

The Effect of Principal Leadership on Elementary School Teacher Performance in Petungkriyono District, Pekalongan Regency

¹Hannif Affan Eka Putra, ²Senowarsito, ³Harjito

Universitas Persatuan Guru Republik Indonesia Semarang, Indonesia

e-mail: h.affanep@gmail.com

Abstract: *This study aimed to examine the effect of principal leadership on elementary school teacher performance in Petungkriyono District, Pekalongan Regency. This research employed a quantitative approach using a survey method with a correlational ex post facto design. The population consisted of 147 teachers from 21 public elementary schools, with 118 teachers selected through proportional random sampling. Data were collected using a five-point Likert-scale questionnaire developed based on principal leadership and teacher performance indicators. The collected data were analyzed using descriptive statistics, Pearson correlation analysis, and simple linear regression with the assistance of IBM SPSS Statistics 25. The results revealed that principal leadership had a positive and significant relationship with teacher performance ($r = 0.756$, $p < 0.001$). The coefficient of determination ($R^2 = 0.571$) indicated that principal leadership contributed 57.1% to the variation in teacher performance. Furthermore, the regression analysis produced a coefficient value of 0.492 with $t = 12.435$ and $p < 0.001$. These findings indicate that effective principal leadership is an important factor in improving elementary school teacher performance.*

Keywords: *principal leadership; teacher performance; elementary school; academic supervision; educational management*

Abstract: *Penelitian ini bertujuan untuk menganalisis pengaruh kepemimpinan kepala sekolah terhadap kinerja guru sekolah dasar di Kecamatan Petungkriyono Kabupaten Pekalongan. Penelitian ini menggunakan pendekatan kuantitatif dengan metode survei dan desain ex post facto korelasional. Populasi penelitian terdiri atas 147 guru dari 21 Sekolah Dasar Negeri, dengan sampel sebanyak 118 guru yang dipilih menggunakan teknik proportional random sampling. Pengumpulan data dilakukan melalui kuesioner dengan skala Likert lima tingkat yang disusun berdasarkan indikator kepemimpinan kepala sekolah dan kinerja guru. Data penelitian dianalisis menggunakan statistik deskriptif, korelasi Pearson, dan regresi linear sederhana dengan bantuan IBM SPSS Statistics 25. Hasil penelitian menunjukkan bahwa kepemimpinan kepala sekolah memiliki hubungan positif dan signifikan dengan kinerja guru ($r = 0,756$; $p < 0,001$). Nilai koefisien determinasi ($R^2 = 0,571$) menunjukkan bahwa kepemimpinan kepala sekolah mampu menjelaskan 57,1% variasi kinerja guru. Hasil analisis regresi menunjukkan koefisien sebesar 0,492 dengan nilai $t = 12,435$ dan $p < 0,001$. Temuan ini menunjukkan bahwa kepemimpinan kepala sekolah merupakan faktor penting dalam meningkatkan kinerja guru sekolah dasar.*

Keywords: *kepemimpinan kepala sekolah; kinerja guru; sekolah dasar; supervisi akademik; manajemen Pendidikan.*

Introduction

Principal leadership is one of the organizational factors associated with teacher performance in the implementation of education at the elementary school level. Teacher performance is reflected in the ability to plan learning activities, implement instructional processes, conduct assessments, follow up assessment results, and continuously develop professional competencies. Within school organizations, teacher performance is not only determined by individual capabilities but is also influenced by how principals provide direction, coordination, supervision, and support for teachers in carrying out their professional responsibilities. Therefore, principal leadership has a strategic role in creating a supportive working environment, improving instructional quality, and achieving school goals.

Teacher performance issues remain an important concern in public elementary schools in Petungkriyono District, Pekalongan Regency. Based on the 2025 Education Report of 21 public elementary schools, learning quality indicators showed that 11 schools (52.38%) were categorized as good, 4 schools (19.05%) as moderate, and 6 schools (28.57%) as low. Thus, 47.62% of schools had not yet achieved the good category in the learning quality dimension. Preliminary findings also indicated challenges related to lesson planning, variations in teaching methods, and consistency in assessment implementation. These conditions indicate that teacher performance still requires improvement to support better learning quality.

In educational management, principals have important responsibilities in providing direction, establishing communication, managing resources, conducting academic supervision, providing feedback, and creating conditions that support teachers' professional practices. Aslam et al. (2022) demonstrated that principal instructional leadership is associated with improved teacher performance through the development of school missions, professional learning communities, working environments, and academic learning climates. Haryani et al. (2022) also found a relationship between principal leadership styles and teacher performance. These findings indicate that leadership quality is not merely determined by the formal authority of principals but by leadership practices that influence teachers' professional task implementation.

