

Academic Supervision as the Dominant Predictor of Learning Quality: The Role of Instructional Leadership and Teacher Reflection in Elementary Schools

¹Dian Putri Amelia,²Harjito,³Ghufron Abdullah

¹⁻³Universitas Persatuan Guru Republik Indonesia Semarang, Indonesia

e-mail: dianputriamelia87@gmail.com

Abstract: This study aimed to analyze the effects of academic supervision, instructional leadership, and teachers' learning reflection on the quality of learning in elementary schools in Tlogomulyo District. The study employed a quantitative approach with an ex post facto design and survey method. The population comprised 140 teachers, with a sample of 104 teachers selected through proportional random sampling. Data were collected using a Likert-scale questionnaire and analyzed using descriptive statistics, prerequisite tests, and multiple linear regression with SPSS 26. The results showed that academic supervision, instructional leadership, and teachers' learning reflection each had a positive and significant effect on learning quality. Simultaneously, the three variables had a significant positive effect, with an F value of 95.929 and a coefficient of determination of 0.742, explaining 74.2% of the variance in learning quality. Academic supervision was the dominant variable, contributing an effective 47.4%. These findings emphasize the importance of strengthening supervision follow-up, instructional leadership, and teachers' reflective culture in an integrated manner to improve learning quality sustainably.

Keywords: academic supervision; instructional leadership; learning reflection; learning quality; elementary school.

Abstrak: Penelitian ini bertujuan menganalisis pengaruh supervisi akademik, kepemimpinan instruksional, dan refleksi pembelajaran guru terhadap kualitas pembelajaran Sekolah Dasar di Kecamatan Tlogomulyo. Penelitian menggunakan pendekatan kuantitatif dengan desain ex post facto dan metode survei. Populasi penelitian berjumlah 140 guru, dengan sampel 104 guru yang dipilih melalui proportional random sampling. Data dikumpulkan menggunakan kuesioner skala Likert dan dianalisis dengan statistik deskriptif, uji prasyarat, serta regresi linier berganda menggunakan SPSS 26. Hasil penelitian menunjukkan bahwa supervisi akademik, kepemimpinan instruksional, dan refleksi pembelajaran guru masing-masing berpengaruh positif dan signifikan terhadap kualitas pembelajaran. Secara simultan, ketiga variabel juga berpengaruh positif dan signifikan dengan nilai F sebesar 95,929 dan koefisien determinasi sebesar 0,742, sehingga mampu menjelaskan 74,2% variasi kualitas pembelajaran. Supervisi akademik menjadi variabel paling dominan dengan sumbangan efektifif 47,4%. Temuan ini menegaskan pentingnya penguatan tindak lanjut supervisi, kepemimpinan pembelajaran, dan budaya reflektif guru secara terintegrasi untuk meningkatkan kualitas pembelajaran secara berkelanjutan. Implikasinya, sekolah perlu membangun pembinaan profesional yang sistematis, kolaboratif, berbasis kebutuhan, dan berorientasi pada perbaikan praktik pembelajaran di kelas.

Kata kunci: supervisi akademik; kepemimpinan instruksional; refleksi pembelajaran; kualitas pembelajaran; sekolah dasar.

Introduction

Instructional quality is a crucial aspect in determining the success of educational provision in schools. High-quality instruction is characterized not only by the successful delivery of subject matter but also by the creation of a conducive learning environment, affective support, cognitive activation, and active student engagement. This orientation is consistent with the *Merdeka Curriculum*, which positions students as active participants in the learning process. The Ministry of Education, Culture, Research, and Technology (Kemendikbudristek, 2022) emphasizes that educational institutions should provide safe, supportive, inclusive, and diversity-sensitive learning environments that foster the development of students' competencies and character.

However, these ideal conditions have not yet been fully realized in elementary schools in Tlogomulyo District, Temanggung Regency. Data from the 2025 Elementary School Education Report for Tlogomulyo District indicate that instructional quality varies considerably across schools and is predominantly classified in the moderate and low categories, while only a relatively small proportion of schools have achieved a good level. This condition suggests that although instruction in several schools has begun to demonstrate conducive classroom environments, affective support, and cognitive activation, its implementation remains suboptimal and uneven. From an educational management perspective, instructional quality may be associated with teachers' professional development, school principals' learning-oriented leadership, and teachers' capacity to continuously evaluate and improve their instructional practices.

