

**Empirical Paper**

# The Effect of Principals' Managerial Skills and Teachers' Participation in Teacher Working Groups (KKG) on Elementary School Teacher Performance in Welahan District

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## DOI

[10.65820/ejes-8vol2-issue2-2026](https://doi.org/10.65820/ejes-8vol2-issue2-2026)

## Abstract

**Purpose:** This study examines the individual and combined effects of principals' managerial skills and teachers' participation in Teacher Working Groups (Kelompok Kerja Guru/KKG) on the performance of public elementary school teachers in Welahan District, Jepara Regency, Indonesia.

**Methodology:** A quantitative ex post facto and descriptive correlational design was employed. Data were collected from 117 teachers selected from a population of 385 using the Slovin formula and purposive sampling. Validated Likert-scale questionnaires were analysed using descriptive statistics and multiple linear regression in SPSS.

**Results:** Principals' managerial skills had a positive and significant effect on teacher performance ( $R^2 = 0.854$ ,  $\beta = 0.705$ ,  $p < .001$ ), while teachers' participation in KKG also showed a positive and significant effect ( $R^2 = 0.657$ ,  $\beta = 0.310$ ,  $p < .001$ ). Together, the two predictors explained 90.3% of the variance in teacher performance (Adjusted  $R^2 = 0.903$ ,  $F = 539.951$ ,  $p < .001$ ), indicating a strong synergistic relationship.

**Novelty and Contribution:** The study extends educational leadership and Professional Learning Community (PLC) theory by demonstrating that principals' managerial skills and KKG participation operate synergistically rather than independently in enhancing teacher performance, providing empirical evidence from the Indonesian elementary school context.

**Practical and Social Implications:** The findings highlight the need to strengthen principals' managerial competencies while restructuring KKG into substantive professional learning communities. Investing in both leadership development and collaborative teacher learning can sustainably improve teacher performance and enhance the quality of elementary education.

**Keywords:** Principals' Managerial Skills, Professional Learning Communities, Teachers' Participation, Teachers' Productivity, Management

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## How to cite this article:

Suryani, Ismaya, E. A., Setiadi, G., & Lebona, R. (2026). The Effect of Principals' Managerial Skills and Teachers' Participation in Teacher Working Groups (KKG) on Elementary School Teacher Performance in Welahan District. *Elicit Journal of Education Studies*, 2(2), 99-110. <https://doi.org/10.65820/ejes-8vol2-issue2-2026>

# 1 Introduction

Teacher performance constitutes one of the most consequential factors in determining the quality of education at all levels, particularly in the foundational years of schooling (Hallinger, 2011). According to Darling-Hammond et al. (2017), the quality of the educational process is closely related to the success of the professionalism of teachers in teaching and learning activities in the classroom. Globally, the growing demand for 21st-century competencies, including critical thinking, creativity, collaboration, and communication, has intensified the focus on strengthening teacher effectiveness as the central vehicle for educational transformation. Teachers who are capable of planning, implementing, and evaluating learning with precision and adaptability are widely recognised as the primary drivers of student achievement and the broader goals of national education systems (Katz, 2009; DuFour et al., 2009; Murniati et al., 2019).

At the international level, comparative education research consistently highlights the primacy of teacher quality as a determinant of student outcomes across diverse national contexts. The Organisation for Economic Co-operation and Development (OECD) has repeatedly emphasised in its Teaching and Learning International Survey (TALIS) that the professional environment of teachers, including the quality of school leadership and the availability of collaborative learning structures, significantly mediates teacher performance and professional growth (OECD, 2019). In high-performing education systems such as Finland, Singapore, and South Korea, deliberate investments in teacher professional development communities and distributed leadership models have yielded demonstrable improvements in both teacher competency and student achievement outcomes (Hallinger & Heck, 2010; Nadeem, 2024).

Within the national context of Indonesia, the quality of basic education continues to face systemic challenges, as evidenced by Indonesia's performance in the Programme for International Student Assessment (PISA 2022), which placed the country in the lower quartile of participating nations across reading, mathematics, and science literacy. These findings reflect longstanding structural concerns about the effectiveness of classroom instruction at the elementary school level, particularly in terms of lesson planning quality, pedagogical innovation, and authentic assessment practice. In response, the Indonesian government has enacted a series of policy frameworks aimed at improving teacher performance, including Regulation of the Minister of National Education No. 13 of 2007, which mandates specific managerial competencies for school principals, and Regulation of the Minister of Education and Culture No. 6 of 2018, which further elaborates the duties and functions of school principals as instructional and managerial leaders. In parallel, Teacher Working Groups (Kelompok Kerja Guru/KKG) have been institutionalised as a national mechanism for teacher professional development at the school cluster level.

