



The Influence of School Principal Leadership, Utilization of the Merdeka Mengajar Platform, and Learning Communities on the Pedagogical Competence of Teachers in Vocational High Schools in Indragiri Hilir Regency

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ARTICLE INFO

Keywords: Learning Community, Pedagogical Competence, Principal Leadership, Independent Teaching

Received : 12, Oktober

Revised : 20, November

Accepted: 27, December

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ABSTRACT

This study examines the influence of school principals' leadership, utilization of the Merdeka Mengajar platform, and learning communities on teachers' pedagogical competence. Enhancing teachers' pedagogical competence is crucial for effective learning in the modern era. These factors are expected to support teacher professionalism in vocational high schools in Indragiri Hilir Regency. A quantitative approach with an explanatory survey design was employed. Data were collected through validated and reliable questionnaires and analyzed using multiple linear regression and descriptive analysis. Findings indicate that school leadership, the Merdeka Mengajar platform, and learning communities significantly and positively influence teachers' pedagogical competence ($p < 0.05$). These results highlight the importance of leadership, technology integration, and collaborative learning in influencing teacher competence.

INTRODUCTION

Educational changes driven by curriculum revisions and technological advancements require educators to continuously enhance their competencies. Merdeka Belajar, supported by digital platforms, promotes professional development and serves as a benchmark for education quality. Mulyasa (2017) defines pedagogical competence as the ability to manage learning effectively. However, interviews with 26 teachers at State Vocational High School 2 Tembilahan (July 2024) revealed low competence, with 61.53% struggling with technology integration, 53.84% facing challenges in adapting teaching methods, and 61.53% lacking regular training. School leadership significantly impacts pedagogical competence. Muhaimin et al. (2019) define leadership as the ability to inspire and guide school personnel. At State Vocational High School 1 Tembilahan, an instructional and visionary leadership model emphasizes industry-linked learning, aligning with Leithwood and Riehl (2003). Conversely, State Vocational High School 2 adopts a democratic and servant leadership model focused on collaboration (Day, 2012). However, ineffective communication persists, with 61.53% of teachers dissatisfied and 53.84% perceiving leadership decisions as unwise.

The Merdeka Mengajar platform is essential for enhancing pedagogical competence, yet 38.46% of teachers face access issues, and 46.15% struggle with its features. Sari (2024) highlights its significant role in teaching improvement. Learning communities are also crucial (Wenger et al., 2015), but at State Vocational High School 2, 50% of teachers cite time constraints, and 34.61% undervalue peer learning.

Key issues include ineffective leadership communication, lack of structured training, challenges in technology integration, and limited participation in learning communities. Addressing these through strong leadership, optimal platform use, and collaborative learning communities can enhance teachers' pedagogical competence and improve education quality.

LITERATURE REVIEW

A. Pedagogical Competence

Pedagogical competence is essential for improving education, with teachers as key facilitators. Hakim (2015) defines it as the ability to monitor student progress and deliver effective instruction, while Musfah (2015) emphasizes its development through training. Beyond technical skills, it includes social and emotional dimensions (Suprihatiningrum, 2019). Key aspects include student awareness, curriculum design, and technology integration (Meutia, 2017; Sanjaya, 2017). Competence is assessed through credentials, training, experience, and lesson planning (Rifa'i & Anni, 2015). Effective school leadership enhances teacher performance (Muhaimin et al., 2019), but observations at State Vocational High School 2 Tembilahan show communication gaps, with 61.53% of teachers feeling unsupported. Platforms like Merdeka Mengajar aid teacher development, yet 38.46% struggle with access and 46.15% with platform features (Sari, 2024). Learning

communities also play a role (Wenger et al., 2015), though 50% of teachers cite time constraints. Strengthening leadership, optimizing learning platforms, and fostering collaboration can enhance pedagogical competence, ultimately improving education quality and student outcomes.