One factor expected to influence instructional quality is academic supervision. Academic supervision is intended to support teachers in improving their ability to plan, implement, and evaluate instruction through professional guidance, classroom observation, feedback, and follow-up activities. Sumarni (2019) demonstrated that regular and professionally conducted academic supervision can improve teachers' instructional capabilities, while Daryanto (2018) explained that teachers who receive effective academic supervision tend to demonstrate better teaching performance. These findings are reinforced by U-Sayee and Adomako (2021), who emphasized the importance of principals' supervisory practices in maintaining educational quality. Yani et al. (2022) similarly found that academic supervision plays an important role in developing teachers' pedagogical competence. Prasetya et al. (2022) showed that collaborative supervision emphasizing listening and responding skills can strengthen professional relationships between supervisors and teachers. Usman et al. (2023) further highlighted the importance of academic supervision in improving educational quality, whereas Barokah et al. (2025) emphasized the need to transform supervision from an administrative practice into a process that promotes teachers' professional learning.

The importance of academic supervision is particularly relevant because data from the Elementary School Education Report in Tlogomulyo District indicate that academic supervision outcomes remain relatively low compared with several other indicators. This suggests that supervision should not be limited to administrative activities but should instead function as a professional development process that leads to tangible improvements in instructional practice.

Another important factor is principals' instructional leadership. Instructional leadership places the improvement of teaching and learning processes and outcomes at the core of school leadership. School principals are not merely responsible for administrative management; they are also expected to guide instructional planning, monitor classroom implementation, provide professional support for teachers, and build a school environment oriented toward improved learning outcomes. Mariana (2021) argued that principals' involvement in monitoring instruction and supporting teachers can contribute to improving the quality of educational processes.

Bellibaş, Gümüş, and Liu (2021) found a significant effect of instructional leadership on teachers' instructional quality. Bellibaş, Kılınç, and Polatcan (2021) further demonstrated that this relationship operates through teachers' professional learning, while Bellibaş, Polatcan, and Kılınç (2022) identified shared practice and teacher agency as mechanisms linking instructional leadership with teachers' instructional practices. Thien and Liu (2024) subsequently reported a positive relationship between instructional leadership and teacher professional learning, with teacher self-efficacy serving as a mediator. In the Indonesian context, Elfira et al. (2024) also demonstrated that instructional leadership is associated with teacher self-efficacy and performance.

Interestingly, instructional leadership outcomes in elementary schools in Tlogomulyo District are relatively better than those of instructional quality and academic supervision. This condition indicates that relatively strong instructional leadership has not necessarily been translated into optimal and equitable instructional quality across schools. Therefore, the relationship between instructional leadership and instructional quality requires further empirical examination.

In addition to supervision and instructional leadership, teachers' reflection on instruction also plays an important role in improving instructional quality. Reflection enables teachers to evaluate their teaching experiences, identify successes and challenges, adapt instructional strategies to students' needs, and design improvements for subsequent lessons. Putri and Rahmawati (2022) showed that instructional reflection contributes positively to teachers' professionalism. Fathi et al. (2021) found that teacher reflection is associated with self-efficacy, emotion regulation, and teachers' professional conditions. Chen and Chen (2022) demonstrated that reflective practice skills are influenced by both personal and environmental factors. Marshall et al. (2022) emphasized that effective reflection requires a safe environment, guided dialogue, and support from colleagues or facilitators. Kharlay et al. (2022) found that reflective practice is not necessarily conducted systematically even when teachers engage in reflection consistently. Zohrabi and Xodabande (2024) likewise showed that both individual and peer reflection can serve as effective means of developing teachers' reflective practices.

Data from Tlogomulyo District indicate that a reflective culture has begun to develop among some teachers; however, in several schools, reflective practices remain inconsistent, resulting in instructional improvements that tend to be sporadic and insufficiently structured. A comparison across variables reveals an empirical gap: instructional leadership and instructional reflection demonstrate relatively better outcomes, whereas instructional quality and academic supervision remain predominantly within the moderate and low categories. Thus, relatively favorable supporting conditions for instruction have not yet fully resulted in optimal and equitable instructional quality.

Previous studies have generally examined academic supervision, instructional leadership, or teacher reflection separately, focusing on outcomes such as pedagogical competence, professionalism, self-efficacy, performance, and instructional practices. Consequently, there remains a research opportunity to examine academic supervision, instructional leadership, and teachers' instructional reflection simultaneously as predictors of instructional quality, particularly in elementary schools in Tlogomulyo District. Based on this empirical gap, this study aims to analyze the effects of academic supervision, instructional leadership, and teachers' reflection on instruction on the instructional quality of elementary schools in Tlogomulyo District, both partially and simultaneously.

