AL-TANZIM
Jurnal Manajemen Pendidikan Islam
e-ISSN : 2549-5720
p-ISSN : 2549-3663

Al-Tanzim: Jurnal Manajemen Pendidikan Islam
Vol. 10 No. 02 (2026) : 635-650
Available online at https://ejournal.unuja.ac.id/index.php/al-tanzim/index

The Effect of School Principals' Academic Supervision and Teachers' Professional Competence on The Quality of Learning in Elementary Schools

Hery Listiyanto[1*], Widya Kusumaningsih[2], Joko Sulianto[3]
Education Management Department, Universitas Persatuan Guru Republik Indonesia Semarang, Semarang, Central Java, Indonesia
Email: hery.chan13@gmail.com[1], widyakusumaningsih@upgris.ac.id[2], sulianto.jo@gmail.com[3]

DOI: http://doi.org/10.33650/al-tanzim.v10i2. 14306

Received: 25 December 2025	*Revised: 19 February 2026*	*Accepted: 16 April 2026*

Abstract:

This study aims to analyze the influence of principals' academic supervision and teachers' professional competence on the quality of learning in elementary schools. Using a quantitative approach and a survey of 138 teachers, data were collected via a Likert-scale questionnaire and analyzed using simple and multiple linear regression in SPSS version 29. The results showed that principals' academic supervision had a positive and significant effect on the quality of learning (r = 0.520; contribution 27%). Teachers' professional competence also had a positive and significant effect, with a correlation coefficient (r = 0.733) and a coefficient of determination (R^2 = 0.538), accounting for 53.8% of the variation in learning quality ($p < 0.001$). Together, academic supervision and teachers' professional competence explained 70% of the variation in learning quality (R^2 = 0.700; Adjusted R^2 = 0.695). This regression model was significant (F = 32.879; $p < 0.001$), indicating that both independent variables explained 70% of the variance in learning quality. These findings suggest that improving academic supervision and strengthening teachers' professional competencies can improve the quality of learning in elementary schools.

Keywords: *Learning Quality, Academic Supervision, Professional Competence*

Abstrak:

Penelitian ini bertujuan untuk menganalisis pengaruh supervisi akademik kepala sekolah dan kompetensi profesional guru terhadap kualitas pembelajaran di sekolah dasar. Menggunakan pendekatan kuantitatif dengan metode survei terhadap 138 guru, data dikumpulkan melalui angket skala Likert dan dianalisis dengan regresi linier sederhana dan berganda menggunakan SPSS versi 29. Hasil penelitian menunjukkan bahwa supervisi akademik kepala sekolah berpengaruh positif dan signifikan terhadap kualitas pembelajaran (r = 0,520; kontribusi 27%). Kompetensi profesional guru juga berpengaruh positif dan signifikan dengan koefisien korelasi (r = 0,733) dan koefisien determinasi (R^2 = 0,538), yang menjelaskan 53,8% variasi dalam kualitas pembelajaran ($p < 0,001$). Secara bersamaan, supervisi akademik dan kompetensi profesional guru menjelaskan 70% variasi kualitas pembelajaran (R^2 = 0,700; Adjusted R^2 = 0,695). Model regresi ini signifikan (F = 32,879; $p < 0,001$), yang berarti kedua variabel independen menjelaskan 70% variansi dalam kualitas pembelajaran. Temuan ini menunjukkan bahwa peningkatan supervisi akademik dan penguatan kompetensi profesional guru dapat meningkatkan kualitas pembelajaran di sekolah dasar.

Kunci: *Kualitas Pembelajaran, Supervisi Akademik, Kompetensi Profesional*

Please cite this article in APA style as:
Listiyanto, H., Kusumaningsih, W., & Sulianto, J. (2026). The Effect of School Principals' Academic Supervision and Teachers' Professional Competence on The Quality of Learning in Elementary Schools. *Al-Tanzim: Jurnal Manajemen Pendidikan Islam*, *10*(2), 635-650.

INTRODUCTION

Improving the quality of education is a crucial agenda in human resource development and remains a top priority in national education systems worldwide. High-quality education plays a fundamental role in shaping students' cognitive abilities, social skills, and character development, particularly at the elementary school level, where foundational competencies are established. However, despite continuous reforms, many countries, including Indonesia, still face significant challenges in achieving optimal learning outcomes. Evidence from international assessments, such as the Program for International Student Assessment, shows that students' literacy and numeracy skills remain below the global average (Snow et al., 2025; Wild et al., 2022). Similarly, national evaluation systems indicate that a substantial proportion of students have not achieved minimum competency standards in essential skills (Jenkins-Weintaub et al., 2023; Larsen, 2025). These findings suggest that classroom instruction remains limited in many contexts. Therefore, improving the quality of learning is not only an educational concern but also a societal necessity, as it directly shapes the development of the competitive, adaptive human resources required in the modern era.