Previous empirical studies have consistently examined the relationship between principal leadership and teacher performance. Romadhon and MS (2021) found that principal leadership influenced elementary school teacher performance. Ideswal et al. (2020) demonstrated that principal leadership contributed to the performance of public elementary school teachers. Meanwhile, Mardiaty et al. (2023) showed that principals' managerial competence had a positive and significant effect on elementary school teacher performance. These findings emphasize that principals' abilities in managing schools, guiding teachers, and developing organizational conditions are related to the quality of teachers' professional work.

The relationship between principal leadership and teacher performance has also been examined together with other organizational factors. Indajang et al. (2020) found that principal leadership had a significant effect on teacher performance in a model involving organizational culture and teacher competence. Wijayanto et al. (2021) found that transformational leadership style had a positive and significant effect on elementary school teacher performance along with work motivation and job satisfaction. Balela et al. (2024) also identified a relationship between transformational principal leadership and teacher performance when work culture and organizational commitment were considered. These findings suggest that leadership may influence teacher performance directly and may also interact with other organizational conditions.

Evidence from different educational contexts further strengthens the importance of principal leadership. Nurzaman AM (2019) showed that principal leadership had a significant

effect on vocational high school teacher performance. Efendi et al. (2023) demonstrated that transformational principal leadership was associated with improved teacher performance through strengthening work commitment. Rizki (2023) also positioned principal leadership together with incentives and work motivation as factors associated with improved teacher performance among public elementary school teachers. However, empirical findings have not been entirely consistent. Ratnasari et al. (2022) found that principal leadership did not have a direct significant effect on elementary school teachers' teaching performance, while motivation had a direct effect. These differences indicate that the influence of principal leadership may vary depending on school characteristics, leadership practices, organizational conditions, teacher characteristics, and environmental support.

The need for further examination becomes more relevant when considering the specific conditions of Petungkriyono District. Based on information provided by the supervisor of the Petungkriyono District Coordinator Region during the School Principals Working Group meeting on March 11, 2025, among 21 public elementary school principals, 14 principals (66.67%) had not developed structured planning related to managerial responsibilities. Furthermore, 12 principals (57.14%) had limited understanding of academic supervision planning and had not developed academic supervision programs. These conditions indicate challenges in two essential leadership functions, namely managerial implementation and academic supervision. Aslam et al. (2022) emphasized the role of instructional leadership in managing teachers' working and learning environments, while Mardiaty et al. (2023) demonstrated the importance of principals' managerial competence for teacher performance.

This study is also distinguished by its geographical and contextual characteristics. Petungkriyono District is a mountainous area with transportation access limitations, which may create different school management challenges compared with schools located in more accessible areas. Previous studies have been conducted in various contexts, including North Jakarta (Romadhon & MS, 2021), Payakumbuh (Ideswal et al., 2020), Kedungwaringin (Mardiaty et al., 2023), Pandeglang (Rizki, 2023), and secondary or vocational school contexts (Nurzaman AM, 2019; Balela et al., 2024). Therefore, evidence regarding the effect of principal leadership on teacher performance in mountainous elementary school settings remains limited.

Based on the literature review, this study addresses two research gaps. First, an empirical gap exists because previous studies generally indicate a positive relationship between principal leadership and teacher performance, while Ratnasari et al. (2022) reported different findings regarding the direct effect of principal leadership. Second, a contextual gap exists because limited empirical evidence explains how principal leadership relates to teacher performance in elementary schools located in geographically challenging areas such as Petungkriyono District.

The novelty of this study lies in providing contextual empirical evidence regarding the predictive relationship between principal leadership and elementary school teacher performance in a mountainous educational setting. Unlike previous studies that frequently examined leadership together with other variables such as organizational culture, motivation, competence, and commitment (Indajang et al., 2020; Wijayanto et al., 2021; Balela et al., 2024), this study specifically examines principal leadership as a predictor of teacher performance while considering the unique challenges of managerial planning, academic supervision, communication, and resource management in geographically constrained schools.

Therefore, this study aims to analyze the effect of principal leadership on elementary school teacher performance in Petungkriyono District, Pekalongan Regency. The findings are expected to provide contextual empirical evidence and serve as a basis for strengthening managerial practices, academic supervision, professional communication, and teacher development programs in elementary schools.