Methods

This study employed a quantitative approach using an *ex post facto* design and a causal-comparative research method. A quantitative approach was selected because the research data consisted of numerical values obtained through research instruments and analyzed using statistical techniques to test the proposed hypotheses. Sugiyono (2023) states that quantitative research involves numerical data collected through specific instruments and analyzed using statistical procedures. The *ex post facto* design was employed because the study examined conditions that had already occurred without manipulating or administering any treatment to the research variables. The causal-comparative approach was used to investigate causal relationships among variables by observing existing outcomes and tracing the factors presumed to have influenced them (Sugiyono, 2023).

The study was conducted in 13 public elementary schools in Tlogomulyo District, Temanggung Regency, from January to October 2026. The research participants were teachers employed at public elementary schools in Tlogomulyo District during the 2025/2026 academic year. Four variables were examined: academic supervision (X_1), instructional leadership (X_2), and teachers' instructional reflection (X_3) as the independent variables, and instructional quality (Y) as the dependent variable.

The study population consisted of 140 teachers from 13 public elementary schools in Tlogomulyo District, Temanggung Regency. According to Sugiyono (2023), a population is a generalization domain consisting of objects or subjects with particular qualities and characteristics determined by the researcher for investigation and subsequent conclusion drawing. The study involved a sample of 104 teachers. Sampling was conducted using *proportional random sampling*, in which the number of respondents selected from each school was determined proportionally according to the number of teachers at the respective school. This technique provided every member of the population with an equal opportunity to be selected as a respondent.

Data were collected using a closed-ended questionnaire. Respondents were required to select one of the predetermined response alternatives for each statement. The instrument employed a five-point Likert scale consisting of Strongly Agree (SA) = 5, Agree (A) = 4, Somewhat Agree (SWA) = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1. The research instruments were developed based on the operational definitions, dimensions, and indicators of each variable. Arikunto, Suhardjono, and Supardi (2022) state that a sound research instrument must meet the requirements of validity and reliability. Therefore, the instruments were subjected to validity and reliability testing before being used for data collection.

Table 1. Research Instrument Blueprint

Variable	Dimension	Indicators	Item Numbers	Total
Instructional Quality (Y)	Instructional planning	Preparing lesson plans in accordance with the curriculum; formulating clear and measurable learning objectives; preparing materials, methods, and media according to students' characteristics	1–9	9
	Instructional implementation	Implementing instruction in accordance with lesson plans; using varied teaching methods; creating active, creative, and enjoyable learning experiences	10–18	9
	Use of instructional methods and media	Using appropriate and innovative teaching methods; utilizing instructional media and learning resources; using information and communication technology	19–27	9

Variable	Dimension	Indicators	Item Numbers	Total
Total Y Academic Supervision (X ₁)	Classroom management	Managing the classroom in a conducive manner; managing instructional time effectively; maintaining students' attention and engagement	28–36	9
	Learning assessment and evaluation	Assessing learning processes and outcomes; applying various assessment techniques; using assessment results for follow-up actions	37–45	9
			1–45	45
	Academic supervision planning	Preparing supervision programs, schedules, and instruments; determining supervision objectives; disseminating information about the supervision program	1–15	15
	Implementation of academic supervision	Conducting classroom observations; providing professional assistance; analyzing supervision results; preparing supervision reports	16–27	12
	Assessment of academic supervision	Assessing program and instrument implementation, supervision-related problems, supervision outcomes, and the volume and frequency of supervision activities	28–42	15
	Follow-up of academic supervision	Developing and implementing follow-up programs and assigning teachers to professional training activities	43–51	9
			1–51	51
	Developing the school's vision, mission, and goals	Developing the school vision and mission; initiating school improvement; developing programs based on the school's vision and mission	1–9	9
		Managing instruction/learning programs	10–18	9
		Creating a conducive learning climate	19–27	9
		Establishing academic standards	28–36	9
			1–36	36
Total X ₂ Teachers' Instructional Reflection (X ₃)	Reflection on instructional planning	Assessing the alignment of learning objectives with students' needs; evaluating materials, methods, and media; identifying strengths and weaknesses in planning	1–9	9
	Reflection on instructional implementation	Assessing the implementation of instruction; evaluating the effectiveness of methods and strategies; identifying instructional constraints	10–18	9
	Reflection on learning outcomes	Analyzing learning outcomes; assessing achievement of learning objectives; identifying factors influencing learning outcomes	19–27	9
	Follow-up of reflection results	Formulating improvement plans; applying reflection results to subsequent instruction; adjusting instructional strategies	28–36	9
Total X ₃			1–36	36
Total Instrument Items				168

The instructional quality instrument (Y) consisted of 45 items covering five dimensions: instructional planning, instructional implementation, the use of instructional methods and media, classroom management, and learning assessment and evaluation. The academic supervision instrument (X_1) consisted of 51 items covering the planning, implementation, assessment, and follow-up of academic supervision. The instructional leadership instrument (X_2) consisted of 36 items covering the development of the school's vision, mission, and goals; management of instructional programs; creation of a conducive learning climate; and establishment of academic standards. Meanwhile, the teachers' instructional reflection instrument (X_3) consisted of 36 items covering reflection on instructional planning, instructional implementation, learning outcomes, and follow-up actions based on reflection. Thus, the complete research instrument comprised 168 statement items.