The quality of learning can be understood through several theoretical perspectives, particularly Instructional Leadership Theory and teacher competence frameworks. Instructional Leadership Theory emphasizes the critical role of school principals in improving teaching and learning processes through academic supervision, guidance, and professional support for teachers (Gechere et al., 2025; Li, Chan, & Hu, 2023). Effective academic supervision involves systematic observation, constructive feedback, and continuous professional development, which are expected to enhance instructional quality. In parallel, teacher professional competence theory emphasizes that teachers must possess mastery of subject matter, pedagogical skills, and the ability to design and implement effective learning experiences. These competencies enable teachers to create meaningful learning experiences, foster student engagement, and support higher-order thinking skills.

Furthermore, the interaction between leadership practices and teacher competence is essential in shaping classroom instruction. Academic supervision strengthens teacher competence, while professional competence determines how effectively instructional practices are implemented. Therefore, these two variables are theoretically interconnected in influencing the quality of learning outcomes.

Despite the importance of effective learning, various problems persist in educational practice, particularly at the elementary school level. Many schools still struggle to implement student-centered learning approaches, as classroom instruction often relies on conventional teacher-centered methods that limit student participation and the development of critical thinking. In addition, lesson planning is often treated as an administrative requirement rather than a strategic

tool for addressing diverse student needs. Another significant issue is the limited integration of technology in the learning process, which reduces opportunities for interactive and innovative instruction. Furthermore, disparities in teacher professional competence persist, with some teachers lacking the ability to design engaging learning experiences or to apply appropriate assessment strategies (Alieto et al., 2024; Wolterinck et al., 2024). The implementation of academic supervision by school principals is also suboptimal, often focusing on administrative compliance rather than instructional improvement. These challenges indicate that learning quality is influenced by multiple interconnected factors, underscoring the need for systematic efforts to strengthen both leadership practices and teacher competence in schools.

Previous studies have examined the roles of academic supervision and instructional leadership in improving teaching and learning. Research has shown that effective supervision by school principals positively influences teachers' instructional practices and student learning outcomes (He et al., 2024; Ting & Chuang, 2025). Studies also indicate that structured feedback and continuous professional support can enhance teachers' pedagogical skills and classroom performance. In addition, several researchers have found that collaborative supervision approaches, including reflective dialogue and peer learning, contribute significantly to professional development and instructional improvement. However, other studies suggest that the impact of academic supervision is not always consistent, as its effectiveness depends on factors such as the quality of feedback, school culture, and teacher engagement. These findings imply that while academic supervision can improve learning quality, its effectiveness is highly context-dependent. Therefore, understanding how supervision practices function within specific educational environments remains an important area for further investigation.

In addition to supervision, teacher professional competence has been widely recognized as a key determinant of instructional quality. Empirical studies demonstrate that teachers with strong content knowledge and pedagogical competence are more effective in delivering meaningful learning experiences and improving student outcomes (Geletu, 2022; López-Martín et al., 2023). Professional competence also supports the implementation of innovative teaching strategies, classroom management, and assessment practices that promote student engagement (Seufert et al., 2022; Sharma et al., 2024). However, most previous research has examined academic supervision and teacher competence as separate variables, focusing on their individual effects on learning quality. Limited studies have explored the combined influence of these variables within a single analytical model.

Furthermore, existing research often emphasizes direct relationships without adequately explaining how leadership practices and teacher competence interact to shape instructional processes. This gap indicates the need for integrative research that examines both variables simultaneously to provide a more comprehensive understanding of the factors influencing learning quality.

Addressing this gap is essential for developing more effective strategies to improve educational outcomes.

Based on the identified gaps, this study seeks to analyze the influence of principals' academic supervision and teachers' professional competence on the quality of learning. The research problem focuses on how these two variables individually and simultaneously contribute to improving instructional practices in elementary schools. It is hypothesized that academic supervision positively affects learning quality by enhancing teachers' instructional practices through feedback and guidance. Similarly, teachers' professional competence is expected to have a significant positive effect on learning quality, as competent teachers are better able to design and implement effective learning strategies. Furthermore, the combination of strong academic supervision and high teacher competence is assumed to produce a greater impact on learning quality than either factor alone. This study contributes theoretically by integrating leadership and competence perspectives within a unified framework. In practice, the findings are expected to provide evidence-based recommendations to improve supervision practices and strengthen teacher professionalism, thereby enhancing the quality of learning in schools.

RESEARCH METHODS

This study employed a quantitative, explanatory, cross-sectional survey design to examine relationships among variables. The explanatory design was chosen because it allows the researcher to analyze the association between independent and dependent variables and to test hypotheses derived from theoretical frameworks (Suman et al., 2022; Wang & Cheng, 2020). A cross-sectional approach was applied, in which data were collected at a single point in time without repeated measurements, enabling efficient analysis of relationships within a defined population (Cvetkovic-Vega et al., 2021; Wang & Cheng, 2020). The study was conducted in public elementary schools in Tanggungharjo Subdistrict, Grobogan Regency. This location was selected because it represents typical characteristics of elementary schools with varying levels of teacher competence and instructional practices, making it relevant for examining factors influencing learning quality. The population consisted of 210 elementary school teachers. The sample size was determined using the Slovin formula with a 5% margin of error, resulting in 138 respondents. Proportional random sampling was used to ensure that each school was represented according to its number of teachers (Berndt, 2020; Turner, 2020).

