various causal relationships and the role of the mediating variable "motivation" in this study.

The author uses the survey method for data collection. A survey is a research method that uses a questionnaire as a data collection tool. A questionnaire is an instrument in the form of a list of questions or written statements that are answered or filled out by respondents according to the instructions for completion (Sanjaya, 2015:255). The questionnaire distributed will use Google Forms (GF) as the distribution medium.

The following is the relationship pattern of the research to be studied:

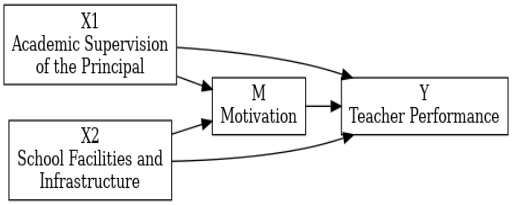

Figure 1. Relationship Pattern

The population in this study was all public elementary school teachers who were civil servants, both permanent and temporary, in the Sirampog subdistrict, with data sourced from the Sirampog Subdistrict Education Unit Coordinator (Korwilcamsatpendik) office. There were 232 teachers spread across 14 villages. The sampling area was divided into three regions: the upper Sirampog region, comprising the villages of Igirklanceng, Dawuhan, Batursari, and Sridadi; then the central Sirampog area, which includes the villages of Kaligiri, Mendala, Melayang, Buniwah, and Manggis, and finally the lower Sirampog area, which includes the villages of Kaliloka, Plompong, Gunung Sumping, Benda, and Wanareja. This population was selected because the study focused on the influence of academic supervision by school principals, facilities and infrastructure, and work motivation on teacher performance in elementary schools throughout the Sirampog subdistrict.

Quoted from Sugiyono (2017), the population is a generalization area consisting of objects or subjects that have qualities and characteristics determined by the research to be studied and then conclusions are drawn. The approach used in this population aims to obtain data that is appropriate and relevant and can be generalized to the research area.

Table 1. Population Size

Number	Population Distribution	Number of Teachers
1	Upper Sirampog	145
2	Central Sirampog	142
3	Lower Sirampog	141
Total		**428**

A sample is a group that is relatively smaller than the population selected and used for research (Alvi, 2016). According to Sugiyono (2013), a sample is part of the population in terms of quantity and quality. The sampling technique used is the "propositional simple random sampling" technique. According to Sugiyono (2019:129), it is called "simple" because the selection of sample members from the population is done randomly without considering the strata within the population. To calculate the sample size from a specific population, the Slovin formula is used as follows:

n = Sample size

N = Population size

e = Error margin (Tolerance range of error)

Based on the above formula, with a confidence level of 95% and a tolerance range of error of 5, the sample size is calculated as follows:

= 206.76, rounded to 207

According to Riduwan and Engkos Achmad Kuncoro (2008: 45), proportional allocation of samples from a stratified population can be done using the following proportional allocation formula:

Notes: ni = Sample size according to proportion

Ni = Population size according to proportion

N = Total population size

n = Total sample size

Based on the above formula, the sample size for each region can be seen in the following table:

Table 2. Research Sample Members

No	Population per region	Calculation	Sample size
1.	Upper Sirampog	$n_i = \frac{145}{428}\ x\ 207$ = 70,128	70 teachers
2	Central Sirampog	$n_i = \frac{142}{428}\ x\ 207$ = 68,677	69 teachers
3	Lower Sirampog	$n_i = \frac{141}{428}\ x\ 207$ = 68,193	68 teachers
	Total		**207 teachers**

It can be concluded that the number of teachers who will be sampled in this study is 207 public elementary school teachers in the Sirampog subdistrict. With this procedure model, it is hoped that the data will be sufficient to conclude that the number of respondents in this study can represent all teachers in the Sirampog subdistrict.

It can therefore be concluded that the number of teachers who will be sampled in this study is 207 public elementary school teachers in the Sirampog subdistrict. With this procedural model, it is hoped that there will be sufficient data to conclude that the number of respondents in this study is representative of all teachers in the Sirampog subdistrict.

This study uses primary data collected directly from respondents, namely elementary school teachers. Data collection was carried out using a closed questionnaire method, which is a questionnaire presented in such a way that respondents are asked to select one answer that matches their characteristics by checking a box (Π).

To obtain data on teacher performance based on academic supervision, facilities and infrastructure mediated by motivation, statements were formulated using a numerical scale. According to Sekaran (2011:33), "a numerical scale is similar to a semantic differential scale, with the difference being that a 1-point or 7-point scale is provided, with bipolar adjectives at both ends." Using this scale, respondents were asked to evaluate a specific object. Each statement contained 5 options. The following is a questionnaire table with numerical ratings sourced from Sugiyono (2022:94).

Table 3. Numerical Scale Assessment

No.	Question / Statement	Linear Scale Score				
		1	2	3	4	5

The explanation of the scores in the questionnaire is as follows:

1) The number 5 is used for the highest positive statement
2) The number 4 represents a high positive statement
3) The number 3 represents a moderate positive statement

4) The number 2 represents a low positive statement
5) The number 1 represents the lowest positive statement

With the above scoring criteria, the validity of the data generated can be assured. Therefore, before being administered to the research sample, the research instrument must first be tested for validity and reliability.

The validity of the instrument was tested using construct validity, which measures whether each item in the questionnaire truly reflects the concept being measured. Validity analysis was performed using statistical software to measure the correlation between each item and the total score.