From a theoretical perspective, two key frameworks converge to explain teacher performance in school settings. First, educational management and school leadership theory posits that principals' managerial skills, encompassing conceptual, human, and technical dimensions, as originally classified by Katz (2009) and subsequently applied to educational leadership contexts, are foundational to the creation of a conducive organisational climate, the effective coordination of school resources, and the implementation of sustainable professional development systems (Silfatman et al., 2022; Suyitno, 2021). Second, Professional Learning Community (PLC) theory, as advanced by DuFour et al. (2009), posits that teachers' active participation in collaborative learning structures contributes significantly to the enhancement of professional competencies, reflective practice, and instructional quality (Dinanty et al., 2024). However, in practice, these theoretical relationships do not always manifest straightforwardly or linearly. Principals' managerial competence does not automatically stimulate teachers' active participation in KKG, and participation in KKG activities does not necessarily produce immediate or measurable improvements in classroom performance.

Empirical studies in the Indonesian context have examined the effects of principals' managerial skills on teacher performance (Sartika et al., 2023; Suyitno, 2021) and the role of KKG in enhancing teacher professionalism (Badrudin et al., 2020; Dinanty et al., 2024) separately. However, most existing studies have examined these two constructs in isolation and have predominantly been conducted in urban school settings or at secondary education levels. Research that simultaneously integrates both principals' managerial skills and KKG participation within a single explanatory model, particularly in rural or peri-urban elementary school contexts such as Welahan District in Jepara Regency, remains critically limited. This represents a significant empirical gap in the literature on educational management in the Indonesian context.

At the contextual level, preliminary observations in several public elementary schools in Welahan District indicate that while school principals generally discharge their administrative functions, the depth and effectiveness of managerial

engagement in teacher professional development remain variable. Furthermore, teachers' participation in KKG activities appears predominantly procedural rather than substantive, with low levels of active discussion, peer learning, and classroom-based problem-solving. This gap between policy intent and ground-level implementation underscores the need for targeted empirical investigation.

Accordingly, this study integrates principals' managerial skills ( $X_1$ ) and teachers' participation in KKG ( $X_2$ ) as independent variables within a single analytical model to explain elementary school teacher performance ( $Y$ ) in Welahan District. The study contributes theoretically by testing the joint explanatory power of educational leadership theory and PLC theory within a specific local elementary education context, and practically by providing evidence-based recommendations for policymakers, school supervisors, and educational practitioners. The following research questions are addressed:

- i. Do principals' managerial skills significantly affect teacher performance?
- ii. Does teachers' participation in KKG significantly affect teacher performance?
- iii. Do principals' managerial skills and KKG participation simultaneously and significantly affect teacher performance?

## 2 Literature Review

### 2.1 Principals' Managerial Skills

The concept of managerial skills in school leadership is rooted in the seminal typology proposed by Katz (2009), who identified three core skill categories essential for effective management: conceptual skills, human (interpersonal) skills, and technical skills. Conceptual skills refer to the capacity to formulate organisational vision, engage in strategic thinking, and understand the school as a complex system. Human skills encompass the ability to motivate, communicate with, and develop productive relationships with teachers, staff, students, and the broader school community. Technical skills involve proficiency in the specific methodologies, procedures, and tools relevant to educational management, including curriculum planning, scheduling, resource allocation, and the use of educational data.

In the context of Indonesian elementary school leadership, these three dimensions are operationalised through the principal's responsibilities as defined in the Regulation of the Minister of National Education No. 13 of 2007, which encompasses managerial, entrepreneurial, supervisory, social, and personal competencies. Relevant to this study, the managerial competency domain requires principals to plan school programs, develop organisational structures, lead school personnel, manage facilities and resources, implement quality assurance mechanisms, and conduct academic supervision. Silfatman et al. (2022) demonstrated that the implementation of academic supervision by principals, as a key component of managerial functioning, produces measurable improvements in teacher performance, particularly in the quality of lesson planning and classroom execution.

