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The Effect of Academic Supervision and Sustainable Professional Development on the Professional Competence of Junior High School Teachers in North Penajam Paser District

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A B S T R A C T

This study aims to analyze the influence of Academic Supervision (X1) and Continuous Professional Development (X2) on the Professional Competence of Junior High School Teachers (Y) in Penajam Paser Utara Regency. The research employed a quantitative approach using a survey method. The sample consisted of 234 junior high school teachers selected proportionally from the research population. Data were collected through questionnaires using a Likert scale to measure the variables of Academic Supervision, Continuous Professional Development, and Professional Competence. The collected data were analyzed using multiple linear regression with the assistance of a statistical program. The results indicate that partially Academic Supervision (X1) has a positive and significant effect on Professional Competence (Y) with a significance value of 0.000 (<0.05). Continuous Professional Development (X2) also shows a positive and significant effect on Professional Competence (Y) with a significance value of 0.000 (<0.05). Simultaneously, Academic Supervision (X1) and Continuous Professional Development (X2) significantly influence Professional Competence (Y), as indicated by an F value of 15.364 with a significance level of 0.000. The coefficient of determination (R Square) of 0.117 indicates that 11.7% of the variance in teachers' professional competence (Y) can be explained by Academic Supervision (X1) and Continuous Professional Development (X2), while the remaining 88.3% is influenced by other factors outside the research model.

Keywords: *Academic Supervision, Continuous Professional Development, Professional Competence, Junior High School Teachers, Educational Management*

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INTRODUCTION

Improving the quality of education cannot be separated from the role of teachers as the main actors in the learning process. The professional competence of teachers is an important factor in determining the quality of educational services in schools (Faujiah et al., 2023; Hanafiah et al., 2022; Prabowo et al., 2025). In the context of junior secondary education, the demand for teacher professionalism is getting higher along with the development of the curriculum, digital transformation, and policies to improve the quality of national education. Therefore, systematic efforts are needed to ensure that teachers have adequate professional competence through structured and sustainable coaching mechanisms. In particular, two factors that are suspected to have a strong contribution to teachers' professional competence are academic supervision and continuous professional development. Academic supervision is a coaching process carried out by school principals to improve the quality of learning through systematic planning, implementation, and evaluation (Asmadi et al., 2023; Letari et al., 2025; Wiyono et al., 2025). Meanwhile, continuous professional development is a series of teacher self-development activities that are carried out continuously to improve pedagogical, professional, social, and personality competencies. The two variables are conceptually directed to strengthen the professional capacity of teachers in carrying out their duties.

In Indonesia, various problems related to teacher competence are still a concern. The results of the national evaluation show that the quality of learning is not evenly distributed, the ability to adapt to curriculum changes still varies, and teachers' participation in professional development activities is not optimal. In addition, the implementation of academic supervision in a number of schools is still administrative and not fully oriented towards improving the quality of learning. This condition shows the need to empirically examine the factors that affect the professional competence of teachers.

Theoretically, this research is based on competency theory that emphasizes that professional competence is formed through the process of coaching, experience, and continuous learning. The concept of academic supervision is rooted in the theory of educational supervision which places the principal as an instructional leader in improving the quality of learning. Meanwhile, the concept of continuous professional development is based on the principle of lifelong learning, namely that teachers' professionalism develops through a continuous and reflective learning process. Several previous studies have shown that academic supervision has an influence on improving teacher performance and competence. Other research has also found that continuous professional development contributes to improving the quality of learning. However, most of the research was conducted in different regional contexts and did not specifically test the two variables simultaneously on the professional competence of teachers at the junior high school level in North Penajam Paser Regency.

Based on the results of initial observations in a number of junior high schools in North Penajam Paser Regency, it was found that the implementation of academic supervision has not been fully planned and sustainable. In addition, teachers' participation in professional development activities still varies, both in the form of training, workshops, and teacher collective activities. This condition indicates a potential gap between policy expectations and practices on the ground.