Quoted from Sugiyono (2010: 176), non-test instruments used to measure attitudes sufficiently meet construct validity. Validity testing was carried out through factor analysis of the research instrument. Instrument validity testing in this study used Pearson product moment correlation as follows:

Notes:
rxy: Correlation coefficient between variables X and Y
X: Total item score
Y: Total score (all items)
$\sum XY$: X and Y scores for each respondent
$\sum X2$: Square of item scores
$\sum Y2$: Square of respondent scores
N: Number of respondents

To determine the validity of the data, the following criteria were used:

a) If > , the instrument is considered valid
b) If > , the instrument is considered invalid

Each item in the instrument provides five response intervals, with a score of 1 for the lowest response and a score of 5 for the highest response. The research instrument consists of 50 items, comprising 20 items to measure teacher performance (Y), 10 items to measure academic supervision (X.1), 10 items to measure infrastructure (X.2), and 10 items to measure motivation (Z). Each item in the instrument provides five response intervals, with a score of 1 for the lowest response and a score of 5 for the highest response.

Reliability was tested using Cronbach's Alpha, which aims to measure the consistency of the results of the research instrument. A Cronbach's Alpha value above 0.60 is considered to indicate good reliability, while a value below 0.60 indicates the need to revise the instrument. The formula used to measure reliability is Cronbach's Alpha formula in Sugiono (2020: 187) as follows:

$$r_{11} = \left[\frac{k}{k-1}\right]\left[1 - \frac{\sum a_b^{\,2}}{a_1^{\,2}}\right]$$

Explanation:
r11 = instrument reliability coefficient
k = number of questions
$\Sigma\sigma b2$ = total respondent answers for each question
$\Sigma\sigma t2$ = total variance

According to Sugiyono (2022:135), if the Cronbach's Alpha value is greater than 0.60, the statement items in the questionnaire are considered reliable. Conversely, if the Cronbach's Alpha value is less than 0.60, the statement items in the questionnaire are considered unreliable. The researcher presents a list of Cronbach's Alpha for all research variables, both independent and dependent, based on calculations using SPSS.

Table 4. Interpretation Table for r Alpha Correlation Index Values

Coefficient r	Reliability
0,8000-1,0000	Very high
0,6000-0,7999	High
0,4000-0,5999	Moderate
0,2000-0,3999	Low
0,0000-0,1999	Very low

Based on the table, it can be concluded that each variable with a value > 0.60 is reliable and can be used for further testing.

Descriptive analysis was used to describe the profile of respondents and research variables. This analysis included calculating the mean, standard deviation, frequency distribution, and central tendency of each research variable. Data presentation was in the form of tables and diagrams to facilitate understanding.

Inferential analysis is used to test research hypotheses and causal relationships between variables. Inferential analysis in this study includes:

1. Normality Test:

According to Sugiyono (2019:76), the normality test is used to assess the normality of the variables being studied, whether the data is normally distributed or not. This is important because if the data for each variable is not normal, then hypothesis testing cannot use parametric statistics. Normality testing using the following normal probability plots method:

a) If the data is scattered around the diagonal line and follows the direction of the diagonal line, it can be concluded that the regression model meets the normality assumption.
b) If the data is scattered far from the diagonal line and does not follow the direction of the diagonal line, it can be concluded that the regression model does not meet the normality assumption.

2. Multicollinearity Test:

Multicollinearity is a test to determine whether the regression model has problems among the independent variables. The guideline for a regression model free of multicollinearity is to test the Tolerance value above 0.1, with the VIF limit being 1 (Sugiyono, 2019: 79). The multicollinearity test aims to determine whether the regression model shows correlations among the independent variables, which in this study are the variables of well-being, work environment, and competence. To detect the presence of multicollinearity in the regression model, the following steps are taken:

a. Analyzing the correlation matrix of the independent variables. If there is a sufficiently high correlation between independent variables (generally above 0.90), this indicates the presence of multicollinearity.
b. Examining the tolerance value and variance inflation factor (VIF). A low tolerance value corresponds to a high VIF value (since VIF = 1/tolerance) and indicates high collinearity. The commonly used cutoff values are a tolerance value of 0.10 or a VIF value above 10.

3. Heteroscedasticity Test:

This is conducted to ensure that the independent variables have constant residual variance. If the variance remains constant from one observation to another, the regression model is homoscedastic. Conversely, if the variance from one observation to another is different, then the regression model is heteroscedastic. A good regression model is one that is homoscedastic or does not exhibit heteroscedasticity (Ghozali, 2017). To test whether there is a problem with heteroscedasticity in the regression, the probability value of the variable can be examined.

The basis for decision-making in this test is as follows:

a) If the probability value of the independent variable is < 0.05, then heteroscedasticity occurs.
b) If the probability value of the independent variable is > 0.05, then heteroscedasticity does not occur.

4. Autocorrelation Test:

The autocorrelation test aims to determine whether there is a correlation between the error in period t and the disturbance in period t-1 (previous) in the linear regression model. If there is a correlation, it is called an autocorrelation problem (Ghozali, 2017). To test for the presence or absence of autocorrelation, the Durbin-Watson test (DW test) can be used. The following is the Durbin-Watson autocorrelation table:

Table 5. The Durbin-Watson Autocorrelation Table

No	DW Value	Description
1	< 1.50	Positive autocorrelation is present
2	1.50 - 2.50	No autocorrelation
3	> 2.50	Negative autocorrelation is present

Explanation

a) < 1.50: Indicates that the residuals from the regression model are positively correlated, which may indicate a problem in the model.
b) 1.50 - 2.50: Indicates no autocorrelation, meaning the residuals can be considered independent.

c) > 2.50: Indicates that the residuals from the regression model are negatively correlated, which may also indicate problems in the model.