B. School Principal Leadership

Effective school leadership is essential for quality education. Qomar (2018) defines managerial leadership as guiding an organization toward its goals, not only through administration but also by motivating and influencing individuals. Toha (2019) emphasizes leadership as the ability to inspire collective effort. Principals play a key role in improving teaching standards. Yukl (2017) highlights their influence in goal-setting and trust-building, while Muhaimin et al. (2019) stress their role in fostering collaboration. Strong leadership enhances management, resource development, and staff engagement (Rumondan, 2021; Wibowo, 2017; Rahayu, 2019). Leadership effectiveness depends on adaptability. Mulyadi (2016) stresses flexible leadership, while Andang (2017) identifies democratic leadership as fostering responsibility. Key indicators include decision-making, organizational management, and positive work culture (Sudarsyah, 2017). In conclusion, strong school leadership fosters teacher growth and educational adaptation, ensuring continuous improvement in learning quality.

C. The Utilization of Merdeka Mengajar Platform

The Merdeka Mengajar Platform (PMM) is a digital tool supporting the Merdeka Curriculum by providing autonomy to educators and students. According to the Ministry of Education and Culture (2022), PMM promotes technology-based education and assists teachers through self-paced training, inspirational videos, and a collaborative teacher community. PMM enhances teacher development through three key features: motivational videos, flexible self-training, and My Work Proof for documenting achievements (Lasmawan, 2023). It also enables personalized learning through efficient student assessments (Silaswati, 2022). PMM plays a vital role in facilitating access to best teaching practices, encouraging innovation, and fostering nationwide collaboration among teachers. Its success depends on accessibility, relevance, and effectiveness in improving teaching quality (Teknodik et al., 2021). As a strategic educational tool, PMM helps teachers enhance their pedagogical skills, ultimately improving the quality of education in Indonesia.

D. Teacher Learning Community

A Teacher Learning Community (TLC) is a professional group that improves teaching quality through collaboration, reflection, and knowledge sharing (Ferayanti, 2023). It unites educators with shared goals, fostering competency and performance (Sekar & Kamarubiani, 2023; Sumarmi, 2020). TLCs support the Merdeka Curriculum by facilitating discussions and problem-solving (Hord, 2004). Establishing a TLC involves forming teams, analyzing data, conducting workshops, and promoting collaboration (Kemendikbudristek, 2023). Key success indicators include teamwork,

continuous learning, self-reflection, and supportive leadership (Mulyasa, 2017; Daryanto, 2015). With strong leadership and a collaborative culture, TLCs enhance teacher development and educational quality.

E. Relevant Studies

Research highlights the impact of school leadership, the Merdeka Mengajar Platform (PMM), and teacher learning communities on pedagogical competence. Tsauri (2022) found that leadership and pedagogical skills significantly influence teachers' motivation. Similarly, Nurkolis et al. (2024) and Rahmadi et al. (2021) confirmed that transformational leadership enhances teacher performance. PMM is a key tool for professional development. Kurniawan et al. (2023) and Yustisia et al. (2024) found it improves teaching skills, though Kusumastuti et al. (2023) noted challenges in implementation. Teacher learning communities also strengthen pedagogy, as shown by Khusna & Priyanti (2023). These studies emphasize the role of leadership, technology, and collaboration in improving teaching quality. This research in Tembilahan vocational schools will further explore their combined impact on pedagogical competence.

F. Research Hypotheses

The hypotheses in this study are as follows:

1. H1: School leadership positively and significantly influences teachers' pedagogical competence in vocational schools in Indragiri Hilir.
2. H2: The use of the Merdeka Mengajar Platform positively and significantly impacts instructors' pedagogical competence in vocational schools in Indragiri Hilir.
3. H3: Teacher learning communities positively and significantly affect teachers' pedagogical competence in vocational schools in Indragiri Hilir.
4. H4: School leadership, the use of the Merdeka Mengajar Platform, and teacher learning communities collectively have a positive and significant impact on teachers' pedagogical competence in vocational schools in Indragiri Hilir.

METHODS

This study employs a quantitative method using a survey of 152 vocational high school (SMK) teachers in Indragiri Hilir Regency, selected proportionally using Slovin's formula. Data were collected through questionnaires covering school leadership, the utilization of the Merdeka Mengajar Platform, learning communities, and teachers' pedagogical competence. Instrument validity and reliability were tested using correlation coefficients and Cronbach's Alpha, with results indicating that most items were valid and reliable. Conducted across four vocational schools from July to December 2024, this study aims to identify factors influencing teachers' pedagogical competence.