Data were collected through a structured questionnaire using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) (Ferrando et al., 2025; South et al., 2022). The instrument was developed based on theoretical indicators derived from previous studies and relevant literature. It consisted of three variables: principals' academic supervision (12 items), teachers' professional competence (10 items), and learning quality (10 items), covering supervision practices, instructional planning, teaching strategies, and student engagement. Prior to data collection, the instrument was tested for validity and reliability. Construct validity was assessed using exploratory factor analysis, with all items

showing factor loadings above 0.50, indicating acceptable validity (Jani et al., 2023; Narmaditya et al., 2024). Reliability testing using Cronbach's Alpha yielded coefficients of 0.86, 0.88, and 0.90, respectively, exceeding the recommended threshold of 0.70 (Dorsah, 2026; Zakariya, 2022). To minimize common method bias, procedural remedies such as ensuring respondent anonymity, providing clear instructions, and organizing questionnaire items systematically were implemented (Kaltsonoudi et al., 2022; Yao & Xu, 2024).

Data analysis was conducted using descriptive and inferential statistical techniques. Descriptive statistics were used to summarise the data, including means, standard deviations, and frequency (Josua et al., 2025; Nombera-Aznaran et al., 2024). Inferential analysis was performed using simple linear regression to examine the association between each independent variable and the dependent variable, and multiple linear regression to analyze their simultaneous influence on learning quality (Abdullahi & Adamu, 2024; Dorta-González, 2023). Teaching experience was included as a control variable to account for its potential effect on instructional practices. Prior to regression analysis, classical assumption tests were conducted, including tests of normality, linearity, multicollinearity, and heteroscedasticity, all of which indicated that the data met the required assumptions (Christy et al., 2025; Youssef, 2022). The coefficient of determination (R^2) was used to assess the model's explanatory power. All analyses were performed using IBM SPSS Statistics version 29.0 with a significance level of $\alpha = .05$.

RESULTS AND DISCUSSION

Results

This study involved 138 respondents and analyzed three main variables, namely principal academic supervision, teacher professional competence, and teacher learning quality. The results of descriptive analysis show that principal academic supervision had an average score of 153.38 (SD = 7.87) with a minimum score of 136 and a maximum score of 170, with most respondents (43%) falling into the moderate category, followed by the high and very high categories, indicating that the implementation of academic supervision was generally at a moderate level. Teachers' professional competence had an average score of 131.28 (SD = 6.46), ranging from 116 to 145, with 54% of respondents in the moderate category. The rest were distributed across the low to very high categories, indicating that teachers' professional competence is generally moderate. Meanwhile, teachers' learning quality had an average score of 130.83 (SD = 6.86), ranging from 116 to 144, with most respondents (37%) categorized as moderate, followed by low, high, and very high. Overall, these findings indicate that the three research variables, principal academic supervision, teachers' professional competence, and teachers' learning quality, are generally in the moderate category, suggesting that although these aspects have been implemented fairly well, further improvements are still needed to achieve optimal levels.

Principal Supervision and Elementary School Teachers' Learning Quality

Simple regression analysis was used in this study to examine the effect of academic supervision on teacher learning quality. The hypotheses tested included an alternative hypothesis stating that academic supervision affects the quality of elementary school teacher learning in Tanggungharjo Subdistrict, Grobogan Regency, and a null hypothesis stating that academic supervision does not affect the quality of teacher learning in that area. Hypothesis testing was conducted through systematic statistical analysis.

Table 1. Correlation of Principal Supervision and Teachers' Learning Quality

Correlations

		Academic Supervision	Teaching Quality
Academic Supervision	Pearson Correlation	1	.520**
	Sig. (2-tailed)		<,001
	N	138	138
Teaching Quality	Pearson Correlation	.520**	1
	Sig. (2-tailed)	<,001	
	N	138	138

Table 1 presents the results of the Pearson correlation test between principal academic supervision and teachers' learning quality. Based on the analysis, the correlation coefficient r = 0.520 was obtained, with a p-value of < 0.001. This result indicates a positive, statistically significant relationship between principal academic supervision and teacher learning quality. In other words, higher levels of academic supervision by school principals are associated with better learning quality. According to the interpretation guidelines for correlation coefficients, a value of 0.520 falls within the moderate category, suggesting a reasonably strong relationship between the two variables.

Table 2. The Effect of Principal Academic Supervision on Teacher Learning Quality

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1650.272	1	1650.272	50.413	<,001[b]
	Residual	4451.968	136	32.735		
	Total	6102.239	137			

Table 2 presents the results of the ANOVA test examining the effect of principal academic supervision on teacher learning quality. The analysis shows an F value of 50.413 with a p-value of < 0.001, which is lower than the 0.05 threshold. This indicates that the regression model is statistically significant. Therefore, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted. It can be concluded that principal academic supervision has a significant effect on the quality of teacher learning.