5. Path Analysis

Path analysis is used to measure the direct and indirect effects between research variables. In this analysis, the effects of academic supervision and infrastructure on teacher performance are tested directly, while work motivation is tested as a mediating variable. The following are the steps to determine whether the effect of the mediating variable is accepted or rejected:

a) Formulate the first multiple linear regression equation, i.e., between the independent variable and the mediating variable.
b) Formulate the second multiple linear regression equation, between the independent variable and the mediating variable on the dependent variable.
c) Conduct a mediation effect test using the Sobel test. The mediation effect will be accepted if the calculated t-value is greater than the table t-value at a significance level of 5%.

6. Hypothesis Testing

Quoting Sugiyono (2015: 314), who states that "comparative hypothesis testing with independent and paired t-tests as well as one-way and two-way analysis of variance." This study will use the independent t-test formula. According to Sugiyono (2015: 304), the following applies in this hypothesis testing:

a) Calculated t > table t: Ho is rejected and Ha is accepted.
b) Calculated t < table t: Ho is accepted and Ha is rejected.

1) Direct Effect Test:

The effect of academic supervision and infrastructure on teacher performance was tested using linear regression. A significant effect was indicated by a p-value < 0.05.

2) Mediation Test (Sobel Test):

The mediation hypothesis was tested using the Sobel test method. The Sobel test is used to evaluate the impact of the mediating variable as a mediating variable. The purpose of this test is to assess the extent of the indirect effect of variable X on variable Y through variable M. If the calculated value of M is greater than the value listed in the M table, this indicates the presence of a mediating effect. The Sobel test calculation is performed by multiplying the X-M path coefficient by the M-Y path coefficient, as explained by Ghozali (2018). The following formula is used:

Notes:

Sa = Standard error of X-M Sb = Standard error of M-Y

α = Regression coefficient of M-Y

β = Regression coefficient of X-M

To test the significance of the partial indirect effect, the following formula is used:

Mediation regression analysis using the product of coefficients method can be conducted with the following steps:

a) Create the regression equation for the independent variable (X) against the mediating variable (M), and obtain the regression coefficient value (a) and the standard error of the regression coefficient (sb).
b) Formulate the regression equation for the independent variable (X) with respect to the dependent variable (Y) by including the mediating variable (M) in the equation. In this step, the coefficient value (b) and the standard error of the regression coefficient (Sb) are obtained.

Thus, it can be summarized that when the calculated t-value exceeds the t-value in the table, there is an indication of mediation. This indicates that the mediating variable has the potential to mediate the relationship between the independent and dependent variables. If the indirect effect is more significant than the direct effect, this indicates that the mediating variable plays a role in mediating the effect of the independent variable on the dependent variable.

3) Coefficient of Determination (R^2):

Used to measure how much the independent and mediating variables can explain the dependent variable, namely teacher performance.

To measure the independent variables against the dependent variable partially and multiply, the coefficient of determination (KD) is used with the formula:

$$KD = R2 \times 100\%$$

R^2 = Coefficient of Determination

R^2 = Square of the Correlation Coefficient

a) If R^2 is close to zero (0), then the influence of the independent variable on the dependent variable is weak.
b) If R^2 is close to one (1), then the influence of the independent variable on the dependent variable is strong.

RESULTS AND DISCUSSIONS

RESULTS

Description of Respondents

This study is quantitative in nature, with data generated in numerical form. The purpose of this study is to analyze the influence of academic supervision by school principals and infrastructure on teacher performance through work motivation. Data was collected using a questionnaire, which was distributed confidentially using a 1–5 Likert scale. This study used two independent variables, namely academic supervision by the school principal and infrastructure, with motivation as the mediating variable. The dependent variable is teacher performance. The questionnaire, which was designed with the variables under study, has an average of 10 questions for the independent and mediating variables, while the dependent variable has 20 questions. The sample consists of 207 elementary school teachers in Sirampog Subdistrict, Brebes Regency, with the following profile:text should focus on the importance of the principal findings of the study. In general, journal papers will contain three-seven figures and tables. Same data can not be presented in the form of tables and figures. The results of the study are discussed to address the problem formulated, objectives and research hypotheses. It is higly suggested that discussion be focused on the why, how , what else of the research findings can happen and to extend to which the research findings can be applied to other relevant problems. Explain your your research contributions to science.

Table 6. Respondent Profile Based on Gender

	Frequency	Percent	Valid Percent
Male	94	45.4	45.4
Female	113	54.6	54.6
Total	207	100.0	100.0

From the data analysis, it can be seen that there is a fairly balanced distribution between male and female respondents. Male respondents numbered 94 teachers (45.4%), while female respondents numbered 113 teachers (54.6%). In conclusion, it can be said that female teachers have a slightly higher proportion compared to male teachers. This indicates that the participation of female teachers is quite significant in the elementary education environment in the Sirampog sub-district.

Statistical Description

1) Academic Supervision of the Principal

The descriptive statistics results for the principal's academic supervision variable show that the statement with the highest mean value in X.1.7 is 4.10, with a minimum value of 1, a maximum value of 5, and a standard deviation of 0.741. Meanwhile, the statement with the lowest mean value is found in X.1.1, which is 3.42, with a minimum value of 1, a maximum value of 5, and a standard deviation of 1.137.