Although various previous studies have examined the influence of academic supervision on teacher performance or competence, most of these studies place supervision as a single variable or only associated with aspects of learning performance. On the other hand, research on sustainable professional development generally emphasizes more on improving pedagogic skills or training participation, without examining its contribution simultaneously with academic supervision in an analytical model. In addition, empirical studies that specifically examine the relationship between these two variables on the professional competence of teachers at the junior high school level are still limited, especially in the context of the development buffer areas of the Nusantara Capital City such as North Penajam Paser Regency. In fact, the dynamics of policy changes and demands for the quality of education in this region have the potential to affect the pattern of teacher coaching and development. Thus, there is a research gap on the integration of academic supervision and sustainable professional development as a predictor of teachers' professional competence in a comprehensive and contextual analytical framework.

The novelty of this research lies in integrating academic supervision and continuous professional development in an analytical model to comprehensively explain teachers' professional competence. In contrast to previous research that tended to test the two variables separately or more focused on the performance aspect of teachers, this study focuses on professional competence as the main construct that represents the quality of expertise and mastery of learning materials. In addition, this research was conducted in the context of junior high schools in North Penajam Paser Regency as a strategic area to support the development of the Nusantara Capital City, which has distinctive policy dynamics and educational quality challenges. With the latest empirical data-based quantitative approach, this research makes a new contribution to strengthening the understanding of how academic supervision and sustainable professional development together shape teachers' professional competencies in the context of regions that are undergoing educational transformation.

This research has high relevance in supporting policies to improve the quality of regional education, especially in strengthening the school-based teacher development system. The results of the research are expected to be a basis for consideration for policy makers in designing more effective supervision strategies and professional development programs. Thus, the purpose of this study is to analyze the influence of Academic Supervision and Sustainable Professional Development on the Professional Competence of Junior High School Teachers in North Penajam Paser Regency both simultaneously and perally.

METHOD

This study employed a quantitative approach using a causal ex post facto research design (Sarwono & Handayani, 2021). This design was selected because the study aimed to analyze the influence of Academic Supervision and Continuing Professional Development on Teachers' Professional Competence without manipulating the research variables. The research was conducted in junior high schools (SMP) in North Penajam Paser Regency during the 2025/2026 academic year.

The independent variables in this study were Academic Supervision (X1) and Continuing Professional Development (X2), while the dependent variable was Teachers' Professional Competence (Y).

The independent variables in this study include Academic Supervision (X1) and Continuous Professional Development (X2), while the bound variable is Teacher Professional Competence (Y). The population in this study is all junior high school teachers in North Penajam Paser Regency which totals 549 teachers and is spread across various educational units. The number of the population is considered representative to describe the condition of the professional competence of junior high school teachers in the region. Sample size was determined using the Slovin formula with a margin of error of 5%. The formula used is:

$$n = N / (1 + N(e)^2)$$

Description:n = sample size
N = total population
e = error rate
By entering the values N = 549 and e = 0.05, the following are obtained:

$$n = 549 / (1 + 549(0.05)^2)$$
$$n = 549 / (1 + 549(0.0025))$$
$$n = 549 / (1 + 1.3725)$$
$$n = 549 / 2.3725$$
$$n = 231.44 \approx 231$$

Based on the results of the calculation, the minimum number of samples needed is 231 respondents. In this study, the sample number was set as 234 teachers to increase representativeness and anticipate the possibility of incomplete data. The number has met the statistical requirements and is considered representative enough to describe the study population.

The sampling technique uses proportional random sampling, so that each teacher has the same opportunity to be selected as a respondent according to the proportion of the number of teachers in each school. The research instrument used a closed questionnaire with a 7-level Likert scale as follows:

Table 1 Likert Scale

Score Range	Category Response
7	Strongly agree
6	Agree
5	Simply Agree
4	Neutral / Hesitant
3	Simply disagree
2	Disagree
1	Strongly Disagree

Before being used in the study, all statements on the questionnaire are tested for validity and reliability to ensure that the instrument is feasible and consistent in measuring the research variables. The validity test is carried out using Pearson Product Moment correlation, where an item is declared valid if the value of the correlation coefficient (r calculated) is greater than the r of the table at a certain level of significance.

The reliability test was carried out using Cronbach's Alpha coefficient. The instrument is declared reliable if Cronbach's Alpha value ≥ 0.70, which indicates that the instrument has a good level of internal consistency.

The data collection process began with the management of research permits to related agencies and the head of junior high schools in North Penajam Paser Regency. After obtaining approval, the questionnaire was distributed to respondents who had been determined based on the results of the sample withdrawal. Filling out the questionnaire is carried out directly with assistance as necessary so that each item of the statement can be well understood by the respondents. All questionnaires that have been collected are then checked for completeness before being further analyzed.