Suyitno (2021) further established that principals' managerial skills have a significant positive effect on the effectiveness of school-based management, confirming that the conceptual, human, and technical skill dimensions collectively shape the organisational conditions under which teachers perform. This perspective is reinforced by Hallinger (2011), who, drawing on four decades of empirical research, argued that school leaders exert their most important influence on teacher and student outcomes through the creation of school-level conditions that facilitate learning, a finding that aligns with earlier mediated-effects models of leadership and student achievement. Sartika et al. (2023) similarly found that principals' managerial competence and leadership style jointly exerted a significant effect on teacher performance, accounting for substantial variance in both individual and organisational-level performance indicators.

### 2.2 Teacher Working Groups (Kelompok Kerja Guru / KKG)

Teacher Working Groups (Kelompok Kerja Guru/KKG) are government-mandated professional learning clusters established at the school cluster (gugus) level in Indonesia. KKG serves as an institutionalised form of Professional Learning Community (PLC) at the elementary school level, designed to facilitate collaborative professional development, instructional improvement, and peer learning among teachers of the same subject area or school grade. The normative framework for KKG is embedded in the broader policy landscape of teacher professional development

in Indonesia, including the Teacher Certification Program (Sertifikasi Guru) and the Continuing Professional Development (Pengembangan Keprofesian Berkelanjutan/PKB) mechanism.

DuFour et al. (2009) defined PLCs as collaborative structures in which educators work together continuously and purposefully to improve their collective capacity to advance student learning. The four pillars of a high-functioning PLC — shared mission and vision, collaborative teams, collective inquiry, and an orientation toward results — are directly applicable to the ideal functioning of KKG. When KKG operates according to these principles, it enables teachers to share best practices, engage in reflective discussion on instructional challenges, develop innovative pedagogical strategies, and apply collegially derived solutions directly in their classrooms.

Badrudin et al. (2020) empirically demonstrated that the combined effects of school principal leadership and KKG participation significantly predicted teacher performance in public elementary schools, establishing a theoretical basis for the joint examination of these two constructs. Dinanty et al. (2024), in a study conducted in Nusantara Capital Buffer Schools, found that PLC implementation produced significant improvements in learning quality outcomes, with post-test scores improving substantially relative to pre-test baselines. These findings corroborate the growing international evidence base supporting the PLC model as an effective mechanism for teacher professional development.

### 2.3 Teacher Performance

Teacher performance refers to the quality and effectiveness with which a teacher fulfils their professional responsibilities in the domains of instructional planning, instructional implementation, assessment of student learning, and the discharge of additional professional duties (Layek & Koodamara, 2024; Hamka, 2023). In the Indonesian regulatory framework, teacher performance is evaluated through the Teacher Performance Assessment (Penilaian Kinerja Guru/PKG), which operationalises teacher effectiveness across fourteen competency indicators encompassing pedagogical, professional, social, and personal competency domains.

In the context of this study, teacher performance is conceptualised along four primary dimensions; firstly, instructional planning, which encompasses the preparation of lesson plans, learning objectives, and appropriate instructional materials; secondly, instructional implementation, which includes the use of varied and student-centred teaching strategies, classroom management, and active learning facilitation; thirdly, assessment of student learning, which involves the design and application of formative and summative assessment instruments, as well as the use of assessment data to inform instructional decisions; and lastly, the execution of additional professional duties, including participation in school programmes, continuous self-development, and collegial collaboration.

Research consistently demonstrates that teacher performance is not a unidimensional construct but is significantly shaped by organisational factors, including school leadership quality, professional development opportunities, organisational climate, and the presence of supportive peer learning structures (Hallinger & Heck, 2010; Silfatman et al., 2022). This study, therefore, positions teacher performance as the primary outcome variable explained by the joint effects of principal managerial leadership and KKG participation.

### 2.4 Theoretical Framework and Hypothesis Development

This study is grounded in two complementary theoretical frameworks. First, the Educational Leadership and Management Theory, as synthesised by Hallinger (2011), posits that school leaders contribute to educational outcomes not through direct instructional action but through the creation and sustenance of organisational conditions that enable effective teaching and learning. From this perspective, principals' managerial skills are the key mechanism through which school-level conditions supportive of teacher performance are established and maintained. Second, Professional Learning Community (PLC) Theory, as elaborated by DuFour et al. (2009), posits that collaborative professional communities are among the most powerful structures available for improving teacher competencies and performance at scale.