2) Infrastructure

The descriptive statistics results for the Infrastructure variable show that the statement with the highest mean value in X.2.3 is 4.09, with a minimum value of 1, a maximum value of 5, and a standard deviation of 0.761. Meanwhile, the statement with the lowest mean value is found in X.2.9, which is 3.06, with a minimum value of 2, a maximum value of 5, and a standard deviation of 0.828.

3) Motivation

The descriptive statistics results for the motivation variable show that the statement with the highest mean value is Z.10, which is 4.27, with a minimum value of 2, a maximum value of 5, and a standard deviation of 0.693. Meanwhile, the statement with the lowest mean value was found in Z.2, which was 3.56, with a minimum value of 1, a maximum value of 5, and a standard deviation of 0.694.

4) Teacher Performance

The descriptive statistics results for the teacher performance variable show that the statement with the highest mean value in Y.20 is 4.24, with a minimum value of 2, a maximum value of 5, and a standard deviation of 0.805. Meanwhile, the statement with the lowest mean value was found in Y.16, which was 3.45, with a minimum value of 1, a maximum value of 5, and a standard deviation of 0.963.

Test of Research Instruments

Validity Test

This test compares the value of r-count with the value of r-table for a degree of freedom (df) of n-2. In this case, n is the number of samples. In this study, the number of samples amounted to 207 teachers, so df = 207 - 2 = 205. The r-table validity test shows a value of 0.1364.

Based on the data processing results from 50 items distributed evenly across 10 variables, all r-count values are greater than the r-table value (Sugiyono, 2010). Since all of the questionnaire items show Pearson correlation results greater than 0.1364, it can be concluded that all of the items from each of the principal leadership variables (X.1), work environment (X.2), teacher competence (X.3), motivation (Z), and teacher performance (Y) are valid and can be used in further testing.

Reliability Test

Table 7. Reliability Test Results

Variabel	Comparison *Cronbach's Alpha*		Information
	Cronbach's Alpha	α > 60 %	
Academic Supervision by the Principal	0,899	0,60	Reliable
Infrastructure	0,763	0,60	Reliable
Motivation	0,865	0,60	Reliable
Teacher Performance	0,921	0,60	Reliable

The data above shows that all Cronbach Alpha values listed in the table of calculation results using SPSS for each variable are> 0.60. So it can be said that all research instruments are reliable and can be used for further tests.

Classical Assumption Test

Table 8. Normality Test Results

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		207
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	5.48651658
Most Extreme Differences	Absolute	.054
	Positive	.040
	Negative	-.054
Test Statistic		.054
Asymp. Sig. (2-tailed)		.200[c,d]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Based on the output results, the significance value is 0.200. So that the value of the processing results is greater than 0.05 or 5%, it can be concluded that the residuals are normally distributed.

Table 9. Multicolinearity Test Results

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Academic Supervision by the Principal	.308	3.249
	Infrastructure	.400	2.501
	Motivation	.318	3.146

a. Dependent Variable: Teacher Performance

The data above shows that all tolerance values of the independent variables are above 0.1 and the VIF values of the independent variables are all below 10. Therefore, it can be said that there is no multicollinearity in the data.

Tabel 10. Results of Heteroscedasticity Test with Glejser Test

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	4.312	1.970		2.189	.030
	Academic Supervision by the Principal	.076	.068	.141	1.114	.267
	Infrastructure	.053	.073	.083	.720	.472
	Motivation	-.107	.093	-.166	-1.144	.254
	Teacher Performance	-.019	.046	-.056	-.413	.680

a. Dependent Variable: ABS_RES

Based on the results of the data processing above, it can be seen that the significance values of academic supervision by the principal, infrastructure, and motivation are each greater than 5% or 0.05, so it can be concluded that there is no evidence of heteroscedasticity.

Hypothesis Test

Hypothesis testing in this study was conducted using multiple regression analysis (without interaction) and regression analysis with interaction or path analysis on the variables of principal academic supervision and infrastructure on teacher performance through motivation.

Table 11. Results of Multiple Linear Regression Analysis

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	23.312	3.050		7.642	.000
	Academic Supervision by the Principal	.697	.099	.446	7.040	.000
	Infrastructure	.756	.118	.405	6.403	.000

a. Dependent Variable: Teacher Performance

Looking at the unstandardized beta coefficients above, the multiple linear regression equation resulting from this study can be determined as follows:

Y = a + b1 + b2 + e

Y = 23.312 + 0.697 + 0.756 + e

Explanation:

Y = Teacher Performance

a = Constant

b1 = Regression coefficient of the principal's academic supervision variable

b2 = Regression coefficient of the infrastructure variable

X1 = Principal's Academic Supervision

X2 = Infrastructure

e = Research error

From the regression equation above, we can see the partial relationship between the independent variables and the dependent variable. Therefore, the following conclusions can be drawn:

a) The constant is 23.213, which means that if the variables of principal's academic supervision and facilities and infrastructure are considered zero, then the teacher performance variable is 23.213.
b) The regression coefficient for academic supervision by the school principal is 0.697, meaning that if academic supervision by the school principal increases while other independent variables are assumed to remain constant, teacher performance will increase by 0.697.
c) The regression coefficient for facilities and infrastructure is 0.756, meaning that if the facilities and infrastructure variable increases while the principal's academic supervision variable is assumed to remain constant, teacher performance will also increase by 0.756.