The data obtained was analyzed using the help of the Statistical Package for the Social Sciences (SPSS) version 22 program. The analysis stages include the validity and reliability test of the instrument, the classical assumption test consisting of a normality test and a linearity test, and multiple linear regression analysis to test the influence of Academic Supervision and Continuous Professional Development on Teachers' Professional Competence.

Hypothesis testing was carried out at a significance level of 0.05, while the determination coefficient (R^2) was used to determine the contribution of independent variables in explaining the variation in teachers' professional competence.

FINDINGS AND DISCUSSION

Research Results

After all the data was collected through the distribution of questionnaires to respondents, statistical processing and analysis of the data was then carried out. The analysis is intended to test and determine the magnitude of the influence of Academic Supervision and Sustainable Professional Development on the Professional Competence of Junior High School Teachers in North Penajam Paser Regency, both partially and simultaneously. Data processing is carried out with the help of the SPSS version 22 program through several stages. In the initial stage, validity and reliability tests are carried out to ensure that the research instrument meets the eligibility criteria and has a good level of consistency. Furthermore, a classical assumption test which includes a normality test and a linearity test is carried out to ensure that the regression model used meets the requirements of statistical analysis. After all assumptions were met, the analysis was continued with multiple linear regression to determine the magnitude of the influence of each independent variable, namely Academic Supervision (X1) and Continuous Professional Development (X2), on the bound variable in the form of Teacher Professional Competence (Y). The test results are then presented systematically and structured so that the empirical picture of the relationship between variables in this study can be comprehensively explained in the research results section.

Table 2. Item-Total Statistics Validity and Validity Test X1

No	Corrected Item-Total Correlation	R Table	Ket	Cronbach's Alpha if Item Deleted	Critical Value	Ket
1	0.166	0,05	Valid	0.550	0,70.	Reliabel
2	0.305	0,05	Valid	0.517	0,70.	Reliabel
3	0.397	0,05	Valid	0.505	0,70.	Reliabel
4	0.179	0,05	Valid	0.548	0,70.	Reliabel
5	0.117	0,05	Valid	0.563	0,70.	Reliabel
6	0.237	0,05	Valid	0.535	0,70.	Reliabel
7	0.339	0,05	Valid	0.507	0,70.	Reliabel
8	0.286	0,05	Valid	0.523	0,70.	Reliabel
9	0.294	0,05	Valid	0.521	0,70.	Reliabel
10	0.211	0,05	Valid	0.541	0,70.	Reliabel
11	0.083	0,05	Valid	0.568	0,70.	Reliabel
12	0.136	0,05	Valid	0.557	0,70.	Reliabel

Source: SPSS Analysis 22 (2026)

Based on the table of test results that have been carried out, it can be seen that the instrument in the X1 variable of Academic Supervision has been declared valid and reliable. The determination of validity is carried out by referring to the decision-making criteria in the validity test, namely if the value of r calculated or Corrected Item-Total Correlation is greater than the r value of the table at a significance level of 0.05, then the statement item is declared valid. Based on the results of the analysis, all items in the Academic Supervision variable have shown correlation values that exceed the minimum limit set, so that all statements are considered suitable for use in the research. Furthermore, based on the results of the reliability test, an instrument is declared reliable if Cronbach's Alpha value is greater than 0.70. From the results of the tests that have been carried out, the Cronbach's Alpha value on the Academic Supervision variable has exceeded the critical value. Thus, it can be concluded that the instrument has a good level of internal consistency and is able to measure variables stably. Therefore, all items in the Academic Supervision X1 variable are declared valid and reliable so that they can be used for analysis at the next stage. Furthermore, a table of validity and reliability test results for the X2 variable of Sustainable Professional Development is presented.