Table 3. Contribution of Principal Academic Supervision to Teacher Learning Quality

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.520[a]	.270	.265	5.721

Table 3 presents the model summary showing the contribution of principal academic supervision to teacher learning quality. The coefficient of determination (R Square) is 0.270, indicating that principal academic supervision explains 27% of the variance in teacher learning quality. Meanwhile, the remaining 73% is influenced by other factors outside the research model, suggesting that additional variables also play an important role in determining learning quality.

Table 4. Regression Coefficients of the Effect of Academic Supervision on Teaching Quality

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	74.510	8.329		8.946	<,001
	Academic Supervision	.438	.062	.520	7.100	<,001

Table 4 presents the regression coefficients of the effect of principal academic supervision on teacher learning quality. Based on the regression analysis, the equation obtained is:

$$Y = 74.510 + 0.438X$$

Where Y represents teacher learning quality and X represents principal academic supervision. The regression coefficient for academic supervision is 0.438, with a p-value of < 0.001, indicating a positive, statistically significant effect. This means that for every one-unit increase in academic supervision, teacher learning quality increases by 0.438 units. Therefore, it can be concluded that principal academic supervision has a positive and significant effect on teacher learning quality.

The Impact of Teachers' Professional Competence on Elementary School Learning Quality

Simple regression analysis was used in this study to examine whether teacher professional competence affects teaching quality. The hypotheses tested included an alternative hypothesis that teacher professional competence affects the quality of teaching in elementary schools in Tanggungharjo Subdistrict, Grobogan Regency, and a null hypothesis that teacher professional competence does not affect the quality of teaching in that area. Hypothesis testing was conducted through systematic statistical analysis.

Table 5. Correlation of Teacher Competence and Learning Quality

Correlations			
		Professional Competence	Learning Quality
Professional Competence	Pearson Correlation	1	.733**
	Sig. (2-tailed)		<,001
	N	138	138
Learning Quality	Pearson Correlation	.733**	1
	Sig. (2-tailed)	<,001	
	N	138	138

Table 5 presents the results of the Pearson correlation test between teacher professional competence and teacher learning quality. The analysis shows a

correlation coefficient of r = 0.733 (p < 0.001), indicating a strong, positive, and statistically significant relationship between the two variables. This result suggests that higher levels of teacher professional competence are associated with higher-quality learning. With 138 respondents, the findings confirm that teacher professional competence has a strong and meaningful relationship with teacher learning quality.

Table 6. The Effect of Professional Competence on Learning Quality

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3283.050	1	3283.050	158.377	<,001[b]
	Residual	2819.189	136	20.729		
	Total	6102.239	137			

Table 6 presents the results of the ANOVA test examining the effect of professional competence on learning quality. The analysis shows an F value of 158.377 with a p-value of < 0.001, which is lower than the 0.05 threshold, indicating that the regression model is statistically significant. Therefore, the null hypothesis (H_0), which states that there is no effect of professional competence on learning quality, is rejected, and the alternative hypothesis (H_1) is accepted. This finding confirms that professional competence has a significant effect on learning quality, and the regression model used in this study is valid in explaining the relationship between the two.

Table 7. Contribution of Teacher Competence to Learning Quality

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.733[a]	.538	.535	4.553

Table 7 presents the model summary showing the contribution of teachers' professional competence to the quality of teacher learning. The results indicate an R value of 0.733, reflecting a strong relationship between teachers' professional competence and learning quality. The coefficient of determination (R Square) is 0.538, indicating that teachers' professional competence explains 53.8% of the variance in teacher learning quality. Meanwhile, the remaining 46.2% is influenced by other factors outside the scope of this research model, suggesting that additional variables also contribute to learning quality.

Table 8. Regression Coefficients of Professional Competence on Learning Quality

Coefficients[a]						
Model		Unstandardized Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	37.149	7.669		4.844	<,001
	Professional Competency	.733	.058	.733	12.585	<,001

Table 8 presents the regression coefficients of the effect of teachers' professional competence on learning quality. The results of the simple regression analysis show a constant of 37.149 and a regression coefficient of 0.733 for the

professional competence variable, with a p-value of < 0.001, indicating a positive, statistically significant effect. The regression equation obtained is Y = 37.149 + 0.733X, where Y represents teacher learning quality and X represents teachers' professional competence. This equation implies that for every one-unit increase in professional competence, learning quality increases by 0.733 units, assuming other variables remain constant. Therefore, teachers' professional competence has a positive and significant effect on learning quality, and the research hypothesis is accepted.

The combined influence of principal academic supervision and teacher professional competence on the quality of elementary school teaching. Multiple regression analysis was used in this study to examine whether the principal's academic supervision and teachers' professional competence simultaneously influenced the quality of teacher learning. The hypotheses tested include an alternative hypothesis stating that the principal's academic supervision and teacher professional competence jointly influence the quality of elementary school teaching in Tanggungharjo Subdistrict, Grobogan Regency, and a null hypothesis stating that the two variables do not simultaneously influence the quality of teaching in that area. Hypothesis testing was conducted through systematic statistical analysis.