Then for the second hypothesis test is path analysis or path analysis. This analysis not only tests the direct effect, but also explains the indirect effect that the independent variable has through the intervening variable on the dependent variable. The first thing to do in the path analysis test is to first describe the path diagram. Second, determine the path coefficient. In this study, there are two path coefficients to be sought, namely the direct effect path coefficient and the indirect effect path coefficient.

Based on picture above, it is known that the first multiple linear regression test was conducted to determine the direct effect of the independent variables, namely academic supervision by the principal and infrastructure, on teacher performance. The test results show that all independent variables have a positive and

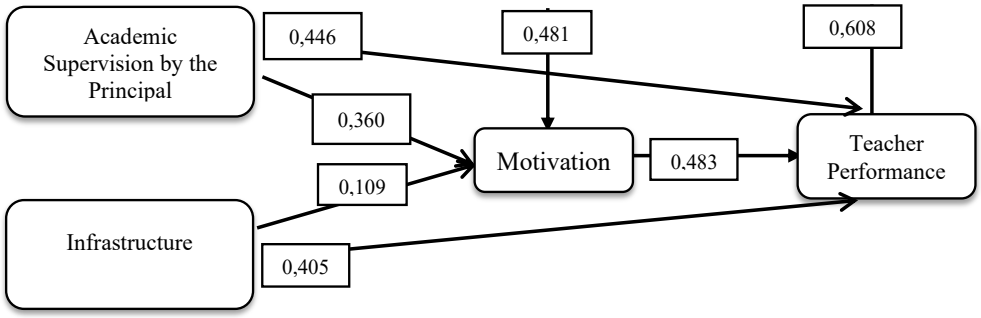

Figure 2. Path Analysis

significant effect on Teacher Performance with a significance value below 0.05.

1) The principal's academic supervision has a coefficient value of 0.697, a t-value of 7.040, and a significance level of 0.000. This means that for every 1-unit increase in the principal's academic supervision score, there will be a 0.697-unit increase in teacher performance. Additionally, the sig value of 0.000 < 0.05 indicates that the principal's academic supervision variable has a significant effect on teacher performance.
2) Facilities and infrastructure have a coefficient value of 0.756, a t-value of 6.403, and a significance level of 0.000. This means that for every 1-unit increase in the infrastructure variable score, there is a corresponding increase of 0.756 units in the teacher performance variable. Additionally, the sig value of 0.000 < 0.05 indicates that the infrastructure variable has a significant effect on teacher performance.

Table 12. Results of Indirect Path Analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.620	1.462		2.476	.014
	Academic Supervision by the Principal	.300	.047	.360	6.426	.000
	Infrastructure	.108	.055	.109	1.978	.049
	Motivation	.257	.030	.483	8.699	.000

a. Dependent Variable: Teacher Performance

Based on Table above, the second model path analysis test was conducted to determine the indirect effect between the independent variables, namely academic supervision by the principal and infrastructure, on teacher performance mediated by motivation. The explanation is as follows:

1) Motivation has a significant direct effect on teacher performance (B = 0.257; Sig. = 0.000). This indicates that teachers' work motivation is a crucial factor in enhancing their performance.
2) When the motivation variable is included in the model, there is a decrease in the coefficients of the independent variables:
   a) The coefficient for the principal's academic supervision decreases from 0.697 to 0.300.
   b) The coefficient for facilities and infrastructure decreased from 0.756 to 0.108.
3) This indicates that motivation acts as a partial mediating variable in relation to the independent variables, namely:
   a) The independent variable of academic supervision by the school principal on motivation, with a beta coefficient of 0.360, a t-value of 8.699, and a significance level of 0.000 < 0.05, indicates that the independent variable of academic supervision by the school principal has a positive and significant effect on motivation. The more structured and routine the implementation of academic supervision by the school principal, the higher the motivation of teachers. Therefore, it can be concluded that is accepted.

b) The independent variable of infrastructure on motivation with a beta coefficient of 0.109, a t-value of 8.699, and a significance level of 0.049 < 0.05 indicates that the independent variable of infrastructure has a positive and significant effect on motivation. The more adequate the facilities and infrastructure available, the higher the motivation of teachers. Therefore, it can be concluded that accepted.

Table 13. Total Indirect Influence

Variabel	Influence		Total
	Direct	Indirect	
Principal's academic supervision	0,360	0,174	0,534
Facilities and infrastructure	0,109	0,053	0,162

It can be seen from the total indirect effect in Table 4.23 above that strengthening teacher motivation can increase the effectiveness of the influence of assessment implementation factors and the completeness of supporting materials on the performance of elementary school teachers in Sirampog District. Academic supervision by the school principal has the largest total influence on teacher performance with a total of (0.534), and infrastructure also has a significant influence with a total of (0.162). Furthermore, the presence of motivation as a mediating variable also has a significant influence on teacher performance, with a coefficient of 0.483, a t-value of 8.699, and a significance level of 0.000. This further reinforces the notion that as teachers' motivation increases, their performance also improves.

It can be explained as follows:

1) The effect of academic supervision by the principal through motivation on teacher performance.

   Based on the calculation results, a Z value of 6.507 was obtained with a p value of 0.000. Since Z > 1.96 and p < 0.05, it can be concluded that motivation significantly mediates the effect of the principal's academic supervision on teacher performance. This indicates that the better the implementation of the principal's academic supervision, the higher the teachers' motivation, which ultimately has a positive impact on their performance.