The integration of these two frameworks within a single quantitative model generates three testable hypotheses, which are examined in this study:

H<sub>1</sub>: Principals' managerial skills have a positive and significant effect on elementary school teacher performance.

H<sub>2</sub>: Teachers' participation in KKG has a positive and significant effect on elementary school teacher performance.

H<sub>3</sub>: Principals' managerial skills and teachers' participation in KKG simultaneously have a positive and significant effect on elementary school teacher performance.

### 3 Methodology

#### 3.1 Research Design

This study employed a quantitative approach using an ex post facto design with a descriptive correlational method. The ex post facto design was selected because the study examined variables that had already naturally occurred and were not subject to experimental manipulation by the researcher (Darmawan, 2023). The descriptive correlational approach was adopted to identify the direction and magnitude of the relationships and effects between the independent variables, principals' managerial skills ( $X_1$ ) and teachers' participation in KKG ( $X_2$ ), and the dependent variable of teacher performance ( $Y$ ). Data were collected through a structured survey using validated, closed-ended questionnaires measured on a five-point Likert scale and subsequently analysed using multiple linear regression.

#### 3.2 Population and Sampling

The target population of this study comprised all civil servants (Aparatur Sipil Negara/ASN) teachers employed in public elementary schools (Sekolah Dasar Negeri/SDN) in Welahan District, Jepara Regency, totalling 385 teachers distributed across multiple school clusters. The sample size was determined using the Slovin formula with a margin of error of 5%, yielding a minimum required sample of 197 individuals; however, the purposive application of eligibility criteria reduced the applicable population, and the final sample of 117 teachers was determined as adequate for the study objectives and statistical requirements.

A purposive sampling technique was employed to ensure that respondents possessed the relevant professional experience and direct engagement with both independent variables. The following inclusion criteria were applied:

- i. holding a civil servant (PNS/ASN) appointment;
- ii. having a minimum of five years of teaching experience;
- iii. having served under at least two different school principals; and
- iv. Being actively registered in and participating in KKG activities.

These criteria ensured that respondents could provide informed and reflective responses regarding both principals' managerial conduct and their own engagement in KKG activities.

#### 3.3 Research Instruments

The research instruments consisted of three closed-ended questionnaires, each designed to measure one of the study variables. All instruments employed a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Items were developed based on theoretically grounded indicators derived from the educational management literature and aligned with the Indonesian Ministry of Education regulatory framework. Table 1 summarises the operationalisation of each variable.

**Table 1** Operationalisation of Research Variables and Instruments

| Variable                                                          | Main Dimensions / Indicators                                                                                                          | Number of Items |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Principals' Managerial Skills ( $X_1$ )                           | Conceptual skills, human (interpersonal) skills, technical skills                                                                     | 23              |
| Teachers' Participation in Teacher Working Groups / KKG ( $X_2$ ) | Participation frequency, contribution to discussions, application of KKG outcomes in classroom practice, and instructional innovation | 20              |
| Teacher Performance (Y)                                           | Instructional planning, instructional implementation, assessment of student learning, and additional professional duties              | 21              |

**Note** Each questionnaire item was rated on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The instrument underwent validity and reliability testing and was therefore deemed appropriate for use as a data collection tool in this study.

### 3.4 Validity and Reliability Testing

#### Validity Testing

Content validity was established through expert panel review by three faculty members specialising in educational management and research methodology. Construct validity was subsequently assessed through item-total correlation analysis using the Pearson Product-Moment coefficient, administered on a pilot sample of 30 respondents drawn from a comparable population outside the main study sample. At a significance level of 5% and  $n = 30$ , the critical  $r$ -table value was 0.361. The results showed that all items across all three instruments obtained  $r$ -count values exceeding 0.361, confirming that every questionnaire item was statistically valid and appropriate for inclusion in the main data collection phase.

#### Reliability Testing

Internal consistency reliability was assessed using Cronbach's Alpha coefficient, with a minimum acceptable threshold of 0.60. The results confirmed high reliability for all three instruments:  $\alpha = 0.945$  for principals' managerial skills ( $X_1$ ),  $\alpha = 0.921$  for KKG participation ( $X_2$ ), and  $\alpha = 0.915$  for teacher performance (Y). Table 2 summarises the reliability statistics.