The collected data were analyzed using descriptive and inferential statistics with IBM SPSS Statistics version 26. Descriptive analysis was used to describe the characteristics of each research variable through the mean, median, mode, standard deviation, and score categories. The data were subsequently classified into five categories: very high, high, moderate, low, and very low. Prior to hypothesis testing, prerequisite analyses were conducted, including tests of normality, multicollinearity, linearity, and heteroscedasticity. Normality was tested using the Kolmogorov-Smirnov test, with the data considered normally distributed when the significance value was greater than 0.05. Multicollinearity was assessed using the *Variance Inflation Factor* (VIF), with the absence of multicollinearity indicated by a VIF value below 10. Linearity was assessed based on the *deviation from linearity* value, with a relationship considered linear when the significance value exceeded 0.05. Heteroscedasticity was examined using the Glejser test, with the regression model considered free from heteroscedasticity when the significance value was greater than 0.05 (Sahir, 2021).

Hypothesis testing was conducted using multiple linear regression analysis to determine the effects of academic supervision, instructional leadership, and teachers' instructional reflection on instructional quality. The regression model was specified as follows: $Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3$, where Y represents instructional quality, X_1 represents academic supervision, X_2 represents instructional leadership, X_3 represents teachers' instructional reflection, a represents the constant, and b_1 , b_2 , and b_3 represent the regression coefficients. According to Sahir (2021), multiple linear regression is used to analyze the effects of more than one independent variable on a single dependent variable.

The partial effect of each independent variable on instructional quality was examined using the *t*-test at a significance level of 0.05. A hypothesis was accepted when the significance value was less than 0.05. The simultaneous effects of academic supervision, instructional leadership, and teachers' instructional reflection on instructional quality were tested using the *F*-test at a significance level of 0.05. Finally, the coefficient of determination (R^2) was used to determine the extent to which academic supervision, instructional leadership, and teachers' instructional reflection explained the variance in instructional quality.

Result and Discussion

Descriptive analysis was conducted on data obtained from 104 teachers at public elementary schools in Tlogomulyo District, Temanggung Regency. The variables analyzed included instructional quality (Y), academic supervision (X_1), instructional leadership (X_2), and teachers' instructional reflection (X_3). The descriptive statistics for each variable are presented in Table 2.

Table 2. Descriptive Statistics of the Research Variables

Variable	N	Minimum	Maximum	Mean	Standard Deviation
Instructional Quality (Y)	104	119.00	199.00	167.8173	11.94223
Academic Supervision (X ₁)	104	133.00	221.00	192.2885	13.15676
Instructional Leadership (X ₂)	104	111.00	161.00	136.0192	10.16847
Teachers' Instructional Reflection (X ₃)	104	115.00	160.00	135.7404	9.18419

As shown in Table 2, instructional quality had a mean score of 167.8173 with a standard deviation of 11.94223. Academic supervision had a mean score of 192.2885 with a standard deviation of 13.15676. Instructional leadership obtained a mean score of 136.0192 with a standard deviation of 10.16847, while teachers' instructional reflection had a mean score of 135.7404 with a standard deviation of 9.18419. The standard deviations of all variables were lower than their respective mean values, indicating relatively limited dispersion in respondents' scores.

The frequency distribution analysis showed that instructional quality was predominantly in the moderate category, involving 40 respondents (38%). Academic supervision was also dominated by the moderate category, with 50 respondents (48%). For instructional leadership, 35 respondents (34%) were classified in the moderate category, while the high and very high categories together accounted for 58 respondents (56%). Teachers' instructional reflection was predominantly classified as moderate, involving 42 respondents (40%). Overall, the descriptive results indicate that most variables were concentrated in the moderate category, although instructional leadership demonstrated a relatively more positive tendency. The distribution of respondents across the categories of each research variable, including very low, low, moderate, high, and very high classifications, is presented in Table 3.