The Combined Influence of Principal Supervision and Teacher Competence on Teaching Quality

Multiple regression analysis was used in this study to examine whether the principal's academic supervision and teachers' professional competence simultaneously influenced the quality of teacher learning. The hypotheses tested include an alternative hypothesis stating that the principal's academic supervision and teacher professional competence jointly influence the quality of elementary school teaching in Tanggungharjo Subdistrict, Grobogan Regency, and a null hypothesis stating that the two variables do not simultaneously influence the quality of teaching in that area. Hypothesis testing was conducted through systematic statistical analysis.

Table 9. Relationship Strength of Principal Supervision and Teacher Competence on Quality

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.572[a]	.328	.318	5.864	.328	32.879	2	135	<,001

Table 9 presents the results of the multiple linear regression analysis showing the strength of the relationship between principal academic supervision and teacher professional competence on learning quality. The model summary indicates a multiple correlation coefficient (R) of 0.572, which reflects a moderate relationship between the two independent variables and teacher learning quality. This suggests that the combination of principal academic supervision and teacher professional competence is associated with improvements in the quality of teachers' learning practices. The coefficient of determination (R Square) is 0.328,

indicating that both variables jointly explain 32.8% of the variance in teacher learning quality. In comparison, the remaining 67.2% is influenced by other factors outside the model, such as teacher motivation, school culture, learning facilities, collaboration, and student characteristics. Furthermore, the R Square Change value of 0.328, the F Change of 32.879, and the significance level of $p < 0.001$ indicate that the regression model is statistically significant. This confirms that principal academic supervision and teacher professional competence simultaneously have a significant effect on teacher learning quality.

Table 10. Combined Effect of Principal Supervision and Teacher Competence on Learning Quality

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2261.573	2	1130.786	32.879	<,001[b]
	Residual	4642.898	135	34.392		
	Total	6904.471	137			

Table 10 presents the results of the ANOVA test for the multiple linear regression model examining the combined effect of principal academic supervision and teacher professional competence on learning quality. The analysis shows an F value of 32.879 and a p-value of < 0.001, indicating that the regression model is statistically significant. These findings demonstrate that principal academic supervision and teacher professional competence simultaneously have a significant effect on teacher learning quality. Therefore, the regression model is considered appropriate (fit) for explaining the relationship between the independent variables and the dependent variable. Based on the F-test results, the simultaneous hypothesis (H_3), which states that there is a joint effect of principal academic supervision and teacher professional competence on teacher learning quality, is accepted.

Table 11. Combined Contribution of Principal Supervision and Teacher Competence to Learning Quality

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.836[a]	.700	.695	3.790

Table 11 presents the model summary showing the combined contribution of principal academic supervision and teacher professional competence to learning quality. The results indicate an R-squared of 0.700, indicating that 70% of the variance in the dependent variable is simultaneously explained by academic supervision and professional competence. Meanwhile, the remaining 30% of the variance is influenced by other factors outside the research model. The Adjusted R-Square value of 0.695 suggests that the regression model has strong and stable explanatory power after adjustment for the number of independent variables. Therefore, the model is considered robust and appropriate for explaining the combined effect of principal academic supervision and teacher professional competence on learning quality.

Table 12. Regression Coefficients of Principal Supervision and Teacher Competence on Learning Quality

Coefficients[a]						
Model		Unstandardized Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	25.605	8.060		3.177	.002
	Academic Supervision	.189	.053	.224	3.528	<,001
	Professional Competence	.627	.063	.628	9.892	<,001

Table 12 presents the regression coefficients of principal academic supervision and teacher professional competence simultaneously on learning quality. The results show a constant value of 25.605, with regression coefficients of 0.189 for academic supervision (X1) and 0.627 for professional competence (X2). Thus, the regression equation can be formulated as Y = 25.605 + 0.189X1 + 0.627X2, where Y represents learning quality. The constant indicates that when both independent variables are assumed to be zero, the learning quality score is 25.605. The partial test (t-test) results show that academic supervision has a t-value of 3.528 and a p-value of < 0.001, indicating a positive and significant effect on learning quality. Similarly, professional competence has a t-value of 9.892 and a p-value of < 0.001, indicating a stronger, positive, and significant effect. Therefore, both variables individually have a significant influence on learning quality, and the proposed hypotheses are accepted.

Discussion

The results of this study indicate that principal academic supervision has a positive and significant effect on the quality of elementary school teachers' learning. This finding implies that the more effective the implementation of academic supervision by school principals, the higher the quality of teachers' instructional practices in the classroom. Academic supervision provides professional guidance to teachers on improving lesson planning, classroom management, instructional strategies, and the evaluation of learning outcomes. Through activities such as classroom observation, feedback, and follow-up coaching, teachers can identify weaknesses in their teaching practices and continuously improve their instructional quality. This finding is consistent with previous studies, which emphasize the important role of principals in improving teacher performance and instructional quality through structured supervision (Khan et al., 2024; Liu, Li, & Huang, 2022). From a practical perspective, academic supervision functions not only as an evaluation mechanism but also as a professional development process that encourages reflective practice, professional dialogue, and continuous improvement in teaching.