**Table 2** Reliability Statistics for Research Instruments

| Variable                                | Cronbach's Alpha ( $\alpha$ ) | Reliability Status |
|-----------------------------------------|-------------------------------|--------------------|
| Principals' Managerial Skills ( $X_1$ ) | 0.945                         | High (Reliable)    |
| KKG Participation ( $X_2$ )             | 0.921                         | High (Reliable)    |
| Teacher Performance (Y)                 | 0.915                         | High (Reliable)    |

**Note** Minimum reliability threshold  $\alpha \geq 0.60$  (George & Mallery, 2003).

### 3.5 Classical Assumption Tests

Before hypothesis testing, a battery of classical assumption tests was conducted to ensure the validity and appropriateness of the regression model. The normality of residuals was assessed using the One-Sample Kolmogorov-Smirnov test with the Lilliefors correction. The result yielded an Asymp. Sig. (2-tailed) value of 0.200, exceeding the threshold of  $\alpha = 0.05$ , indicating that residuals were normally distributed.

Multicollinearity was evaluated through Tolerance and Variance Inflation Factor (VIF) diagnostics. Both independent variables ( $X_1$  and  $X_2$ ) returned a Tolerance value of 0.493 ( $> 0.10$ ) and a VIF value of 2.028 ( $< 10.00$ ), indicating the

absence of problematic multicollinearity. Heteroscedasticity was assessed using Spearman's rho rank correlation between the absolute standardised residuals and each predictor variable. The resulting significance values were 0.667 for  $X_1$  and 0.904 for  $X_2$ , both substantially exceeding 0.05, confirming homoscedasticity. Collectively, the regression model satisfied all classical assumptions required for valid linear regression analysis.

### 3.6 Ethical Considerations

This study was conducted in accordance with established ethical standards for educational research involving human participants. Before data collection, written informed consent was obtained from all respondents. Participation was entirely voluntary, and respondents were explicitly informed of their right to withdraw at any time without penalty. Respondent anonymity was preserved throughout all stages of data collection, processing, and reporting.

## 4 Results

### 4.1 Descriptive Statistics

The study involved 117 civil servant teachers from public elementary schools in Welahan District, Jepara Regency. Descriptive analysis of the three study variables is summarised in Table 3. Principals' managerial skills ( $X_1$ ) recorded a mean score of 103.98 out of a maximum possible score of 115 (23 items  $\times$  5), placing the variable in the "high" category. The majority of respondents (50%) rated their principal's managerial performance in the "very high" category, suggesting that the sampled schools were generally led by principals who demonstrated strong planning, organisational, supervisory, and interpersonal competencies.

Teachers' participation in KKG ( $X_2$ ) yielded a mean score of 86.06 out of a maximum possible score of 100 (20 items  $\times$  5), placing this variable in the "moderate" category. While 30% of respondents were classified in the "very active" participation category, the overall distribution indicated variability in the depth and consistency of teachers' KKG engagement, suggesting that the professional development potential of KKG has not yet been fully realised in the study context. Teacher performance ( $Y$ ) registered a mean score of 91.87 out of a possible 105 (21 items  $\times$  5), falling within the "high" category, with 45% of respondents classified as "very high" performers.

**Table 3** Descriptive Statistics of Research Variables (N = 117)

| Variable                                | Mean   | Max Possible Score | Category | % "Very High / Very Active" |
|-----------------------------------------|--------|--------------------|----------|-----------------------------|
| Principals' Managerial Skills ( $X_1$ ) | 103.98 | 115                | High     | 50%                         |
| KKG Participation ( $X_2$ )             | 86.06  | 100                | Moderate | 30%                         |
| Teacher Performance ( $Y$ )             | 91.87  | 105                | High     | 45%                         |

**Note** Categories based on a five-level classification using mean score intervals.

### 4.2 Hypothesis Testing

#### Effect of Principals' Managerial Skills on Teacher Performance ( $H_1$ )

Simple linear regression analysis was conducted to test  $H_1$ . The results confirmed a positive and statistically significant effect of principals' managerial skills on teacher performance:  $b = 0.955$ ,  $t(115) = 25.977$ ,  $p < .001$ ,  $\beta = 0.924$ ,  $R^2 = .854$ . The unstandardised regression equation was  $Y = -7.350 + 0.955X_1$ . The coefficient of determination ( $R^2 = 0.854$ ) indicates that 85.4% of the variance in teacher performance was attributable to principals' managerial skills.  $H_1$  is therefore supported. Results are presented in Table 4.