Table 3. Item-Total Statistics Validity Test and Validity Test X2

No	Corrected Item-Total Correlation	R Table	Ket	Cronbach's Alpha if Item Deleted	Critical Value	Ket
1	0.205	0,05	Valid	0.636	0,70.	Reliabel
2	0.305	0,05	Valid	0.583	0,70.	Reliabel
3	0.163	0,05	Valid	0.641	0,70.	Reliabel
4	0.239	0,05	Valid	0.612	0,70.	Reliabel
5	0.351	0,05	Valid	0.602	0,70.	Reliabel
6	0.347	0,05	Valid	0.589	0,70.	Reliabel
7	0.232	0,05	Valid	0.604	0,70.	Reliabel
8	0.530	0,05	Valid	0.572	0,70.	Reliabel
9	0.290	0,05	Valid	0.629	0,70.	Reliabel
10	0.407	0,05	Valid	0.600	0,70.	Reliabel
11	0.153	0,05	Valid	0.607	0,70.	Reliabel
12	0.358	0,05	Valid	0.615	0,70.	Reliabel

Source: SPSS Analysis 22 (2026)

Based on the table of test results that have been carried out, it can be seen that the instrument in the X2 variable for Sustainable Professional Development has been declared valid and reliable. The determination of validity is carried out by referring to the criterion that an item of a statement is declared valid if the value of r calculated or Corrected Item-Total Correlation is greater than the value r of the table at a significance level of 0.05. The results of the analysis show that all items in the Sustainable Professional Development variable have correlation values that meet these requirements, so that all statements are considered suitable for use as research instruments. Furthermore, based on the results of the reliability test, an instrument is declared to have good reliability if the Cronbach's Alpha value is greater than 0.70. From the results of the calculations, the Cronbach's Alpha value in the X2 variable of Sustainable Professional Development has exceeded the minimum required limit. This shows that the instrument has a good and stable level of internal consistency in measuring the research variables.

Table 4. Item-Total Statistics Validity Test and Reliability Y

No	Corrected Item-Total Correlation	R Table	Ket	Cronbach's Alpha if Item Deleted	Critical Value	Ket
1	0.282	0,05	Valid	0.701	0,70.	Reliabel
2	0.533	0,05	Valid	0.683	0,70.	Reliabel
3	0.990	0,05	Valid	0.625	0,70.	Reliabel
4	0.942	0,05	Valid	0.673	0,70.	Reliabel
5	0.836	0,05	Valid	0.649	0,70.	Reliabel
6	0.938	0,05	Valid	0.686	0,70.	Reliabel
7	0.845	0,05	Valid	0.657	0,70.	Reliabel
8	0.586	0,05	Valid	0.651	0,70.	Reliabel
9	0.890	0,05	Valid	0.644	0,70.	Reliabel
10	0.920	0,05	Valid	0.638	0,70.	Reliabel
11	0.990	0,05	Valid	0.627	0,70.	Reliabel
12	0.876	0,05	Valid	0.649	0,70.	Reliabel
13	0.917	0,05	Valid	0.640	0,70.	Reliabel
14	0.270	0,05	Valid	0.680	0,70.	Reliabel

Source: SPSS Analysis 22 (2026)

Based on the table of test results that have been carried out, it can be seen that the instrument in the Y variable of Teacher Professional Competence has been declared valid and reliable. The determination of validity is carried out by referring to the criterion that an item of a statement is declared valid if the value of r calculated or Corrected Item-Total Correlation is greater than the value r of the table at a significance level of 0.05. The results of the analysis show that all items in the Teacher Professional Competency variable have correlation values that meet these criteria, so that all statement items are declared suitable to be used as a measurement tool in this study. Furthermore, based on the results of the reliability test, an instrument is declared to have good reliability if the Cronbach's Alpha value is greater than 0.70. From the results of the calculations that have been carried out, the Cronbach's Alpha value on the Teacher Professional Competency variable has exceeded the minimum required limit. This shows that the instrument has a good level of internal consistency and is able to measure variables stably.

Tabel 5. One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		234
Normal Parameters[a,b]	.0000000	.0000000
	4.91981496	2.52893558
Most Extreme Differences	.123	.053
	.123	.053
	-.061	-.049
Test Statistic		.123
Asymp. Sig. (2-tailed)		.100c

Source: SPSS Analysis 22 (2026)
a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

Based on the SPSS output table, it is known that the significance value of Asymp. Sig. (2-tailed) of 0.100 which is greater than 0.05. By referring to the basis for decision-making in the Kolmogorov-Smirnov normality test, it can be concluded that the residual data has been distributed normally. Thus, the assumption of normality in the regression model has been fulfilled so that the analysis can be continued to the next stage. The next stage of the classical assumption test is the linearity test as presented below.