In addition, the results show that teachers' professional competence has a positive and significant effect on learning quality. This means that higher levels of professional competence are associated with better classroom instructional practices. Teachers with strong professional competence are better able to master subject matter, design effective learning strategies, use appropriate learning media, and conduct meaningful assessments. This finding is in line with

educational theories emphasizing the central role of teacher competence in determining instructional quality, as well as empirical studies which highlight the importance of professional competence in improving teaching effectiveness and learning innovation (Blömeke et al., 2022; Yang & Kaiser, 2022). Practically, this finding underscores the importance of continuous professional development programs, including training, workshops, and collaborative learning activities, to strengthen teachers' competencies and enhance the quality of learning.

Furthermore, the findings reveal that principal academic supervision and teachers' professional competence simultaneously have a positive and significant influence on the quality of learning. This indicates that improving learning quality cannot rely on a single factor but requires the combined contribution of effective school leadership and competent teachers. Academic supervision provides direction, feedback, and monitoring, while professional competence enables teachers to implement instructional strategies effectively and improvements suggested through supervision. This finding supports educational management theories that highlight the importance of instructional leadership and teacher competence as key determinants of instructional quality (Kwan, 2020; Özdemir et al., 2024). Empirical evidence also confirms that integrating supervision with teacher competence improves teaching practices and learning outcomes.

The synergy between leadership practices and teacher capabilities can explain the combined influence of these variables. Academic supervision facilitates structured feedback and reflective practice, enabling teachers to identify areas for improvement. At the same time, teachers with strong professional competence are better equipped to apply the feedback and adopt innovative teaching strategies. This interaction promotes professional dialogue, collaboration, and continuous improvement in instructional practices. As a result, schools that effectively integrate supervision and teacher development are more likely to create a supportive learning environment that enhances teaching quality and student engagement (Admiraal et al., 2021; Weddle, 2022).

From a practical perspective, these findings highlight the importance of designing integrated strategies to improve learning quality in elementary schools. Educational policymakers and school leaders should focus on strengthening academic supervision while simultaneously enhancing teachers' professional competence through sustainable professional development programs. Initiatives such as mentoring, professional learning communities, workshops, and collaborative lesson planning can support this goal. Therefore, the synergy between principal academic supervision and teachers' professional competence is a critical factor in improving the overall quality of learning and achieving better educational outcomes (Admiraal et al., 2021; Özdemir et al., 2024).

CONCLUSION

This study concludes that principal academic supervision and teachers' professional competence significantly improve teaching quality, both individually and simultaneously. The most important finding is that teachers' professional competence makes a stronger contribution, underscoring the critical roles of subject mastery, instructional strategies, and assessment in effective learning.

Meanwhile, academic supervision supports this process through guidance, feedback, and professional support. The key lesson is that improving teaching quality requires synergy between strong instructional leadership and teacher professionalism.

This study contributes to educational research by providing empirical evidence on the combined role of academic supervision and teacher competence in a single model. However, the use of a cross-sectional design and a limited research area restricts generalizability, and only two variables were examined. Future research should involve broader samples, additional variables, and longitudinal approaches to gain a more comprehensive understanding of factors influencing teaching quality.

ACKNOWLEDGMENT

The authors wish to express their sincere gratitude to the leadership of UPGRIS, including the Dean, Head of Study Program, faculty, and staff of the Postgraduate Program at PGRI University Semarang, for their invaluable support. Special thanks are also extended to the principals and teachers of elementary schools in Tanggungharjo District, Grobogan Regency, for their active participation and meaningful responses during the research.

REFERENCES

Abdullahi, A., & Adamu, A. D. (2024). Analysing Basic Assumptions of Simple Linear Regression and Step-by-Step Procedure in SPSS. *UMYU Journal of Educational Research*, *12*(2), 120–129. https://doi.org/10.70886/ujer.24124.014

Admiraal, W., Schenke, W., De Jong, L., Emmelot, Y., & Sligte, H. (2021). Schools as professional learning communities: what can schools do to support professional development of their teachers? *Professional Development in Education*, *47*(4), 684–698. https://doi.org/10.1080/19415257.2019.1665573

Alieto, E., Abequibel-Encarnacion, B., Estigoy, E., Balasa, K., Eijansantos, A., & Torres-Toukoumidis, A. (2024). Teaching inside a digital classroom: A quantitative analysis of attitude, technological competence and access among teachers across subject disciplines. *Heliyon*, *10*(2). https://doi.org/10.1016/j.heliyon.2024.e24282

Berndt, A. E. (2020). Sampling Methods. *Journal of Human Lactation*, *36*(2), 224–226. https://doi.org/10.1177/0890334420906850

Blömeke, S., Jentsch, A., Ross, N., Kaiser, G., & König, J. (2022). Opening up the black box: Teacher competence, instructional quality, and students' learning progress. *Learning and Instruction*, *79*, 101600. https://doi.org/10.1016/j.learninstruc.2022.101600

Christy, O. N., Olayemi, O. S., & Anono, M. Z. (2025). Robust Estimation In Simultaneous Equation Models: Addressing Multicollinearity And Heteroscedasticity Through Adaptive Penalized Gmm Techniques. *African Journal of Mathematics and Statistics Studies*.