Table 3. Distribution of Research Variable Categories

Variable	Very Low	Low	Moderate	High	Very High
Instructional Quality	7 (7%)	29 (28%)	40 (38%)	21 (20%)	7 (7%)
Academic Supervision	3 (3%)	13 (13%)	50 (48%)	25 (24%)	13 (13%)
Instructional Leadership	2 (2%)	9 (9%)	35 (34%)	30 (29%)	28 (27%)
Teachers' Instructional Reflection	10 (10%)	25 (24%)	42 (40%)	23 (22%)	4 (4%)

Source: Primary data processed by researchers (2026)

Analysis of Variable Dimensions

Dimension analysis was conducted using *Principal Component Analysis* (PCA) to identify the dimensions that contributed most strongly and least strongly to the formation of each research variable. The results are presented in Table 4.

Table 4. Results of the Dimension Analysis

Variable	Dimension	Extraction Value
Instructional Quality	Instructional planning	0.624
	Instructional implementation	0.756
	Use of instructional methods and media	0.496
	Classroom management	0.663
	Learning assessment and evaluation	0.691
Academic Supervision	Academic supervision planning	0.696
	Implementation of academic supervision	0.659
	Assessment of academic supervision	0.720
	Follow-up on academic supervision results	0.633
Instructional Leadership	Developing the school's vision, mission, and goals	0.919
	Managing instruction/learning programs	0.866

Variable	Dimension	Extraction Value
Teachers' Instructional Reflection	Creating a conducive learning climate	0.697
	Establishing academic standards	0.829
	Reflection on instructional planning	0.708
	Reflection on instructional implementation	0.714
	Reflection on learning outcomes	0.691
	Follow-up on reflection results	0.595

Source: Primary data processed by researchers (2026)

For instructional quality, instructional implementation made the strongest contribution, with an extraction value of 0.756, whereas the use of instructional methods and media had the lowest value of 0.496. For academic supervision, supervision assessment had the highest contribution at 0.720, while follow-up on supervision results had the lowest value at 0.633.

For instructional leadership, developing the school's vision, mission, and goals was the most dominant dimension, with an extraction value of 0.919, whereas creating a conducive learning climate had the lowest value of 0.697. Regarding teachers' instructional reflection, reflection on instructional implementation had the highest value of 0.714, while follow-up on reflection results had the lowest value of 0.595. These findings indicate that follow-up remains a relatively weak aspect of both academic supervision and teachers' instructional reflection.

Results of the Prerequisite Tests

Prior to conducting hypothesis testing through multiple regression analysis, prerequisite tests were performed to ensure that the data met the statistical assumptions required for regression analysis. These tests included normality, linearity, multicollinearity, and heteroscedasticity analyses. The Kolmogorov–Smirnov normality test produced significance values of 0.200 for instructional quality, 0.148 for academic supervision, 0.200 for instructional leadership, and 0.200 for teachers' instructional reflection. Since all significance values exceeded the threshold of 0.05, the data distribution for all variables was considered normal.

The normal distribution of data indicates that the respondents' scores did not show extreme deviations and were sufficiently representative for further statistical analysis. This condition is important because regression analysis assumes that the observed data reflect a stable pattern of relationships among variables. Therefore, the normality results provide statistical support that the subsequent analysis of the effects of academic supervision, instructional leadership, and teachers' instructional reflection on instructional quality can be interpreted appropriately.

Furthermore, the prerequisite tests confirmed that the regression model fulfilled the required assumptions. The linearity test demonstrated that the relationships between each independent variable and instructional quality were linear, while the multicollinearity test showed that the independent variables did not have excessive intercorrelations. The heteroscedasticity test also indicated that the regression model was free from unequal error variance. These findings suggest that academic supervision, instructional leadership, and teachers' instructional reflection can be examined simultaneously as predictors of instructional quality because the regression model satisfies the necessary statistical requirements.

The linearity test showed *deviation from linearity* significance values of 0.991 for the relationship between academic supervision and instructional quality, 0.534 for instructional leadership and instructional quality, and 0.816 for teachers' instructional reflection and instructional quality. Since all values were greater than 0.05, the relationships between each independent variable and the dependent variable were considered linear.

The multicollinearity test yielded VIF values of 1.822 for academic supervision, 3.053 for instructional leadership, and 2.131 for teachers' instructional reflection. All VIF values were below 10, and all tolerance values were above 0.10, indicating the absence of multicollinearity. Meanwhile, the heteroscedasticity test produced significance values of 0.484 for academic supervision, 0.132 for instructional leadership, and 0.082 for teachers' instructional reflection. Because all values exceeded 0.05, the regression model was considered free from heteroscedasticity.