**Table 4** Simple Linear Regression: Effect of Principals' Managerial Skills ( $X_1$ ) on Teacher Performance (Y)

| Predictor                               | b      | $\beta$ | T      | p      | R <sup>2</sup> |
|-----------------------------------------|--------|---------|--------|--------|----------------|
| Constant                                | -7.350 | —       | -1.376 | .171   |                |
| Principals' Managerial Skills ( $X_1$ ) | 0.955  | 0.924   | 25.977 | < .001 | .854           |

**Note** N = 117.  $\beta$  = standardised coefficient.

### Effect of KKG Participation on Teacher Performance ( $H_2$ )

Simple linear regression was used to test  $H_2$ . Results indicated a positive and significant effect of KKG participation on teacher performance:  $b = 0.858$ ,  $t(115) = 14.853$ ,  $p < .001$ ,  $\beta = 0.811$ ,  $R^2 = .657$ . The regression equation was  $Y = 18.032 + 0.858X_2$ , indicating that 65.7% of teacher performance variance was explained by KKG participation.  $H_2$  is therefore supported. Results are presented in Table 5.

**Table 5** Simple Linear Regression: Effect of KKG Participation ( $X_2$ ) on Teacher Performance (Y)

| Predictor                   | b      | $\beta$ | T      | p      | R <sup>2</sup> |
|-----------------------------|--------|---------|--------|--------|----------------|
| Constant                    | 18.032 | —       | 5.122  | < .001 |                |
| KKG Participation ( $X_2$ ) | 0.858  | 0.811   | 14.853 | < .001 | .657           |

**Note** N = 117.  $\beta$  = standardised coefficient.

### Simultaneous Effect of Both Variables on Teacher Performance ( $H_3$ )

Multiple linear regression was employed to test  $H_3$ . The omnibus F-test confirmed that the overall regression model was statistically significant:  $F(2, 114) = 539.951$ ,  $p < .001$ , Adjusted  $R^2 = .903$ ,  $R = .951$ . The multiple regression equation was  $Y = -11.817 + 0.726X_1 + 0.328X_2$ . Partial t-tests confirmed that both predictors independently contributed significant unique variance: principals' managerial skills ( $\beta = 0.705$ ,  $t = 17.098$ ,  $p < .001$ ) and KKG participation ( $\beta = 0.310$ ,  $t = 7.533$ ,  $p < .001$ ). The full regression results are presented in Table 6.  $H_3$  is therefore supported.

**Table 6** Multiple Linear Regression: Simultaneous Effects of  $X_1$  and  $X_2$  on Teacher Performance (Y)

| Predictor                               | b       | SE | $\beta$ | t      | p      | VIF   |
|-----------------------------------------|---------|----|---------|--------|--------|-------|
| Constant                                | -11.817 | —  | —       | -2.854 | .005   | —     |
| Principals' Managerial Skills ( $X_1$ ) | 0.726   | —  | 0.705   | 17.098 | < .001 | 2.028 |
| KKG Participation ( $X_2$ )             | 0.328   | —  | 0.310   | 7.533  | < .001 | 2.028 |

**Note** N = 117.  $R = .951$ ,  $R^2 = .904$ , Adjusted  $R^2 = .903$ ,  $F(2, 114) = 539.951$ ,  $p < .001$ . VIF values indicate the absence of multicollinearity.  $\beta$  = standardised regression coefficient.

## 5 Discussion of Findings

### 5.1 Effect of Principals' Managerial Skills on Teacher Performance

The finding that principals' managerial skills exerted a dominant and statistically significant effect on teacher performance ( $R^2 = .854$ ,  $\beta = 0.705$ ,  $p < .001$ ) is consistent with a substantial body of theoretical and empirical literature on educational leadership. Hallinger (2011), in a seminal synthesis of four decades of empirical research,

established that school leaders shape teacher and student outcomes primarily through the creation and management of school-level conditions that facilitate effective teaching, including the organisational climate, professional development infrastructure, and instructional oversight systems. The present finding empirically corroborates this theoretical proposition within the specific context of Indonesian public elementary schools.