Cvetkovic-Vega, A., Maguiña, J. L., Soto, A., Lama-Valdivia, J., & Correa López, L. E. (2021). Cross-sectional studies. *Revista de La Facultad de Medicina Humana* , *21*(1), 179–185. https://doi.org/10.25176/RFMH.V21I1.3069

Dorsah, P. (2026). The Use of Cronbach's Alpha Reliability in Educational Research: A Systematic Review. *European Journal of Contemporary Education and E-Learning*, *4*(2), 39–50. https://doi.org/10.59324/ejceel.2026.4(2).04

Dorta-González, P. (2023). A multiple linear regression analysis to measure the journal contribution to the social attention of research. *Axioms*, *12*(4), 337. https://doi.org/10.3390/axioms12040337

Ferrando, P. J., Morales-Vives, F., Casas, J. M., & Muñiz, J. (2025). Likert Scales: A Practical Guide to Design, Construction and Use. *Psicothema*, *37*(4), 1–15. https://doi.org/10.70478/psicothema.2025.37.24

Gechere, T., Oumer, J., & Ouke, T. (2025). Influence of principals' instructional leadership and teachers' efficacy on students' performance in secondary schools in the Wolaita Zone, South Ethiopia. *Discover Sustainability*, *6*(1). https://doi.org/10.1007/s43621-025-01797-3

Geletu, G. M. (2022). The effects of teachers' professional and pedagogical competencies on implementing cooperative learning and enhancing students' learning engagement and outcomes in science: Practices and changes. *Cogent Education*, *9*(1), 2153434. https://doi.org/10.1080/2331186X.2022.2153434

He, P., Guo, F., & Abazie, G. A. (2024). School principals' instructional leadership as a predictor of teacher's professional development. *Asian-Pacific Journal of Second and Foreign Language Education*, *9*(1), 63. https://doi.org/10.1186/s40862-024-00290-0

Jani, W., Razali, F., Ismail, N., & Ismawi, N. (2023). Exploratory factor analysis: Validity and reliability of teacher's knowledge construct instrument. *International Journal of Academic Research in Progressive Education and Development*, *12*(1), 944–953. https://doi.org/10.6007/IJARPED/v12-i1/16236

Jenkins-Weintaub, E., Goodwin, M., & Fingerhood, M. (2023). Competency-based evaluation: Collaboration and consistency from academia to practice. *Journal of the American Association of Nurse Practitioners*, *35*(2), 142–149. https://doi.org/10.1097/JXX.0000000000000830

Josua, D. P., Idayanti, N., Sarifah, I., & Arthur, R. (2025). Exploratory Factor Analysis of Instruments Evaluation Interactivity Learning Management System (LMS) for Increase Involvement Study Student Faculty of Engineering. *Information Technology Education Journal*, 1–10.

Kaltsonoudi, K., Tsigilis, N., & Karteroliotis, K. (2022). Common method bias in research designs using self-report tools: Literature overview and recommended remedies. *Psychology*, *27*(1), 210–231.

Khan, F., Preeti, & Gupta, V. (2024). Examining the relationships between instructional leadership, teacher self-efficacy and job satisfaction: a study of primary schools in India. *Journal of Educational Administration*, *62*(2), 223–238. https://doi.org/10.1108/JEA-09-2022-0145

Kwan, P. (2020). Is transformational leadership theory passé? Revisiting the integrative effect of instructional leadership and transformational leadership on student outcomes. *Educational Administration Quarterly*, *56*(2), 321–349. https://doi.org/10.1177/0013161X19861137

Larsen, S. A. (2025). Are Australian students' academic skills declining? Interrogating 25 years of national and international standardised assessment data. *Australian Journal of Social Issues*, *60*(1), 302–333. https://doi.org/10.1002/ajs4.341

Li, J., Chan, P. W. K., & Hu, Y. (2023). The Effects of Principals' Instructional Leadership on Primary School Students' Academic Achievement in China: Evidence from Serial Multiple Mediating Analysis. *Sustainability (Switzerland)*, *15*(3). https://doi.org/10.3390/su15032844

Liu, Y., Li, L., & Huang, C. (2022). To what extent is shared instructional leadership related to teacher self-efficacy and student academic performance in China? *School Effectiveness and School Improvement*, *33*(3), 381–402. https://doi.org/10.1080/09243453.2022.2029746

López-Martín, E., Gutiérrez-de-Rozas, B., González-Benito, A. M., & Expósito-Casas, E. (2023). Why do teachers matter? A meta-analytic review of how teacher characteristics and competencies affect students' academic achievement. *International Journal of Educational Research*, *120*, 102199. https://doi.org/10.1016/j.ijer.2023.102199