2) The effect of infrastructure variables through motivation on teacher performance variables.

   The Sobel test shows a Z value of 4.481 with p = 0.007. This value is also greater than the critical threshold (Z) = 1.96 with significance < 0.05, so it can be concluded that motivation significantly mediates the effect of infrastructure on teacher performance. This means that adequate infrastructure can increase teacher motivation, which in turn contributes to improved teacher performance.

Tabel 14. Determination test results (Adjusted R^2).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.826[a]	.682	.679	2.724

a. Predictors: (Constant), Infrastructure, Academic Supervision by the Principal

Based on the results of Model 1 Summary above, it is known that the adjusted coefficient of determination (Adjusted R Square) is 0.679. This indicates that the independent variables consisting of Principal Academic Supervision and Infrastructure are simultaneously able to explain 67.9% of the variation in the dependent variable, namely Teacher Performance. Meanwhile, the remaining 32.1% is explained by other variables outside this research model. Adjusted R Square is used to provide a more accurate picture of the predictor's ability in the regression model, especially when there is more than one independent variable, because this value has been adjusted to the number of predictors and samples used.

Thus, it can be concluded that Model 1 has good predictive power, where more than half of the variability in teacher performance can be explained by the combination of the two independent variables. However, there is still room for contribution from other factors not included in the model, which can be further investigated in subsequent research.

Table 15. T Test Result Model 1

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	22.240	2.977		7.470	.000
	Academic Supervision by the Principal	.809	.100	.503	8.060	.000
	Infrastructure	.668	.116	.358	5.742	.000

a. Dependent Variable: Teacher Performance

Based on the results of the T-test in model 1, the effects of each independent variable, namely academic supervision by the principal and infrastructure, on the dependent variable of teacher performance can be explained as follows:

1) The effect of academic supervision by the principal on teacher performance

The principal's academic supervision variable has a significance value of 0.000 < 0.05, with a t-value of 8.060 > 0.1367. This indicates that the principal's academic supervision has a positive and significant effect on teacher performance. The better the principal's academic supervision, the higher the teacher performance. Therefore, it can be concluded that the hypothesis is accepted.

2) The effect of facilities and infrastructure on teacher performance

The infrastructure variable also shows a positive and significant effect on teacher performance with a significance value of 0.000 < 0.05 and a t-value of 5.742 > 0.1367. This means that supportive infrastructure can significantly improve teacher performance. Therefore, it can be concluded that is accepted.

Table 16. T Test Result Model 2

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	13.281	2.835		4.684	.000
	Academic Supervision by the Principal	.283	.110	.176	2.573	.011
	Infrastructure	.407	.107	.218	3.802	.000
	Motivation	.991	.124	.528	7.983	.000

a. Dependent Variable: Teacher Performance

Based on the results of the t-test to determine the effect of each independent variable on the dependent variable of Teacher Performance partially. Model 2 includes four independent variables, namely the principal's academic supervision, facilities and infrastructure, and the mediating variable of motivation. The following are the results of the t-test interpretation for each variable:

1) The effect of the principal's academic supervision on teacher performance through motivation.

The principal's academic supervision through motivation has a t-value of 2.573 > 0.1371 and a significance value of 0.011 (< 0.05). Therefore, it can be concluded that academic supervision by the school principal, mediated by motivation, has a significant simultaneous effect on teacher performance. Thus, it can be stated that the hypothesis is accepted.

2) The effect of facilities and infrastructure on teacher performance through motivation.

Facilities and infrastructure through motivation have a t-value of 3.802 > 0.1371 and a significance of 0.000 < 0.05. Therefore, it can be concluded that facilities and infrastructure mediated by motivation significantly influence teacher performance. Therefore, it can be stated that the hypothesis is accepted.

3) The influence of motivation in mediating academic supervision by the school principal and infrastructure on teacher performance.

Motivation, as a mediating variable, showed a t-value of 7.983 > 0.1374 with a significance of 0.000 < 0.05, which means that motivation has a positive and significant effect in mediating the principal's academic supervision and infrastructure on teacher performance. Therefore, it can be stated that accepted.

Table 17. F Test Result Model 1

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10914.476	2	5457.238	190.438	.000[b]
	Residual	5845.881	204	28.656		
	Total	16760.357	206			

a. Dependent Variable: Teacher Performance

b. Predictors: (Constant), Infrastructure, Academic Supervision by the Principal

Based on the F test results presented in the ANOVA Model 1 table, the calculated F value is 190.438, which is > 3.04 with a significance value of 0.000 < 0.05. This significance value is much smaller than the specified significance limit (α = 0.05), which means that the regression model is

statistically significant. Therefore, it can be concluded that, simultaneously or together, the variables of Academic Supervision by the School Principal and Infrastructure have a significant influence on Teacher Performance.

Table 18. F Test Result Model 2

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	12311.091	3	4103.697	187.233	.000[b]
	Residual	4449.266	203	21.918		
	Total	16760.357	206			

a. Dependent Variable: Teacher Performance

b. Predictors: (Constant), Motivation, Infrastructure, Academic Supervision by the Principal

The F-test in Model 2 was used to determine whether the variables of Motivation, Infrastructure, and Academic Supervision by the Principal simultaneously had a significant effect on Teacher Performance. The F distribution table shows df (n1) = k = 3, and df (n2) = 207 – 3 –1 = 203, with the F table value being 2.42. If the calculated F value is greater than the F table value or the significance level is less than 0.05, then it can be concluded that the hypothesis is accepted.