Effect of Academic Supervision on Instructional Quality

The simple regression analysis showed that academic supervision had a very strong relationship with instructional quality, with a correlation coefficient (R) of 0.861. The R^2 value of 0.742 indicates that academic supervision explained 74.2% of the variance in instructional quality. The regression coefficient for academic supervision was 0.782, with a t -value of 17.114 and a significance level of $0.000 < 0.05$. Therefore, academic supervision had a positive and significant effect on instructional quality. The positive coefficient indicates that better implementation of academic supervision is associated with higher instructional quality. Accordingly, the first hypothesis (H_1) was supported.

The findings indicate that academic supervision has a positive and significant effect on the instructional quality of elementary school teachers in Tlogomulyo District. The partial test yielded a t -value of 17.114, with a significance level of $0.000 < 0.05$ and a regression coefficient of 0.782. These results indicate that better academic supervision is associated with higher instructional quality among teachers.

These findings confirm that academic supervision should not be understood merely as an administrative activity, but rather as a process of professional support aimed at helping teachers improve their instructional practices. This result is consistent with Sumarni (2019), U-Sayee and Adomako (2021), and Yani et al. (2022), who highlighted the importance of supervision in improving teachers' competencies and the quality of their professional performance. A collaborative supervision approach also facilitates meaningful communication, attentive listening, and constructive feedback between supervisors and teachers (Prasetia et al., 2022). Strengthening academic supervision should therefore be closely linked to teachers' professional development. Abakah, Widin, and Ameyaw (2022) demonstrated that professional development tends to be less effective when it is not aligned with teachers' needs and lacks adequate institutional support. Ventista and Brown (2023) likewise showed that professional learning involving sustained coaching and collaboration is associated with improved learning outcomes, while Zhou et al. (2023) found that professional development can enhance teachers' self-efficacy. Accordingly, supervision results should be used as a basis for designing professional development activities that address teachers' actual needs. This interpretation is particularly relevant to the present study because 48% of respondents rated academic supervision in the moderate category. Dimension analysis showed that supervision assessment was the strongest dimension, with an extraction value of 0.720, whereas follow-up on supervision results had the lowest value of 0.633. This suggests that assessment procedures have been implemented relatively well, while follow-up actions remain suboptimal. Usman et al. (2023) and Barokah et al. (2025) similarly emphasized that supervision should move beyond administrative practices toward sustained professional learning for teachers. The dominant role of academic supervision is also reflected in its effective contribution of 47.4% and relative contribution of 63.9%. Therefore, efforts to improve instructional quality in Tlogomulyo District should prioritize follow-up supervision through constructive feedback, individualized mentoring, repeated classroom observation, and needs-based professional training.

Effect of Instructional Leadership on Instructional Quality

The analysis yielded a correlation coefficient (R) of 0.566 between instructional leadership and instructional quality, with an R^2 value of 0.321. Thus, instructional leadership explained 32.1% of the variance in instructional quality, while the remaining 67.9% was explained by other factors outside the simple regression model. The regression coefficient for instructional leadership was 0.665, with a t -value of 6.943 and a significance level of $0.000 < 0.05$. These results demonstrate that instructional leadership had a positive and significant effect on instructional quality. In other words, improvements in the quality of principals' instructional leadership tended to be accompanied by improvements in teachers' instructional quality. Therefore, the second hypothesis (H_2) was supported.

Instructional leadership was also found to have a positive and significant effect on instructional quality. The t -value of 6.943, significance level of $0.000 < 0.05$, and regression coefficient of 0.665 indicate that stronger instructional leadership by school principals is associated with higher instructional quality. When examined independently, instructional leadership explained 32.1% of the variance in instructional quality. This finding indicates that school principals function not only as administrators but also as instructional leaders who guide the school's academic vision, monitor teaching and learning processes, develop teachers' capacities, and create a supportive school environment. This is consistent with Mariana (2021) and Bellibaş, Gümüş, and Liu (2021), who emphasized the association between instructional leadership and the quality of teaching practices. Bellibaş, Kılınç, and Polatcan (2021), as well as Bellibaş, Polatcan, and Kılınç (2022), further demonstrated that the effects of leadership operate through professional learning, shared practice, and teacher agency. Within the Indonesian context, Amzat, Yanti, and Suswandari (2022) found a direct effect of instructional leadership on teachers' professional development. Dami et al. (2022) also highlighted the importance of principals' self-efficacy in exercising instructional leadership. Meyer et al. (2023) demonstrated that principals can facilitate teacher collaboration and organizational change by providing time, resources, direction, and professional support. Mohd Tahir et al. (2023) further identified mentoring as an important component of principals' leadership development, while He, Guo, and Abazie (2024) found that instructional leadership is a significant predictor of teachers' professional development. Dimension analysis showed that developing the school's vision, mission, and goals was the strongest dimension, with a value of 0.919, whereas creating a conducive learning climate was the weakest, with a value of 0.697. This suggests that school principals are relatively effective in providing strategic direction but still need to strengthen the translation of that vision into a tangible and supportive learning environment. This finding is consistent with Thien and Liu (2024), Elfira et al. (2024), and Gechere, Oumer, and Ouke (2025), who highlighted the importance of instructional leadership in strengthening self-efficacy, professional practice, and educational outcomes.