Data analysis includes classical assumption tests and multiple regression analysis to examine the hypotheses. The t-test assesses the impact of each independent variable, while the F-test evaluates their combined influence. The

coefficient of determination measures the contribution of independent variables to pedagogical competence. The findings are expected to provide insights into how school leadership, technology integration, and learning communities enhance teachers' competence, serving as a foundation for more effective educational policies.

RESULTS AND DISCUSSION

A. Descriptive Analysis

The descriptive analysis in this study provides an overview of data collected from 110 respondents. The first variable, school leadership (X1), was measured using 25 Likert-scale items, yielding a mean score of 106.75, with values ranging from 105 to 124 and a standard deviation of 6.189, indicating relatively homogeneous responses. The majority of respondents (57%) rated school leadership as high, 27.27% as moderate, and 15.45% as low. The second variable, utilization of the Merdeka Mengajar platform (X2), was also measured with 25 items, resulting in a mean score of 113.89 within the same range. The findings show that 36% of respondents reported high utilization, 28.18% moderate, and 35.45% low, suggesting that while the platform is widely used, its adoption varies among teachers.

The third variable, learning community (X3), had a mean score of 109.51, with values ranging from 84 to 125. The analysis indicates that 53.64% of respondents classified their participation as moderate, 42% as high, and 4.55% as low, reflecting its effectiveness while highlighting areas for improvement. Lastly, teachers' pedagogical competence (Y) had a mean score of 119.96, with values ranging from 102 to 125. A significant majority (82.73%) fell into the high category, indicating strong pedagogical skills among teachers. These findings suggest that school leadership, digital platform utilization, and participation in learning communities contribute positively to enhancing teachers' pedagogical competence. The analysis highlights the importance of collaboration and technology integration in improving the quality of education in vocational schools.

Table 1. Descriptive Statistics

		Statistics			
		Principal Leadership	PMM Platform Utilization	Learning Communities	Teacher Pedagogical Competence
N	Valid	110	110	110	110
	Missing	0	0	0	0
Mean		106.75	113.89	109.51	119.96
Median		115.00	115.00	108.00	122.00
Mode		106	106	100	123
Standard Deviation		6.189	6.189	10.283	5.949
Variance		38.300	38.300	105.738	35.393
Range		19	19	41	23
Lowest Score		105	105	84	102

Highest Score	124	124	125	125
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B. Preliminary Test

This study conducted normality, linearity, multicollinearity, and heteroscedasticity tests to validate the data. Normality was tested using the Kolmogorov-Smirnov method in SPSS 26, showing significance values above 0.05 for all variables (e.g., school leadership = 0.070, Merdeka Mengajar utilization = 0.100), confirming a normal distribution. Linearity testing indicated no deviations (highest p = 0.790), validating a linear relationship.

Multicollinearity was assessed through VIF and tolerance values, with all VIF scores below 10 (e.g., school leadership = 1.025), confirming no multicollinearity issues. Heteroscedasticity testing showed significance values above 0.05 (e.g., school leadership = 0.221), indicating homoscedasticity. Overall, the findings confirm that all classical assumptions are met, ensuring the regression model's validity and reliability for further analysis.

C. Hypothesis Testing

1. Linear Regression Analysis

This study evaluates the impact of school leadership, Merdeka Mengajar platform utilization, and learning communities on teachers' pedagogical competence using simple linear regression. Analysis using SPSS version 26 shows that school leadership (X1) has a positive effect, with a regression equation of $(Y = 120.847 + 0.023X1)$ and a significance value of 0.000, confirming a significant impact. Merdeka Mengajar utilization (X2) follows a similar pattern $(Y = 136.262 + 0.149X2)$, with a significance value of 0.000, indicating a strong positive influence. Learning communities (X3) also show a significant effect $(Y = 129.883 + 0.157X3)$, with a significance value of 0.000. Overall, these findings confirm that effective leadership, digital platforms, and professional collaboration significantly enhance teachers' pedagogical competence, supporting policies for improving education quality in vocational schools.