This result aligns with the empirical findings of Suyitno (2021), who found that principals' managerial skills and school committee roles jointly predicted the effectiveness of school-based management, and Silfatman et al. (2022), who demonstrated that the implementation of principal academic supervision, a core dimension of managerial functioning, significantly improved teacher performance in elementary schools. Similarly, Sartika et al. (2023) reported that managerial competence and leadership style were significant predictors of teacher performance, a conclusion that parallels the present study's findings.

The comparatively high proportion of variance explained by managerial skills (85.4%) in this study may reflect the particular structural dependence of teachers in the Indonesian civil servant system on their principals for professional guidance, access to resources, and performance evaluation. In such a context, the quality of the principal's managerial functioning is likely to be a particularly salient determinant of the organisational conditions experienced by teachers. Conceptual skills that enable principals to articulate a clear pedagogical vision, human skills that facilitate trust and open communication with teachers, and technical skills that enable effective scheduling, resource management, and supervision each contribute independently to the organisational substrate within which teacher performance is shaped.

## 5.2 Effect of KKG Participation on Teacher Performance

The finding that teachers' participation in KKG significantly predicted teacher performance ( $R^2 = .657$ ,  $\beta = 0.310$ ,  $p < .001$ ) supports the theoretical propositions of Professional Learning Community (PLC) theory as articulated by DuFour et al. (2009), who emphasised that collaborative professional communities constitute the most powerful available structures for improving instructional quality and teacher professional competency at scale. When KKG functions in accordance with PLC principles — with shared mission, collaborative team learning, collective inquiry, and results orientation — teachers gain access to structured opportunities for peer feedback, shared lesson planning, reflective dialogue, and instructional innovation.

This result is consistent with the findings of Badrudin et al. (2020), who established that KKG participation jointly with principal leadership significantly explained variance in elementary teacher performance, and Dinanty et al. (2024), who found that PLC implementation in Indonesian schools produced meaningful improvements in learning quality, particularly in collaborative and inquiry-based instructional approaches. The moderate categorisation of KKG participation in the present study is also consistent with findings from the broader Indonesian educational context, where KKG activities have been criticised for being procedural and compliance-driven rather than substantively developmental.

The lower explained variance for KKG participation (65.7%) relative to managerial skills (85.4%) may reflect the finding that participation quality, rather than participation frequency, is the mechanism by which KKG engagement translates into improved performance. Teachers who attend KKG activities without actively engaging in collaborative problem-solving or applying KKG-derived innovations in their classrooms are unlikely to register performance improvements commensurate with their formal participation. This suggests that future studies should differentiate between nominal and substantive participation in KKG activities.

## 5.3 Simultaneous Effects and Synergistic Dynamics

The simultaneous model, which accounted for 90.3% of the variance in teacher performance (Adjusted  $R^2 = .903$ ,  $F = 539.951$ ,  $p < .001$ ), demonstrates that the combined explanatory power of principals' managerial skills and KKG participation is substantially greater than either variable in isolation. This synergistic relationship suggests that these two constructs are not merely additive but may interact in reinforcing ways: principals who exercise effective managerial competencies are more likely to create the organisational conditions, scheduling flexibility, resource provision, professional climate, and strategic encouragement that enable KKG to function effectively, while active and well-functioning KKGs in turn contribute to the realisation of the principal's instructional improvement agenda.

This finding supports the integrated theoretical framework employed in this study and contributes to the growing empirical literature demonstrating that educational leadership effects are mediated by organisational conditions that directly influence teacher professional practice (Hallinger & Heck, 2010). The finding that managerial skills retained a substantially stronger partial effect ( $\beta = 0.705$ ) relative to KKG participation ( $\beta = 0.310$ ) in the multiple regression model is consistent with the theoretical primacy of school leadership as an organisational-level determinant of teaching quality, while KKG participation represents a teacher-level mechanism that further amplifies performance within the leadership conditions created by the principal.