Methods

This study employed a quantitative approach using a survey method with a correlational ex post facto research design. This approach was used to examine the predictive relationship between principal leadership as the independent variable (X) and teacher performance as the dependent variable (Y) based on naturally occurring conditions without providing treatment or manipulating the research variables. The ex post facto design was selected because the variables investigated in this study had already existed within the school environment, and the researcher did not intervene in the implementation of principal leadership practices or teacher performance activities. This design was considered appropriate because the purpose of the study was to identify statistical relationships and predictive patterns between variables based on existing conditions. However, due to the characteristics of the ex post facto design, the findings should be interpreted carefully. The results indicate predictive associations between principal leadership and teacher performance but cannot be interpreted as absolute evidence of a causal relationship. The study was conducted in public elementary schools in Petungkriyono District, Pekalongan Regency, from January to May 2026.

The population of this study consisted of all teachers in 21 public elementary schools in Petungkriyono District, Pekalongan Regency, totaling 147 teachers. The sample size was determined using the Krejcie and Morgan formula with a 5% margin of error, resulting in 118 teachers as research respondents. The sampling technique used was proportional random sampling. The number of samples from each school was determined proportionally based on the number of teachers, and respondents were selected randomly to ensure that each school obtained representation according to its population proportion.

This study involved two research variables: principal leadership as the independent variable and teacher performance as the dependent variable. Principal leadership was measured through five dimensions, namely personality, managerial, entrepreneurship, academic supervision, and social dimensions. These dimensions represent principal leadership practices in managing schools, providing direction, conducting supervision, developing social relationships, and supporting teachers' professional responsibilities. Teacher performance was measured through five dimensions: lesson planning, learning implementation, evaluation of learning outcomes, follow-up actions based on assessment results, and self-development.

Research data were collected using a closed-ended questionnaire with a five-point Likert scale. The response alternatives consisted of strongly agree (SA), agree (A), moderately agree (MA), disagree (D), and strongly disagree (SD), with scores of 5, 4, 3, 2, and 1, respectively. The principal leadership instrument consisted of 60 statement items, while the teacher performance instrument consisted of 39 statement items. The questionnaires were distributed directly to respondents using manual paper-based responses.

Before being used for the main data collection, the instruments were tested on 30 teachers outside the research sample. Item validity was examined by comparing the calculated r value (r count) with the critical r value (r table). With 30 respondents in the pilot test and a 5% significance level, the r table value was 0.361. A statement item was considered valid if the calculated r value was greater than 0.361. The test results showed that all 60 items of the principal leadership instrument and all 39 items of the teacher performance instrument met the validity criteria and were therefore suitable for use in the study.

Instrument reliability was tested using Cronbach's Alpha coefficient with the criterion of $\alpha > 0.70$. The results showed Cronbach's Alpha values of 0.983 for the principal leadership instrument and 0.981 for the teacher performance instrument. Both values exceeded the

acceptance threshold of 0.70, indicating that the instruments had adequate internal consistency for data collection.

The collected data were analyzed using descriptive and inferential statistics with the assistance of IBM SPSS Statistics version 25. Descriptive analysis was used to describe the tendency of principal leadership and teacher performance scores through mean values, standard deviations, frequency distributions, and percentages.

Before hypothesis testing, prerequisite analysis tests were conducted, including residual normality testing using the Kolmogorov-Smirnov test, linearity testing through the Test for Linearity, multicollinearity testing, and heteroscedasticity testing using the Glejser method. The data were considered to meet the normality assumption if the significance value was greater than 0.05. The relationship between principal leadership and teacher performance was considered linear if the significance value of deviation from linearity was greater than 0.05. The regression model was considered free from multicollinearity if the tolerance value was greater than 0.10 and the VIF value was below 10. Meanwhile, the regression model was considered free from heteroscedasticity if the Glejser test significance value was greater than 0.05.

Hypothesis testing was conducted using Pearson correlation analysis and simple linear regression analysis. Pearson correlation was used to determine the direction and strength of the relationship between principal leadership and teacher performance, while simple linear regression was used to examine the predictive ability of principal leadership in explaining variations in teacher performance. The regression model was expressed as $Y = a + bX$, where Y represents teacher performance, X represents principal leadership, a represents the constant, and b represents the regression coefficient. The significance of the regression coefficient was tested using the t-test at a significance level of $\alpha = 0.05$. The hypothesis was accepted when the p-value was < 0.05 . The coefficient of determination (R^2) was used to determine the proportion of variance in teacher performance explained by principal leadership.