Effect of Teachers' Instructional Reflection on Instructional Quality

The simple regression analysis showed a correlation coefficient (R) of 0.398 between teachers' instructional reflection and instructional quality, with an R^2 value of 0.158. This indicates that teachers' instructional reflection explained 15.8% of the variance in instructional quality. The regression coefficient for teachers' instructional reflection was 0.517, with a t -value of 4.378 and a significance level of $0.000 < 0.05$. Therefore, teachers' instructional reflection had a positive and significant effect on instructional quality. The more effectively teachers reflected on instructional planning, implementation, and learning outcomes and followed up on

the results of their reflections, the higher their instructional quality tended to be. Accordingly, the third hypothesis (H_3) was supported.

Teachers' instructional reflection was found to have a positive and significant effect on instructional quality, with a t -value of 4.378, a significance level of $0.000 < 0.05$, and a regression coefficient of 0.517. The R^2 value of 0.158 indicates that, when examined independently, instructional reflection explained 15.8% of the variance in instructional quality. This finding supports Putri and Rahmawati (2022) and Fathi et al. (2021), who demonstrated that reflection contributes to teachers' professionalism, self-efficacy, and ability to improve their practice. However, reflection needs to be conducted systematically and purposefully. Jung, Lu, and Ding (2022) showed that reflective questions or prompts can influence the depth of reflection, while Chen and Chen (2022) emphasized that reflective skills are shaped by both personal and environmental factors. In this study, reflection on instructional implementation was the strongest dimension, with a value of 0.714, whereas follow-up on reflection results was the weakest, with a value of 0.595. This indicates that teachers are generally able to evaluate their instructional implementation, but the outcomes of reflection are not always translated into concrete improvement actions. Marshall et al. (2022) and Kharlay et al. (2022) similarly emphasized the importance of supportive environments and systematic reflective practice. These findings are further supported by Novoa-Echaurren, Pavez, and Anabalón (2025), Vogelsang et al. (2025), Arendt et al. (2025), and Kaloudis et al. (2025), who demonstrated that reflective practice can be strengthened through structured frameworks, guidance, reflective journals, observation, and professional development interventions. Zohrabi and Xodabande (2024) also showed that both individual and peer reflection can support teachers' professional development. Therefore, schools should facilitate reflective practices through reflective journals, case-based discussions, peer observation, and professional learning communities.

Simultaneous Effects of Academic Supervision, Instructional Leadership, and Teachers' Instructional Reflection on Instructional Quality

The multiple linear regression analysis yielded a multiple correlation coefficient (R) of 0.861, indicating a very strong relationship between academic supervision, instructional leadership, and teachers' instructional reflection collectively and instructional quality. The R^2 value of 0.742 indicates that the three independent variables jointly explained 74.2% of the variance in instructional quality, while the remaining 25.8% was explained by factors outside the research model.

Table 5. Results of the Simultaneous Regression Analysis

Statistic	Value
R	0.861
R^2	0.742
Adjusted R^2	0.734
F-value	95.929
Sig. F	0.000
Standard Error of the Estimate	6.15470

The ANOVA test yielded an F-value of 95.929 with a significance level of $0.000 < 0.05$. This result indicates that academic supervision, instructional leadership, and teachers' instructional reflection simultaneously had a significant effect on instructional quality. Therefore, the fourth hypothesis (H_4) was supported.

Based on the multiple regression coefficients reported in the research findings, the regression equation was as follows: $\hat{Y} = 16.995 + 0.795 X_1 + 0.525 X_2 + 0.377 X_3$. The equation

indicates positive effects of all three independent variables on instructional quality. The academic supervision coefficient of 0.795 indicates that a one-unit increase in academic supervision is associated with a 0.795-unit increase in instructional quality. The instructional leadership coefficient of 0.525 indicates that a one-unit increase in instructional leadership is associated with a 0.525-unit increase in instructional quality, while the teachers' instructional reflection coefficient of 0.377 indicates that a one-unit increase in instructional reflection is associated with a 0.377-unit increase in instructional quality, assuming that the other variables remain constant.