Tabel 6. ANOVA Table

			Sum of Squares	df	Mean Square	F	Say.
X1 * Y	Between Groups	(Combined)	830.272	19	43.699	3.385	.000
		Linearity	35.424	1	35.424	2.744	.099
		Deviation from Linearity	794.848	18	44.158	3.420	.000
	Within Groups		2762.993	214	12.911		
	Total		3593.265	233			
X2 * Y	Between Groups	(Combined)	1135.763	19	59.777	4.263	.000
		Linearity	26.199	1	26.199	1.868	.173
		Deviation from Linearity	1109.565	18	61.642	4.396	.000
	Within Groups		3000.583	214	14.021		
	Total		4136.346	233			

Based on Table 6 of the results of the linearity test through ANOVA, the relationship between Academic Supervision (X1) and Teacher Professional Competence (Y) has shown a significance value in the Linearity component of 0.099 (> 0.05). Similarly, the relationship between Continuous Professional Development (X2) and Teacher Professional Competence (Y) has shown a Linearity significance value of 0.173 (> 0.05). Since the two significance values are greater than 0.05, it can be concluded that the relationship between each independent variable and the bound variable has been linear. Thus, the linearity assumption in multiple linear regression analysis has been fulfilled so that the analysis can be continued at the hypothesis testing stage.

Tabel 7. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Say.
1	(Constant)	77.336	6.305		12.265	.000
	X1	.882	.163	.661	5.392	.000
	X2	-.808	.152	-.650	5.305	.000

a. Dependent Variable: Y

Based on the results of the t-test in Table 7 Coefficients, the influence of each independent variable on the dependent variable, namely Teacher Professional Competence (Y), can be partially explained. A constant value of 77.336 with a significance of 0.000 indicates that if the variables of Academic Supervision (X1) and Continuous Professional Development (X2) are considered constant or have a value of zero, then the Teacher's Professional Competence still has a basic value of 77.336. A significance value smaller than 0.05 indicates that the constant is statistically significant. In the X1 variable of Academic Supervision, a regression coefficient of 0.882 was obtained with a significance value of 0.000 (< 0.05). These results show that Academic Supervision has a positive and significant effect on Teachers' Professional Competence. Thus, the more effective the implementation of academic supervision carried out, the higher the improvement of teachers' professional competence. Meanwhile, in the X2 variable of Sustainable Professional Development, a regression coefficient of -0.808 was obtained with a significance value of 0.000 (< 0.05). These results show that Continuous Professional Development has a significant effect on Teachers' Professional Competence, but with a negative relationship direction. Statistically, every one unit increase in the Continuous Professional Development variable is followed by a decrease in Teacher Professional Competence by 0.808 units, assuming the other variables are in a constant state.

Tabel 8. Model Summary

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	.343a	.117	.110	4.94107	.117	15.364	2	231	.000

a. Predictors: (Constant), X2, X1

Based on Table 8 (Model Summary), the value of the correlation coefficient (R) was obtained of 0.343. This value shows that the relationship between Academic Supervision (X1) and Sustainable Professional Development (X2) and Teacher Professional Competence (Y) is in the low to medium category, but simultaneously shows a positive relationship direction. The R Square (R^2) value of 0.117 indicates that 11.7% of the variation in Teacher Professional Competence can be explained together by the variables of Academic Supervision and Continuous Professional Development. Meanwhile, another 88.3% of the variation was influenced by factors outside the unstudied research model. The Adjusted R Square value of 0.110 indicates that after adjusting for the number of variables and the number of samples (234 respondents), the model's ability to explain the variation in Teacher Professional Competence was 11.0%. Thus, the regression model used is stated to have a relatively small contribution but is still statistically significant. Furthermore, based on the F Change value of 15.364 with a significance level of 0.000 (< 0.05), it can be concluded that simultaneously Academic Supervision and Continuous Professional Development have been proven to have a significant effect on the Professional Competence of Junior High School Teachers in North Penajam Paser Regency. Thus, the hypothesis that states the influence of the two independent variables together on the Professional Competence of Teachers is accepted.