Result and Discussion

This study involved 118 teachers from public elementary schools in Petungkriyono District, Pekalongan Regency. Descriptive analysis was conducted on two research variables, namely principal leadership as the independent variable (X) and teacher performance as the dependent variable (Y). The descriptive statistics of both variables are presented in Table 1.

Table 1. Descriptive Statistics of Research Variables

Variable	N	Minimum	Maximum	Mean	Standard Deviation
Principal Leadership (X)	118	103	290	202.88	40.036
Teacher Performance (Y)	118	55	185	129.41	26.079

Source: Primary data processed, 2026.

The results of the descriptive analysis indicate that the principal leadership variable obtained a mean score of 202.88 with a standard deviation of 40.036, a minimum score of 103, and a maximum score of 290. Meanwhile, the teacher performance variable obtained a mean score of 129.41 with a standard deviation of 26.079, a minimum score of 55, and a maximum score of 185. These findings indicate variations in respondents' perceptions of principal leadership and teacher performance.

The distribution of teacher performance scores showed that 39 respondents (33.1%) were categorized as having moderately high performance, 38 respondents (32.2%) were categorized as high, and 18 respondents (15.3%) were categorized as very high. Meanwhile, 19 respondents

(16.1%) were categorized as low and 4 respondents (3.4%) as very low. Overall, 95 respondents or 80.6% demonstrated teacher performance levels ranging from moderately high to very high.

For the principal leadership variable, 45 respondents (38.1%) rated leadership in the moderately high category, 33 respondents (28.0%) in the high category, and 10 respondents (8.5%) in the very high category. Meanwhile, 21 respondents (17.8%) were categorized as low and 9 respondents (7.6%) as very low. Overall, 88 respondents or 74.6% perceived principal leadership as being in the moderately high to very high categories.

Prerequisite Analysis Test

Before hypothesis testing was conducted, the regression model was examined through prerequisite tests, including normality, linearity, multicollinearity, and heteroscedasticity tests. The results of the analysis are presented in Table 2.

Table 2. Summary of Regression Prerequisite Test Results

Test	Variable/Indicator	Result	Interpretation
Normality	Kolmogorov-Smirnov residual	Sig. = 0.200	Normally distributed
Linearity	X ₁ toward Y	Sig. deviation from linearity = 0.370	Linear relationship
Multicollinearity	X ₁	Tolerance = 0.675; VIF = 1.481	No multicollinearity detected
Heteroscedasticity	X ₁	Sig. = 0.235	No heteroscedasticity detected

Source: Primary data processed, 2026.

The Kolmogorov-Smirnov test results showed that the residual significance value was $0.200 > 0.05$, indicating that the residuals met the assumption of normality. The linearity test produced a *deviation from linearity* significance value of 0.370 for the relationship between principal leadership and teacher performance. Since this value was greater than 0.05, the relationship between principal leadership and teacher performance fulfilled the linearity assumption.

The multicollinearity test results showed that the principal leadership variable had a *tolerance* value greater than 0.10 and a VIF value below 10, indicating that there was no multicollinearity problem in the regression model. Furthermore, the Glejser test showed a significance value of 0.235 for principal leadership, which was above 0.05. Therefore, the regression model did not indicate the presence of multicollinearity or heteroscedasticity and was considered appropriate for hypothesis testing.

The Effect of Principal Leadership on Teacher Performance

Hypothesis testing was conducted to examine the relationship and predictive ability of principal leadership toward teacher performance. The analysis employed Pearson correlation and simple linear regression. The summary of the analysis results is presented in Table 3.

Table 3. Analysis Results of Principal Leadership on Teacher Performance

Statistic	Value
Pearson Correlation (<i>r</i>)	0.756
R Square	0.571
Adjusted R Square	0.568
F	154.631
Sig. F	<0.001
Regression Coefficient (B)	0.492

Statistic	Value
Standard Error	0.040
Standardized Beta	0.756
<i>t</i>	12.435
Sig. <i>t</i>	<0.001

Source: Primary data processed, 2026.

The Pearson correlation analysis showed a value of $r = 0.756$ with $p < 0.001$. The positive correlation coefficient indicates that principal leadership has a direct relationship with teacher performance. The correlation value of 0.756 also indicates that the relationship between the two variables is strong. Therefore, higher levels of principal leadership are associated with higher levels of teacher performance.