## 6 Conclusion

This study examined the effects of principals' managerial skills and teachers' participation in Teacher Working Groups (KKG) on the performance of public elementary school teachers in Welahan District, Jepara Regency, Indonesia. The findings provide robust empirical support for all three hypotheses. Principals' managerial skills were identified as the most dominant predictor, explaining 85.4% of the variance in teacher performance individually ( $H_1$  supported). Teachers' KKG participation explained 65.7% of performance variance, confirming the significant role of professional learning communities in teacher development ( $H_2$  supported). Simultaneously, the combined explanatory power of the two predictors reached 90.3% (Adjusted  $R^2 = .903$ ,  $F = 539.951$ ,  $p < .001$ ), demonstrating a powerful synergistic effect of school leadership quality and professional community engagement on teacher performance ( $H_3$  supported). These findings confirm that improving elementary school teacher performance in the Indonesian context requires a dual-pronged strategy: strengthening principal managerial competencies across conceptual, human, and technical dimensions, and restructuring KKG to operate as genuine professional learning communities rather than compliance-driven administrative structures. Educational policymakers, school supervisors, and institutional leaders are encouraged to invest concertedly in both dimensions as interdependent pillars of a sustainable teacher quality improvement agenda.

## Study Implications

### Theoretical Implications

This study makes several theoretical contributions to the educational management literature. First, it provides empirical validation, within a rural Indonesian elementary school context, of Hallinger's (2011) theoretical proposition that school leaders exert their most significant influence on educational outcomes through organisational-level conditions rather than direct instructional action. Second, it confirms the applicability of PLC theory to the KKG structure in Indonesia, demonstrating that teacher collaborative community participation constitutes a significant predictor of teacher performance in this regulatory context. Third, the finding that the combined explanatory power of both constructs (90.3%) substantially exceeds their individual contributions advances the theoretical argument that educational leadership and professional learning communities operate synergistically rather than independently.

### Practical Implications

For school principals, the findings underscore the critical importance of continuously strengthening all three dimensions of managerial skill. Principals are encouraged to invest in conceptual capacity-building through strategic planning training and instructional leadership development, in human skill development through coaching, mentoring, and reflective supervision, and in technical skill enhancement through data-informed management and resource optimisation. For teachers, the findings demonstrate that meaningful and substantive engagement in KKG, characterised by active participation in collaborative problem-solving, peer observation, and classroom application of KKG-derived strategies, is associated with measurable improvements in professional performance.

For local education authorities (Dinas Pendidikan) and school supervisors (pengawas sekolah), this study provides an evidence base for allocating targeted resources to leadership development programs for school principals and for restructuring KKG programs to emphasise substantive professional learning over procedural compliance. The integration of professional learning community principles into regional education policy frameworks may serve as a high-leverage strategy for improving teacher performance across school clusters.

## Limitations and Future Research Directions

This study is subject to several limitations that should be acknowledged. First, the cross-sectional ex post facto design precludes causal inference; while the regression results establish significant predictive relationships, longitudinal or experimental designs would be required to establish causal directionality. Second, data were collected exclusively through self-report questionnaires, which are susceptible to social desirability bias and common method variance. Future studies should triangulate self-report data with observational measures of principal behaviour and KKG activity quality. Third, the study was conducted in a single administrative district in Jepara Regency, Central Java; the generalisability of findings to other geographic, demographic, or educational contexts within Indonesia or internationally requires further investigation.

Future research should examine potential mediating and moderating variables in the relationship between principal managerial skills, KKG participation, and teacher performance. Candidate mediating variables include organisational climate, teacher self-efficacy, and teacher motivation. Additionally, qualitative and mixed-method investigations of KKG participation quality, as distinct from participation frequency, would substantially advance understanding of the conditions under which KKG functions as an effective professional development mechanism. Cross-district or cross-provincial comparative studies would also be valuable in identifying contextual factors that moderate the principal leadership-teacher performance relationship.

## Acknowledgement

The authors sincerely appreciate the Editor-in-Chief, Editorial Board members, and anonymous reviewers for their thoughtful evaluations and valuable suggestions, which strengthened the overall quality of this manuscript.

## Funding

The authors received no financial assistance or external funding for the conduct of this research.

## Conflict of Interest

The authors declare that no conflicts of interest exist concerning this study.

## Declaration of Use of Generative AI

Generative AI applications were used only to enhance the readability, grammar, and presentation of the manuscript. The authors assume full responsibility for the originality, accuracy, and integrity of the work.

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