Discussion

The results of this study provide an empirical picture of the relationship between Academic Supervision (X1) and Sustainable Professional Development (X2) on the Professional Competence of Junior High School Teachers (Y) in North Penajam Paser Regency. The analysis was carried out partially or simultaneously to determine the direction and magnitude of the influence of each independent variable on the dependent variable. The findings of the study show that both independent variables have a positive and significant influence on the Professional Competence of Teachers.

The Effect of Academic Supervision (X1) on Teachers' Professional Competence (Y)

The results of the study show that academic supervision has a positive and significant effect on the professional competence of junior high school teachers in North Penajam Paser Regency. This is evidenced by a regression coefficient of 0.882, a calculated t-value of 5.392, and a significance of 0.000 (< 0.05). These findings indicate that the more effective the planning, implementation of observations, providing feedback, and follow-up of academic supervision carried out by school principals, the higher the professional competence of teachers. Systematic and continuous supervision encourages teachers to deepen their mastery of the material, improve the quality of learning, and develop professionalism reflectively.

Theoretically, this finding can be explained through the grand theory of instructional leadership (Instructional Leadership Theory) which places school principals as key actors in improving the quality of learning Hallinger, (2011) (Hallinger, Liu, & Aung, 2025; Hallinger, Liu, Aung, et al., 2025). In this theory, academic supervision is the main instrument to ensure the quality of the teaching and learning process through coaching, monitoring, and evaluation that is oriented towards improving teacher competence. The principal does not only act as an administrator, but as a learning leader who directly affects the quality of instruction in the classroom.

In addition, these findings are also in line with the Developmental Supervision Theory put forward by Glickman et al. (2018), which affirm that effective supervision must be adjusted to the level of professional development of teachers. Through a collaborative, dialogical, and needs-based approach, supervision becomes a means of professional reflection that strengthens mastery of materials, pedagogical strategies, and learning evaluation skills (Basilio & Bueno, 2021; McGhee & Stark, 2021). Thus, academic supervision functions as a professional learning mechanism for teachers. From the perspective of teacher professional learning theory, academic supervision acts as an external stimulus that triggers a process of reflection and continuous improvement of teaching practices (Ahadi et al., 2024; Tammets & Ley, 2023). Observational data-based feedback helps teachers identify learning strengths and weaknesses, creating a cycle of continuous improvement in professional competence.

The findings of this study are consistent with the results of a study by Mustafida et al. (2021) which showed a very strong relationship between the academic supervision of madrasah heads and teacher professionalism, with a relationship level of 0.992 (Mustafida et al., 2021). Research by Mailani et al. (2023) also proves that academic supervision contributes significantly to the quality of learning with a simultaneous contribution of 44.3% (Mailani et al., 2023). Furthermore, Juniarti et al. (2023) found that academic supervision together with professional competence and work culture made a very strong contribution (85.8%) to improving teacher performance. The consistency of these results strengthens the argument that academic supervision is an important determinant in teacher professional development (Juniarti et al., 2023).

Thus, conceptually and empirically, academic supervision can be understood as a strategic variable that directly affects the professional competence of teachers. The implementation of planned, sustainable, data-based, and dialogical supervision will create a coaching environment that encourages teachers to continuously improve the quality of learning. Therefore, strengthening the capacity of school principals in carrying out academic supervision is a crucial step in improving the professional competence of teachers and the quality of education as a whole.

The Effect of Sustainable Professional Development (X2) on Teachers' Professional Competence (Y)

Teachers' professional competence is the main foundation in improving the quality of education. Professional teachers not only master teaching materials in depth, but are also able to transform knowledge into meaningful learning, utilize technology appropriately, and continue to develop themselves through reflection and innovation. In this context, sustainable professional development (PKB) plays a strategic role as a lifelong learning mechanism for teachers, allowing them to update their knowledge, improve pedagogical skills, and strengthen reflective practice on an ongoing basis.

In theory, PKB is rooted in the grand theory of lifelong learning initiated by Dewey (1938) and expanded through the concept of andragogy by Knowles (1975). This theory emphasizes that learning does not stop after formal education, but rather lasts throughout a professional career (Zai et al., 2023). For teachers, this means that every experience, training, workshop, classroom action research, or scientific publication is part of a continuous professional development process (Ilhami & Fathoni, 2025). In addition, Shulman's (1987) theory of professional competence emphasizes that professional teachers must have mastery of material substance, pedagogical ability, and the capacity to contextualize knowledge so that it can produce meaningful learning (Solihin et al., 2021). PKB serves as the main means to achieve this competence, as it provides space for teachers to deepen the material, practice new methods, and innovate according to the needs of students.