Table 2. Linear Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	120.847	3.781		31.959	.000
	Principal Leadership (X1)	.008	.035	0.023	.236	.000
	(Constant)	136.262	10.433		13.061	.000
	PMM Platform Utilization (X2)	.143	.091	.149	1.565	.000
	(Constant)	129.883	6.048		21.477	.000

	Learning Community (X3)	.091	.055	.157	1.647	.000
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2. Multiple Regression Analysis

A multiple linear regression analysis was conducted to assess the combined influence of school leadership, the Merdeka Mengajar Platform, and learning communities on teachers' pedagogical competence. The resulting regression equation is $Y = 137.395 + 0.020(X1) + 0.092(X2) + 0.103(X3)$.

Table 3. Multiple Regression Analysis

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	137.395	11.370		12.084	.000
	Principal Leadership	.007	.035	.020	.203	.000
	PMM Platform Utilization	.089	.112	.092	.795	.000
	Learning Community	.060	.067	.103	.887	.000
a. Dependent Variable: Pedagogical Competence						

The constant ($a = 137.395$) represents the predicted pedagogical competence score when all independent variables are zero. The regression coefficients indicate that school leadership ($b1 = 0.020$), platform utilization ($b2 = 0.092$), and participation in learning communities ($b3 = 0.103$) all positively contribute to pedagogical competence, with learning communities showing the strongest effect. These findings align with existing theories that emphasize the role of leadership, technological support, and professional collaboration in enhancing teaching quality. The study highlights the need for integrated policies that strengthen these three aspects to improve teacher competence in vocational schools. The hypothesis testing for the fourth variable was conducted using SPSS version 24, utilizing the ANOVA table as follows:

Table 4. The simultaneous significance test

ANOVA						
Model		Sum of squares	Df	Mean Square	F	Sig.
1	Regression	117.210	3	39.070	1.107	.000
	Residual	3740.645	106	35.289		
	Total	3857.855	109			
a. Dependent Variable: Pedagogical Competence						

b. Predictors: (constant), Learning Community, Principal leadership, Merdeka Mengajar platform utilization

The simultaneous significance test (F-test) in this study yielded a significance value of 0.000, which is less than 0.05. This confirms that the hypothesis is accepted, indicating a significant simultaneous influence of school leadership, the use of the Merdeka Mengajar Platform, and learning communities on teachers' pedagogical competence in vocational high schools in Indragiri Hilir Regency. These findings support the theory that these factors positively contribute to improving teaching quality.

Table 5. Coefficient Determination (R²)

Model Summary				
Model	R	R-square	Adjusted R-square	Std. Error of the Estimate
1	.574 ^a	.653	.652	5.940
a. Predictors: (Constant), Learning Community, Principal Leadership, Merdeka Mengajar Platform Utilization				

The analysis of the influence of the independent variables—school leadership, the use of the Merdeka Mengajar Platform, and learning communities—on the dependent variable, teachers' pedagogical competence, yielded an R-value of 0.574, indicating a moderate relationship among these variables. The R Square value of 0.653 suggests that 65.3% of the variation in teachers' pedagogical competence can be explained by these three independent variables. Additionally, the Adjusted R Square value of 0.652 accounts for the number of variables in the model, providing a more accurate representation of the relationship within the population.

D. Discussions

1. The influence of principal leadership on teacher pedagogical competence

The regression analysis shows that school leadership significantly influences teachers' pedagogical competence in vocational high schools (SMK) in Indragiri Hilir Regency, with a significance value of 0.000 (<0.05). This supports the alternative hypothesis (H_a) and rejects the null hypothesis (H₀). These findings align with Arifin (2018), who found that participatory leadership enhances teachers' pedagogical skills by involving them in decision-making and providing support. Rahmawati (2018) also emphasized the role of structured academic supervision, where regular feedback from principals helps teachers improve instructional strategies. This study reinforces that effective leadership not only supports administrative functions but also strengthens teachers' pedagogical competence, ultimately improving the quality of learning. The influence of Merdeka Mengajar platform utilization on teacher pedagogical competence

The second hypothesis (H₂) test confirms that using the Merdeka Mengajar platform significantly influences teachers' pedagogical competence in vocational high schools (SMK) in Indragiri Hilir Regency,

with a significance value of 0.000 (<0.05). This supports the alternative hypothesis (H_a) and rejects the null hypothesis (H_0). These findings align with Sari et al. (2019), who found that digital education platforms positively impact teachers' pedagogical competence. They emphasize that easy access to diverse learning materials and innovative teaching methods enhances instructional effectiveness.