Narmaditya, B., Sahid, S., & Hussin, M. (2024). Investigation of Content Validity and Exploratory Factor Analysis of Students' Economic Behavior Measure. *Jurnal Pengukuran Psikologi Dan Pendidikan Indonesia Үцреđителu: LP2M Universitas Islam Negeri (UIN) Syarif Hidayatullah Jakarta*, *13*(2), 148–162. https://doi.org/10.15408/jp3i.v13i2.30485

Nombera-Aznaran, N., Guevara-Lazo, D., Fernandez-Guzman, D., & Taype-Rondán, A. (2024). Statistical characteristics of analytical studies published in Peruvian medical journals from 2021 to 2022: A methodological study. *Plos One*, *19*(7), e0306334. https://doi.org/10.1371/journal.pone.0306334

Özdemir, N., Gümüş, S., Kılınç, A. Ç., & Bellibaş, M. Ş. (2024). A systematic review of research on the relationship between school leadership and student achievement: An updated framework and future direction. *Educational Management Administration & Leadership*, *52*(5), 1020–1046. https://doi.org/10.1177/17411432221118662

Seufert, C., Oberdörfer, S., Roth, A., Grafe, S., Lugrin, J.-L., & Latoschik, M. E. (2022). Classroom management competency enhancement for student teachers using a fully immersive virtual classroom. *Computers & Education*, *179*, 104410. https://doi.org/10.1016/j.compedu.2021.104410

Sharma, A., & Sharma, A. (2024). Exploring innovative pedagogical approaches for enhanced student engagement. *Decision Making: Applications in Management and Engineering*, *7*(1), 175–188.

Snow, P. C., & Daffern, T. (2025). National and International Monitoring of Student Literacy and Numeracy Attainment: The Case for Rigorous Macro and Micro Analysis. *Australian Journal of Social Issues*. https://doi.org/10.1002/ajs4.70049

South, L., Saffo, D., Vitek, O., Dunne, C., & Borkin, M. A. (2022). Effective Use of Likert Scales in Visualization Evaluations: A Systematic Review. *Computer Graphics Forum*, *41*(3), 43–55. https://doi.org/10.1111/cgf.14521

Suman, A., van Es, J., Gardarsdottir, H., Grobbee, D. E., Hawkins, K., Heath, M. A., … Zuidgeest, M. G. P. (2022). A cross-sectional survey on the early impact of COVID-19 on the uptake of decentralised trial methods in the conduct of clinical trials. *Trials*, *23*(1). https://doi.org/10.1186/s13063-022-06706-x

Ting, Y.-K., & Chuang, N.-C. (2025). Exploring the Relationship Between Principal Positive Instructional Supervision and Teacher Teaching Effectiveness: A Cross-Sectional Study in Taiwan. *Leadership and Policy in Schools*, *24*(4), 733–752. https://doi.org/10.1080/15700763.2024.2324036

Turner, D. P. (2020). Sampling Methods in Research Design. *Headache*, *60*(1), 8–12. https://doi.org/10.1111/head.13707

Wang, X., & Cheng, Z. (2020). Cross-sectional studies: strengths, weaknesses, and recommendations. *Chest*, *158*(1), S65–S71. https://doi.org/10.1016/j.chest.2020.03.012

Weddle, H. (2022). Approaches to studying teacher collaboration for instructional improvement: A review of literature. *Educational Research Review*, *35*, 100415. https://doi.org/10.1016/j.edurev.2021.100415

Wild, H., Kyrolainen, A. J., & Kuperman, V. (2022). How representative are student convenience samples? A study of literacy and numeracy skills in 32 countries. *PLoS ONE*, *17*(7 July). https://doi.org/10.1371/journal.pone.0271191

Wolterinck, C., Poortman, C., Schildkamp, K., & Visscher, A. (2024). Assessment for Learning: developing the required teacher competencies. *European Journal of Teacher Education*, *47*(4), 711–729. https://doi.org/10.1080/02619768.2022.2124912

Yang, X., & Kaiser, G. (2022). The impact of mathematics teachers' professional competence on instructional quality and students' mathematics learning outcomes. *Current Opinion in Behavioral Sciences*, *48*, 101225. https://doi.org/10.1016/j.cobeha.2022.101225

Yao, M., & Xu, Y. (2024). Method bias mechanisms and procedural remedies. *Sociological Methods & Research*, *53*(1), 235–278. https://doi.org/10.1177/00491241211043141

Youssef, A. M. (2022). Detecting of multicollinearity, autocorrelation and heteroscedasticity in regression analysis. *Advances*, *3*(3), 140–152.

Zakariya, Y. F. (2022). Cronbach's alpha in mathematics education research: Its appropriateness, overuse, and alternatives in estimating scale reliability. *Frontiers in Psychology*, *13*, 1074430. https://doi.org/10.3389/fpsyg.2022.1074430