Based on the regression analysis results shown in Table ANOVA Model 2, the calculated F value is 187.233 > the F table value of 2.42, and the significance level is 0.000 < 0.05. Therefore, it can be concluded that simultaneously, the variables of Motivation, Facilities and Infrastructure, and Academic Supervision by the School Principal have a significant influence on Teacher Performance.

DISCUSSION

The first hypothesis test (H_1) shows the results, namely the effect of the principal's academic supervision on teacher performance with a calculated t-value of 8.060 > t-table 0.1367 and a significance value of 0.000. It can be concluded that the null hypothesis is rejected and the alternative hypothesis is accepted, indicating that the principal's academic supervision has a positive and significant effect on the performance of elementary school teachers in Sirampog District.

Based on the results of the hypothesis test, it can be concluded that academic supervision by the principal is important in improving teacher performance. In academic supervision by school principals, the statement with the highest mean value in X.1.7 was 4.10, with a minimum value of 1, a maximum value of 5, and a standard deviation of 0.741. This can be interpreted to mean that well-planned and effective supervision can motivate teachers to improve their performance. Meanwhile, the statement with the lowest mean value is found in X.1.2, which is 4.1739, with a minimum value of 2, a maximum value of 5, and a standard deviation of 0.70964, found in the statement regarding constructive feedback from the principal. Therefore, it is hoped that principals, when conducting academic supervision, can provide constructive feedback to improve their teachers' performance.

The results of the second hypothesis test (H_2), the independent variable of infrastructure on teacher performance with a significance value of 0.000 < 0.05, a calculated t-value of 3.802 > 0.1371 as the t-table value. Therefore, the conclusion is accepted and rejected, meaning that infrastructure has a positive and significant effect on the performance of elementary school teachers in Sirampog District.

The results of the infrastructure variable test showed that the statement with the highest mean value in X.2.3 was 4.09, with a minimum value of 1, a maximum value of 5, and a standard deviation of 0.761 for the statement "the school provides adequate open materials, such as textbooks and teaching aids that can be used in learning." This indicates that the availability of adequate infrastructure can improve teacher performance. Meanwhile, the statement with the lowest mean value is found in X.2.9, which is 3.06 with a minimum value of 2, a maximum value of 5, and a standard deviation of 0.828, in the statement regarding the obstacles of inadequate infrastructure such as electricity and internet networks, which are quite disruptive during teaching and learning activities. This means that there is a need to improve access to more adequate infrastructure for teachers in their work and communication, which will make them more enthusiastic and also improve their performance.

The results of testing the third hypothesis (H_3), which examines the effect of teacher

competency on teacher performance, show a significance value of 0.010 < 0.05, a t-count of 2.591 > 0.1371, and thus H_3 is accepted and H_0 is rejected. Therefore, it can be concluded that teacher competence positively and significantly affects the performance of elementary school teachers in Sirampog District.

The results of the principal's academic supervision variable, the statement with the second highest mean value in X.1.5, was 4.03 with a minimum value of 2, a maximum value of 5, and a standard deviation of 0.720, was found in the statement "you feel that the principal cares about your professional development." This indicates that motivation will arise if a teacher feels valued in terms of their professional development, one of which is through effective academic supervision between teachers and school principals. Meanwhile, the statement with the lowest mean value is found in X.2.9, which is 3.06 with a minimum value of 2, a maximum value of 5, and a standard deviation of 0.828, in the statement that insufficient infrastructure such as electricity and internet networks is quite disruptive during teaching and learning activities. This means that improving access to more adequate infrastructure for teachers to work and communicate will increase teacher motivation.

Testing the fourth hypothesis (H_4), which is that principal leadership through motivation has a t-value of 3.159 > 0.1374 and a significance value of 0.002 (<0.05), shows that H_4 is accepted and H_0 is rejected. Therefore, it can be concluded that principal leadership, mediated by motivation, has a positive and significant effect on the performance of elementary school teachers in the Sirampog district.

Based on the results of hypothesis testing, it can be concluded that infrastructure can influence motivation. Motivation will be higher if it is balanced with adequate school infrastructure. This is in line with Need Theory, which states that human behavior is driven by the fulfillment of both physiological and psychological needs. Motivation arises when individuals feel that there are unmet needs, and their behavior is directed toward fulfilling those needs. In this context, motivation acts as an intervening variable because needs (the independent variable) trigger motivation, which in turn influences behavior (the dependent variable) to achieve the goal of fulfilling those needs.

Similarly, the results of testing the fifth hypothesis (H_5), which examined the work environment through motivation, remained significant, with a t-value of 3.817 > 0.1374 and a significance value of 0.000 < 0.005. Thus, (H_5) was accepted, and H_0 was rejected. Therefore, it can be concluded that the work environment, mediated by motivation, has a positive and significant effect on the performance of elementary school teachers in the district.

Similarly, the results of testing the sixth hypothesis (H_6) which examined the teacher competency variable through motivation, remained significant, with a t-value of 3.817 > 0.1374 and a significance of 0.000 < 0.005. Thus, (H_6) was accepted, and H_0 was rejected. Thus, it can be concluded that the work environment, mediated by motivation, positively and significantly affects the performance of elementary school teachers in the Sirampog district.

Testing the seventh hypothesis (H_7), which posits motivation as a mediating variable, yielded a t-value of 3.797 > 0.1374, with a significance level of 0.000 < 0.05. Thus, (H_7) is accepted and H_0 is rejected. Therefore, it can be concluded that motivation positively and significantly influences the performance of elementary school teachers in Sirampog District through the principal's leadership, work environment, and competence.