2. The influence of learning communities on teacher pedagogical competence

The third hypothesis (H_3) test confirms that learning communities significantly enhance teachers' pedagogical competence in SMK Indragiri Hilir ($p = 0.000 < 0.05$), supporting the alternative hypothesis (H_a). This aligns with Sari et al. (2019) and Fahmi & Susanti (2018), who found that collaboration in learning communities improves teaching strategies through shared experiences, discussions, and training. These communities provide vital professional support, helping teachers refine their instructional skills and enhance education quality.

3. The influence of principal leadership, Merdeka Mengajar platform utilization, and learning communities on teacher pedagogical competence

The analysis shows that school leadership, the Merdeka Mengajar platform, and learning communities significantly impact teachers' pedagogical competence in SMK Indragiri Hilir ($p = 0.000 < 0.05$), confirming their collective influence. These findings align with Prasetyo & Suryani (2018) on leadership's role in teacher development, Rahmawati (2018) on digital platforms enhancing instruction, and Utami & Syahrul (2018) on learning communities improving teaching. The synergy of leadership, technology, and collaboration strengthens teacher competence and education quality.

CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis and discussion, this study concludes that school leadership, the use of the Merdeka Mengajar Platform, and learning communities significantly influence teachers' pedagogical competence at vocational schools in Indragiri Hilir. The regression analysis produced the equation $\hat{Y} = 120.847 + 0.023X_1$, where the constant 120.847 indicates that when school leadership (X_1) is zero, teachers' pedagogical competence (Y) is 120.847. The regression coefficient of 0.023 suggests that each one-unit increase in school leadership increases pedagogical competence by 0.023 points. Although the coefficient is small, the effect is statistically significant, as indicated by a p-value of 0.000 (< 0.05). Thus, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_a) is accepted, confirming that school leadership significantly influences teachers' pedagogical competence.

For the second variable, the regression equation $\hat{Y} = 136.262 + 0.149X_2$ shows that when the use of the Merdeka Mengajar Platform (X_2) is zero, the predicted value of pedagogical competence (Y) is 136.262. The regression coefficient of 0.149 indicates that a one-unit increase in platform utilization leads to a 0.149-point increase in pedagogical competence. The significance value of 0.000 (< 0.05) confirms that the effect is statistically significant. Therefore, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_a) is accepted,

demonstrating that the Merdeka Mengajar Platform has a significant impact on teachers' pedagogical competence. The third regression equation, $\hat{Y} = 129.883 + 0.157X_3$, indicates that when learning community participation (X_3) is zero, the predicted pedagogical competence (Y) is 129.883. The regression coefficient of 0.157 suggests that a one-unit increase in learning community participation improves pedagogical competence by 0.157 points. The p-value of 0.000 (< 0.05) confirms a statistically significant effect. As a result, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_a) is accepted, indicating that learning communities significantly enhance teachers' pedagogical competence. Overall, these findings highlight the importance of school leadership, technology integration, and professional collaboration in improving teaching quality. The results provide valuable insights for education policymakers in enhancing teacher development programs and ensuring effective learning environments in vocational schools.

Based on the findings, several recommendations can be made to enhance educational effectiveness. Given that the regression coefficient for school leadership (X_1) is the lowest (0.023), strategic efforts should be directed toward improving leadership effectiveness. Principals need to strengthen communication, provide clear guidance, and foster innovation in teaching practices. Implementing leadership training and managerial development programs can further enhance their capacity to lead effectively. Additionally, teachers should maximize the potential of the Merdeka Mengajar Platform by utilizing its digital resources, adopting innovative teaching methods, and engaging in relevant online training. Active participation in learning communities is also crucial for professional development and continuous skill enhancement. Future research should consider incorporating additional variables, such as collaborative work culture and technological innovation, to provide a more comprehensive understanding of the factors influencing pedagogical competence. Expanding research to a broader geographical scope, such as the provincial or national level, and conducting qualitative studies would offer deeper insights into teachers' experiences with Merdeka Mengajar and their involvement in professional learning communities.

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