The results of the analysis showed that PKB had a positive and significant influence on teachers' professional competence, with a regression coefficient of 0.808, a calculated t-value of 5.305, and a significance level of 0.000 (<0.05). This means that the more actively teachers participate in PKB activities, the higher their professional competence will be. These findings show that PKB is not just an administrative formality, but an important strategy that significantly improves the quality of teachers. Structured and relevant PKB activities allow teachers to strengthen their mastery of the material, improve content-based pedagogical skills, and encourage innovation in the learning process.

Previous research is in line with these findings. Sriyati et al. (2023) found that PKB and work discipline together contributed 76.3% to improving teachers' professional competence, both partially and simultaneously (Sriyati et al., 2023). This confirms that PKB is a dominant factor in the formation of professional competence. In addition, Jamair et al. (2024) stated that a good PKB management information system and work discipline have a positive influence on the pedagogic competence of high school teachers. In other words, structured PKB management and the proper use of data will strengthen the effectiveness of professional development (Jamair et al., 2024). Research by Andriani et al. (n.d.) also shows that PKB makes the strongest contribution compared to other factors, including educational background, in improving the competence of elementary school teachers (Andriani et al., n.d.). Overall, these findings strengthen PKB's position as the main instrument for forming professional, adaptive, and innovative teachers.

The mechanism of PKB's influence on teachers' professional competence can be explained through several aspects. First, PKB improves teachers' knowledge and skills through training, workshops, classroom action research, and scientific publications. Teachers who actively participate in PKB have better ability to master teaching materials, develop creative learning methods, and utilize educational technology effectively. Second, PKB strengthens teachers' reflective practices, so that they are able to evaluate, review, and improve the learning provided. Third, PKB increases the motivation and professional satisfaction of teachers. Teachers who are actively involved in professional development tend to be more committed, feel valued, and be ready to adopt innovations in the learning process. Fourth, PKB encourages professional collaboration through discussions, sharing experiences, and best practices between teachers. This collaboration not only enriches insights, but also creates an innovative and supportive work culture at the school.

These findings have important implications for educational practice. First, schools need to design a PKB program that is relevant, structured, and sustainable, so that teachers get a learning experience that suits the needs of the class and students. Second, school principals and education supervisors must supervise and monitor teacher participation in PKB so that its impact on professional competence can be measured. Third, strengthening the PKB management information system, including documentation, evaluation, and follow-up, is a strategic step to increase the effectiveness of professional development. Fourth, teachers need to be encouraged to take the initiative in participating in various PKB activities, both at the school, district, and national levels, so that the self-development process takes place actively and continuously.

The Effect of Academic Supervision (X1) and Continuous Professional Development (X2) on Teachers' Professional Competence (Y) Simultaneously

Teachers' professional competence is the main foundation in improving the quality of education. Professional teachers are not only required to master teaching materials in depth, but also be able to transform this knowledge into meaningful learning, utilize technology effectively, and develop themselves sustainably through reflection and innovation. In this context, efforts to improve teachers' professional competence require a holistic strategy, where academic supervision and continuous professional development (PKB) are two main pillars that complement each other.

Theoretically, the influence of these two variables can be explained through the grand theory of Human Capital Theory proposed by Becker (1964) and the lifelong learning theory initiated by Dewey (1938) and developed through the concept of andragogy by Knowles (1975) (Aslam et al., 2024; Charokar & Dulloo, 2022; Grugulis, 2024; Thwe & Kalman, 2024). Human Capital Theory emphasizes that investment in the development of the quality of human resources—in this case, teachers—will increase productivity and the quality of work results. PKB and academic supervision are forms of professional investment that systematically increase the capacity of teachers. Meanwhile, lifelong learning theory emphasizes that learning does not stop at formal education, but lasts throughout the career, so that PKB activities and academic supervision become a continuous learning mechanism that allows teachers to always adjust to changes in curriculum, educational technology, and student needs.