Based on the results of the coefficient of determination test, the results of the coefficient of determination test of the influence of Principal Academic Supervision (X.1) and Infrastructure (X.2) on Teacher Performance (Y) in Elementary Schools in Sirampog Subdistrict through Motivation were obtained, with an adjusted R Square value of 0.727, representing a percentage value of 72.7%. This value indicates that the influence of academic supervision by the school principal and infrastructure on teacher performance through motivation as a mediating variable is 72.7%, while the remaining 27.3% is influenced by other variables.

CONCLUSION

Academic supervision by the principal has a positive and significant effect on the performance of teachers at elementary schools in Sirampog District; Infrastructure has a positive and significant influence on teacher performance at elementary schools in Sirampog Subdistrict; Academic supervision by the school principal has a positive and significant influence on teacher motivation at elementary schools in Sirampog Subdistrict; Infrastructure has a positive and significant influence on the motivation of elementary school teachers in Sirampog District; Academic supervision by the school principal, mediated by motivation, has a positive and significant influence on the performance of elementary school teachers in Sirampog District; Facilities and Infrastructure, mediated by motivation, has a positive and significant influence on the performance of elementary school teachers in Sirampog District; and School principal academic supervision and infrastructure mediated by motivation have a positive and significant effect on the performance of elementary school teachers in Sirampog District.

REFERENCES

Arikunto, S. (2013). Prosedur Penelitian: Suatu Pendekatan Praktik. Jakarta: Rineka Cipta.

Azwar, S. (2011). Reliabilitas dan Validitas. Yogyakarta: Pustaka Pelajar.

Azwar, S. (2015). Penyusunan Skala Psikologi. Yogyakarta: Pustaka Pelajar.

Burhanuddin, J. (2020). Manajemen Pendidikan: Teori dan Praktik. Bandung: Alfabeta.

Dessler, G. (2009). Manajemen Sumber Daya Manusia. Jakarta: Indeks.

Elfiza, Gusnardi dan Sumarno. (2022). Pengaruh Infrastructure dan Komunikasi Interpersonal terhadap Teacher Performance di SMA Muhammadiyah se-Provinsi Riau. Riau: Universitas Muhammadiyah Riau.

Effendy, O. U. (2007). Ilmu, Teori dan Filsafat Komunikasi. Bandung: Remaja Rosdakarya.

Ghozali, I. (2016). Aplikasi Analisis Multivariate dengan Program IBM SPSS 23. Semarang: Badan Penerbit Universitas Diponegoro.

Gibson, J. L., Ivancevich, J. M., Donnelly, J. H. dan Konopaske, R. (2012). Organizations: Behavior, Structure, Processes. New York: McGraw-Hill.

Hasibuan, M. S. P. (2016). Manajemen Sumber Daya Manusia. Jakarta: Bumi Aksara.

Kementerian Pendidikan dan Kebudayaan. (2021). Rapor Pendidikan Indonesia Versi Terbaru. Jakarta: Kemendikbud.

Lestari, W. dkk. (2023). Pengaruh Supervisi Akademik terhadap Teacher Performance melalui Motivation Guru TK. Magetan: Universitas PGRI Madiun.

Mangkunegara, A. A. P. (2013). Manajemen Sumber Daya Manusia Perusahaan. Bandung: Remaja Rosdakarya.

Martinis, Y. (2014). Manajemen Pendidikan: Teori, Konsep dan Prinsip. Jakarta: Gaung Persada Press.

Maslow, A. (1943). A Theory of Human Motivation. Psychological Review, 50(4), 370–396.

Mulyasa, E. (2007). Manajemen Berbasis Sekolah. Bandung: Remaja Rosdakarya.

Mulyasa, E. (2011). Manajemen dan Kepemimpinan Kepala Sekolah. Jakarta: Bumi Aksara.

Mulyasa, E. (2013). Pengembangan dan Implementasi Kurikulum (2013). Bandung: Remaja Rosdakarya.

Riduwan dan Kuncoro, E. A. (2008). Cara Menggunakan dan Memaknai Analisis Statistik. Bandung: Alfabeta.

Robbins, S. P. dan Judge, T. A. (2015). Perilaku Organisasi. Jakarta: Salemba Empat.

Rohim, M. (2016). Psikologi Pendidikan. Bandung: Alfabeta.

Sergiovanni, T. J. dan Starratt, R. J. (2007). Supervision: A Redefinition. New York: McGraw-Hill.

Sugiyono. (2016). Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, dan R&D. Bandung: Alfabeta.

Sugiyono. (2017). Statistik untuk Penelitian. Bandung: Alfabeta.

Suharsimi, A. (2010). Dasar-Dasar Evaluasi Pendidikan. Jakarta: Bumi Aksara.

Sukmadinata, N. S. (2011). Metode Penelitian Pendidikan. Bandung: Remaja Rosdakarya.

Uno, H. B. (2012). Teori Motivation dan Pengukurannya. Jakarta: Bumi Aksara.

Usman, H. (2009). Manajemen: Teori, Praktik dan Riset Pendidikan. Jakarta: Bumi Aksara.

Wang, Y. (2010). Teachers' Teaching Performance and Student Achievement. Journal of Education Research, 103(2), 67–72.

Yulk, G. (2010). Leadership in Organizations. New Jersey: Pearson Education.