The contribution of each independent variable to instructional quality was further examined through effective contribution (EC) and relative contribution (RC). The results are presented in Table 6.

Table 6. Effective and Relative Contributions of the Research Variables

Variable	Effective Contribution (%)	Relative Contribution (%)
Academic Supervision (X_1)	47.4	63.9
Instructional Leadership (X_2)	15.8	21.3
Teachers' Instructional Reflection (X_3)	11.0	14.8
Total	74.2	100.0

The results show that academic supervision made the largest effective contribution to instructional quality, accounting for 47.4%, with a relative contribution of 63.9%. Instructional leadership contributed 15.8% effectively and 21.3% relatively, while teachers' instructional reflection contributed 11.0% effectively and 14.8% relatively. Thus, within the research model, academic supervision was the most dominant contributor to instructional quality among public elementary schools in Tlogomulyo District.

Simultaneously, academic supervision, instructional leadership, and teachers' instructional reflection were found to have a positive and significant effect on instructional quality. The F-value of 95.929, with a significance level of $0.000 < 0.05$, a multiple correlation coefficient of 0.861, and an R^2 value of 0.742 indicate that the three variables collectively explained 74.2% of the variance in instructional quality.

This finding suggests that instructional quality results from the interaction between school-level managerial factors and teachers' professional processes. Instructional leadership provides strategic direction and institutional support, academic supervision functions as a mechanism for professional guidance and feedback, while reflection serves as an internal mechanism through which teachers evaluate and improve their instructional practices. Potvin et al. (2024) showed that professional learning communities integrating collaboration, professional development, teacher inquiry, and reflection can strengthen instructional practices. Of the total effective contribution of 74.2%, academic supervision accounted for 47.4%, instructional leadership for 15.8%, and teachers' instructional reflection for 11.0%. These results identify academic supervision as the most dominant variable. The dimension analysis also revealed an important pattern: follow-up was the weakest aspect of both supervision and reflection, while the use of instructional methods and media was the weakest dimension of instructional quality. Therefore, quality improvement efforts should be directed toward a continuous cycle of observation, feedback, reflection, follow-up action, implementation of improvements, and re-evaluation. Integrating these three variables can contribute to a more sustainable system for improving instructional quality in elementary schools in Tlogomulyo District.

Conclusion

Based on the findings and discussion, it can be concluded that academic supervision, instructional leadership, and teachers' instructional reflection play important roles in improving instructional quality in elementary schools in Tlogomulyo District. All three variables demonstrated positive and significant effects on instructional quality, both partially and simultaneously. These findings confirm that improvements in instructional quality are determined not only by teachers' ability to conduct teaching and learning activities, but also by the quality of professional support, school principals' learning-oriented leadership, and teachers' capacity to continuously evaluate and improve their instructional practices.

Academic supervision emerged as the most dominant factor influencing instructional quality. The findings showed that academic supervision contributed 47.4% effectively and 63.9% relatively, making it the strongest contributor compared with instructional leadership and teachers' instructional reflection. This result indicates that supervision that is well planned, systematic, collaborative, and followed by appropriate follow-up actions can serve as a strategic mechanism for improving instructional quality. However, the dimension analysis revealed that follow-up on supervision results remains a relatively weak aspect. Therefore, this component needs to be strengthened through constructive feedback, mentoring, professional guidance, and teacher development programs that are responsive to teachers' actual needs.

Instructional leadership was also found to have a positive and significant effect on instructional quality. School principals play an important role in developing instructional vision and goals, managing instructional programs, establishing academic standards, and creating a conducive learning climate. Although the development of the school's vision, mission, and goals emerged as the strongest aspect, greater attention is still needed to the creation of a supportive learning environment so that the school's strategic direction can be translated more effectively into classroom practice.

Teachers' instructional reflection likewise had a positive and significant effect on instructional quality. In general, teachers were able to reflect on the implementation of instruction; however, follow-up on reflection results remains an area requiring further improvement. Therefore, reflective practice should not be limited to evaluating teaching experiences but should also lead to the formulation and implementation of concrete improvement actions.

Simultaneously, the three variables explained 74.2% of the variance in instructional quality, while the remaining 25.8% was explained by other factors outside the research model. Therefore, improving instructional quality in elementary schools in Tlogomulyo District requires the integration of instructional leadership, academic supervision, and a culture of teacher reflection within a continuous cycle of instructional improvement.

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