The results of the simple linear regression analysis showed $F(1,116) = 154.631$ with $p < 0.001$. These findings indicate that the regression model using principal leadership as a predictor of teacher performance was statistically significant. Therefore, principal leadership has significant predictive ability toward teacher performance among elementary school teachers in Petungkriyono District, Pekalongan Regency.

The coefficient of determination analysis showed an R^2 value of 0.571 and an *Adjusted R²* value of 0.568. The R^2 value indicates that principal leadership explains 57.1% of the variance in teacher performance scores within this simple regression model. Meanwhile, the remaining 42.9% of variance in teacher performance is not explained by principal leadership in this model and may be associated with other factors that were not included in this study.

The regression coefficient test showed that principal leadership obtained a value of $B = 0.492$ with a *standard error* of 0.040, $\beta = 0.756$, $t = 12.435$, and $p < 0.001$. The positive regression coefficient indicates that principal leadership is positively associated with teacher performance. Based on the constant value of 29.514 and the regression coefficient of 0.492, the regression equation obtained was: $Y = 29.514 + 0.492X$

The equation indicates that every one-unit increase in the principal leadership score is predicted to be followed by an increase of 0.492 units in the teacher performance score. This value represents a predictive relationship based on the regression model and should not be interpreted as an absolute causal relationship.

Based on the overall analysis results, the research hypothesis stating that principal leadership has a positive and significant effect on teacher performance in public elementary schools in Petungkriyono District, Pekalongan Regency, was accepted. The findings demonstrate a strong relationship between principal leadership and teacher performance ($r = 0.756$), with the model explaining 57.1% of the variance in teacher performance ($R^2 = 0.571$). These findings indicate that principal leadership is a statistically relevant predictor of teacher performance in the elementary schools examined.

The results of this study indicate that principal leadership has a positive and significant effect on teacher performance in public elementary schools in Petungkriyono District, Pekalongan Regency. The correlation coefficient of $r = 0.756$ with $p < 0.001$ indicates a strong positive relationship, while the coefficient of determination ($R^2 = 0.571$) shows that principal leadership explains 57.1% of the variance in teacher performance within the simple regression model. The regression coefficient of 0.492 with $t = 12.435$ and $p < 0.001$ further confirms that higher principal leadership scores are associated with higher teacher performance scores. Since this study employed an *ex post facto* survey design, the relationship should be interpreted as a predictive relationship rather than definitive evidence of a causal effect.

Principal leadership has an important position in managing teacher performance. School principals provide direction, coordinate tasks, manage resources, conduct supervision, establish professional communication, and support teachers in carrying out their responsibilities. Yunus

et al. (2021) demonstrated that principal leadership significantly affects elementary school teacher performance. Similar findings were reported by Romadhon and MS (2021) and Ideswal et al. (2020), who found that the quality of principal leadership is associated with improved teacher performance. These findings highlight the important role of school principals in directing and strengthening teacher practices.

The relationship between principal leadership and teacher performance can be explained through several theoretical mechanisms. Effective leadership may improve teacher motivation by providing recognition, encouragement, and professional support. Principals who appreciate teachers' efforts and provide constructive guidance can strengthen commitment and encourage teachers to improve their instructional practices. Purwanto and Evicasari (2021) explained that principals support teacher performance through motivation, recognition, discipline enforcement, and exemplary behavior. Cakhyadi and Oktarina (2025) also showed that motivation strengthens the relationship between principal leadership and elementary school teacher performance. Although this study did not test motivation as a mediating variable, these findings provide a theoretical explanation of how leadership may contribute to improved teacher performance.

Participatory leadership practices also represent an important pathway in strengthening teacher performance. Ikhsandi and Ramadan (2021) showed that principals can improve teacher performance through democratic leadership, teacher involvement in decision-making, guidance, and collaborative problem-solving. Annisya and Ramadan (2021) emphasized the importance of principal functions, including planning, organizing, directing, coordinating, and supervising, in supporting teacher performance. These findings are consistent with Haryani et al. (2022), who found that principal leadership styles are related to teacher performance quality. Similarly, Zega et al. (2022) found that participatory leadership is associated with teacher performance, indicating that involvement, collaboration, and professional relationships are important mechanisms through which principals influence teacher practices.

Instructional leadership is another mechanism that explains the relationship between leadership and teacher performance. Aslam et al. (2022) found that instructional leadership contributes to improving teacher performance through school mission development, professional learning communities, working environments, and academic learning climates. Werdiningsih et al. (2023) also found that instructional leadership influences teacher performance and explains a substantial proportion of performance variation. Through instructional leadership, principals can facilitate professional development, provide feedback, and support teachers in improving lesson planning, classroom implementation, and assessment practices.