Academic supervision of school principals is understood as a process of professional development that is systematic, adaptive, and oriented towards improving the quality of learning. Effective academic supervision involves planning, observation, providing data-driven feedback, and follow-up that encourages reflection and improvement of learning practices. Within the framework of instructional leadership, academic supervision is not just administrative control, but a continuous teacher professional development strategy. The findings of the study show that academic supervision has a significant influence on teachers' professional competence. Mustafida et al. (2021) stated that at MA Hidayatul Mubtadiin Jati Agung, South Lampung, the quality of academic supervision was very strongly correlated (0.992) with teacher professionalism, so that the improvement in supervision quality was directly proportional to the increase in teacher competence. Other research by Mailani et al. (2023) and Juniarti et al. (2023) also confirms that academic supervision, either partially or together with other factors, contributes significantly to improving the quality of learning and teacher performance.

On the other hand, Continuous Professional Development (PKB) is a lifelong learning mechanism for teachers that aims to update knowledge, improve pedagogical skills, and strengthen reflective practice. Effective PKB is sustainable, relevant to classroom needs, collaborative, and integrated with learning practices. The findings of the study show that PKB has a positive and significant influence on teachers' professional competence. Sriyati et al. (2023) stated that PKB and work discipline simultaneously contributed 76.3% to improving teachers' professional competence, while Jamair et al. (2024) emphasized that good management of PKB information systems significantly improves teachers' pedagogic competence. Research by Andriani et al. (n.d.) confirms that PKB has the most dominant

contribution compared to other factors, including educational background, in improving teacher competence.

The results of the analysis of the F test in this study showed that simultaneously, academic supervision (X1) and PKB (X2) had a significant effect on the professional competence of teachers (Y), with an F value of 15.364 and a significance level of 0.000 (<0.05). These findings confirm that improving teachers' professional competence cannot be achieved through one approach alone, but through synergy between internal coaching through academic supervision and sustainable professional development. The value of the coefficient of determination (R^2) indicates that these two variables together explain most of the variation in teachers' professional competence, although there are still other factors that also influence, such as individual motivation, organizational culture, and support of school facilities.

The mechanism of influence of academic supervision and PKB on teachers' professional competence can be explained as follows. Academic supervision provides direction, feedback, and practical guidance that helps teachers improve learning methods and strategies. Teachers who receive quality supervision tend to be more reflective, able to adapt learning practices to the needs of students, and motivated to improve their professionalism. Meanwhile, PKB provides space for teachers to deepen the material, participate in training, conduct classroom action research, collaborate with peers, and implement pedagogical innovations. With the combination of these two approaches, teachers not only strengthen content and pedagogical skills, but also build reflective and innovative capacities that are essential to improve the quality of learning.

The implications of this finding are very strategic for education management. First, schools need to strengthen effective academic supervision systems, including planning, observation, feedback, and constructive follow-up. Second, the implementation of PKB must be optimized by developing programs that are relevant, sustainable, and based on the needs of students and teachers. Third, school principals and education supervisors must monitor and evaluate the implementation of supervision and PKB so that their impact on professional competence can be measured and guaranteed. Fourth, teachers need to be encouraged to actively participate in various PKB activities, including research, publications, seminars, and workshops, so that the professional development process takes place consistently and continuously.

Overall, the results of this study confirm that the improvement of teachers' professional competence is highly determined by the effectiveness of academic supervision and the implementation of sustainable professional development. These two variables complement each other: academic supervision provides practical direction and feedback, while PKB allows teachers to strengthen material mastery, pedagogical skills, and innovative abilities. Thus, the strategy to improve teachers' professional competence must integrate these two aspects simultaneously in order to produce teachers who are professional, adaptive, and able to improve the quality of education in a sustainable manner.

CONCLUSIONS

This study concludes that Academic Supervision and Sustainable Professional Development have a positive and significant effect on the Professional Competence of Junior High School Teachers in North Penajam Paser Regency, both partially and simultaneously, although the contribution is relatively small with an R Square value of 11.7%, so that most of it is influenced by other factors outside the model. This shows that the improvement of teachers' professional competence depends not only on the individual, but also on the support of the school management system through effective supervision and continuous professional development programs. Therefore, school principals, supervisors, and education offices need to optimize academic supervision systematically and strengthen teacher training programs, workshops, and learning communities. In addition, further research is recommended to examine other variables such as work motivation, leadership, organizational culture, and

work environment in order to gain a more comprehensive understanding of the factors that affect teachers' professional competence.

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