Academic supervision also connects leadership practices with teacher performance improvement. Marhawati et al. (2023) found that principal leadership behavior and the intensity of academic supervision are positively associated with teacher performance. Well-planned supervision allows principals to identify teachers' instructional needs, provide constructive feedback, and develop appropriate follow-up actions. This mechanism is relevant to Petungkriyono, where several principals had not yet developed optimal academic supervision planning.

The managerial dimension of leadership further supports teacher performance improvement. Mardiaty et al. (2023) found that principal managerial competence has a positive and significant effect on elementary school teacher performance. Wicoksono et al. (2022) showed that managerial leadership improves teacher performance through school planning, supervision, collaboration, work meetings, and professional development. Papilaya and Nanda (2024) also demonstrated that principal managerial skills and school climate influence teacher performance. These findings indicate that leadership operates not only through individual

support but also through creating organizational conditions that enable teachers to work effectively.

Principal leadership remains relevant when examined with other organizational factors. Indajang et al. (2020) found that principal leadership influences teacher performance together with organizational culture and teacher competence. Indajang, Sherly, and Halim (2021) further demonstrated the contribution of principal leadership and competence factors in improving teacher performance. Wijayanto et al. (2021) found that transformational leadership positively influences teacher performance when combined with work motivation and job satisfaction. Balela et al. (2024) reported similar findings involving work culture and organizational commitment. Pratiwi et al. (2025) also found that principal leadership influences teacher performance through organizational culture and academic supervision.

At different educational levels, Nurzaman AM (2019) showed that principal leadership significantly affects vocational school teacher performance. Rizki (2023) found similar patterns among elementary school teachers when leadership was analyzed with incentives and work motivation. Efendi et al. (2023) demonstrated that transformational leadership may influence teacher performance through strengthening work commitment. These findings suggest that leadership may influence teacher performance through interconnected mechanisms, including motivation, professional development, commitment, and supportive work environments. However, because this study did not examine mediation variables, these mechanisms should be considered theoretical explanations rather than statistically confirmed pathways.

Although most previous studies support the findings of this research, Ratnasari et al. (2022) found that principal leadership did not have a direct significant effect on teacher teaching performance, while motivation had a direct effect. These differences indicate that leadership effectiveness depends on school characteristics, organizational conditions, and working environments. The context of Petungkriyono, as a mountainous area with limited transportation access, requires adaptive leadership practices. In this context, principals' ability to coordinate, manage resources, communicate, supervise, and solve problems becomes increasingly important. Therefore, this study provides contextual evidence that principal leadership is an important predictor of teacher performance in geographically challenging elementary school environments.

Conclusion

The results of this study indicate that principal leadership has a positive and significant predictive relationship with teacher performance in public elementary schools in Petungkriyono District, Pekalongan Regency. The Pearson correlation analysis showed a strong relationship between the two variables ($r = 0.756$, $p < 0.001$), while the simple linear regression analysis produced a coefficient of 0.492 with $t = 12.435$ and $p < 0.001$. Furthermore, the coefficient of determination ($R^2 = 0.571$) indicates that principal leadership explains 57.1% of the variance in teacher performance within the research model. These findings demonstrate that effective principal leadership, particularly in providing direction, managerial support, academic supervision, and professional communication, is an important predictor associated with improved teacher performance. However, teacher performance remains a multidimensional outcome influenced by various other factors beyond leadership, as indicated by the remaining 42.9% of unexplained variance.

This study has several limitations that should be considered when interpreting the findings. Because this research employed a quantitative survey with an ex post facto design, the results indicate predictive relationships rather than absolute causal effects. Therefore, the

findings cannot confirm that principal leadership directly causes changes in teacher performance. Future studies are recommended to incorporate longitudinal designs, experimental approaches, or mediation models involving variables such as motivation, professional competence, organizational commitment, and school climate to further explain the mechanisms underlying the relationship between leadership and teacher performance. Practically, the findings highlight the importance of strengthening principal leadership capacity through improved managerial planning, systematic academic supervision, constructive feedback, professional communication, and teacher involvement in decision-making. In the specific context of Petungkriyono District, which is characterized by mountainous geographical conditions and limited accessibility, this study contributes contextual empirical evidence that adaptive principal leadership is essential for supporting teacher performance and sustaining educational quality in geographically challenging elementary school environments.

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