

Enhancing Vocational Graduate Employability: The Roles of Teachers' Pedagogical Competence and School-Industry Partnerships in Kendal Regency

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Abstract

Vocational education plays a strategic role in preparing graduates to meet labor market demands. However, despite the industrial potential of Kendal Regency, the employability of vocational high school graduates remains a challenge due to job mismatch, limited entrepreneurial opportunities, and difficulties in aligning educational outcomes with industry needs. This study examines the influence of teachers' pedagogical competence and school-industry partnerships on vocational high school graduate employability. A quantitative ex post facto correlational design was employed involving 216 teachers from public vocational high schools in Kendal Regency, Indonesia, selected through purposive sampling. Data were collected using structured questionnaires and analyzed using simple and multiple linear regression with IBM SPSS Statistics version 27. Prior to hypothesis testing, normality, linearity, heteroscedasticity, and multicollinearity tests were conducted. The findings revealed that teachers' pedagogical competence had a positive and significant effect on graduate employability ($R^2 = 0.363$, $p < 0.001$), while school-industry partnerships also showed a positive and significant effect ($R^2 = 0.169$, $p < 0.001$). Simultaneously, both variables significantly influenced graduate employability ($R = 0.617$; $R^2 = 0.381$; $F = 65.60$; $p < 0.001$), indicating that 38.1% of the variance in graduate employability was explained by the combined contribution of the two predictors. Teachers' pedagogical competence emerged as the stronger predictor. These findings suggest that strengthening teachers' pedagogical competence and enhancing sustainable school-industry partnerships are essential strategies for improving vocational graduate employability and supporting better alignment between vocational education and labor market needs.

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Introduction

Vocational education plays a strategic role in preparing a skilled workforce capable of meeting labor market demands and supporting economic development (Rosina et al., 2021; Permatasari et al., 2024). In Indonesia, Vocational High Schools (Sekolah Menengah Kejuruan/SMK) are designed to equip students with practical competencies aligned with industry needs (Mutzie Revalina et al., 2025; Fatimah et al., 2025). However, empirical evidence indicates a persistent mismatch between the competencies of vocational graduates and labor market expectations (Sekolah Menengah Kejuruan Negeri, 2022; Kholil & Harahap, 2023). This issue is reflected in the relatively high unemployment rate among vocational school graduates compared to other educational levels (Arik Harianto et al., 2025; Zhou et al., 2022). Statistical data in 2025 show that SMK graduates recorded the highest open unemployment rate among all educational levels, highlighting a critical gap between the objectives of vocational education and actual graduate employability outcomes (Bagus et al., 2025; Muharam &

Afrilia, 2024). This situation raises concerns regarding the effectiveness of vocational education systems in preparing graduates who are capable of successfully transitioning from school to work (Ramadhani et al., 2025; Putranto et al., 2024).

In the context of Kendal Regency, an emerging industrial region in Central Java, the potential for absorbing vocational graduates is relatively high due to the presence of manufacturing industries, agro-industries, and service sectors (Utomo et al., 2024). Nevertheless, graduate employability remains suboptimal. Although many graduates obtain employment, challenges such as job mismatch, extended waiting periods before employment, and limited opportunities for entrepreneurship or further study continue to persist. These conditions indicate that vocational education outcomes should not only be assessed by employment rates but also by the quality, relevance, and sustainability of employment outcomes. Therefore, understanding the factors that influence graduate employability has become an important concern for vocational education stakeholders.

Several factors have been identified as contributing to vocational graduate employability. One important internal factor is teachers' pedagogical competence (Hollenstein & Brühwiler, 2024; Arifin & Hanif, 2024; Handayani et al., 2025). Pedagogical competence refers to teachers' ability to design, implement, and evaluate learning processes that are responsive to students' needs and aligned with real-world contexts (Sulistiyarini et al., 2024; Kholil & Harahap, 2023). Within vocational education, pedagogical competence extends beyond classroom instruction to include contextual learning, industry-relevant practices, and the development of both technical and employability skills (Dharma, 2022; Huda, 2023). Consequently, teachers with strong pedagogical competence are expected to create learning environments that better prepare students for workplace demands. However, evidence suggests that gaps still exist between teachers' competencies and the requirements of industry-oriented learning, potentially limiting graduates' readiness for employment.

Another important factor influencing graduate employability is the quality of school–industry partnerships, commonly referred to as *Dunia Usaha, Dunia Industri, dan Dunia Kerja (DUDIKA)* (Rojaki, 2023; Nugraha & Kusumah, 2025). Effective partnerships are fundamental to the implementation of the link-and-match concept, which emphasizes alignment between educational outputs and labor market demands (Putranto et al., 2024). Through collaborative programs such as internships, teaching factories, curriculum synchronization, guest lectures, and graduate placement services, schools can provide students with meaningful exposure to industry practices (Bagus et al., 2025; Uswatun Kasanah et al., 2025). Nevertheless, maintaining sustainable and mutually beneficial partnerships remains a challenge in many vocational schools, including those located in industrial regions. Weak collaboration may reduce opportunities for students to acquire relevant workplace experiences and consequently affect graduate employability.

Previous studies have reported that teachers' pedagogical competence contributes significantly to learning quality and student achievement while school–industry partnerships play an important role in improving vocational relevance and employment outcomes (Siahaan et al., 2023; Darmanto et al., 2025; Abdul Rojak et al., 2024). However, most previous studies have examined these variables separately or have focused primarily on intermediate outcomes such as teacher performance, instructional quality, or student academic achievement. Studies directly investigating graduate employability as the ultimate outcome of vocational education remain relatively limited. Furthermore, empirical evidence concerning the combined influence of teachers' pedagogical

competence and school–industry partnerships on graduate employability, particularly within the context of public vocational high schools in regional industrial areas, is still scarce.

This limitation in the existing literature highlights an important research gap. Graduate employability is not merely determined by instructional quality or institutional collaboration independently, but may be influenced by the interaction between internal educational processes and external industry engagement. Therefore, examining the simultaneous contribution of teachers' pedagogical competence and school–industry partnerships provides a more comprehensive understanding of factors affecting vocational graduate employability.

Based on this gap, the novelty of the present study lies in its integrated examination of pedagogical competence and school–industry partnerships as predictors of vocational graduate employability within the specific context of Kendal Regency, an industrially developing region in Indonesia. By focusing on graduate employability rather than intermediate educational outcomes, this study contributes to the growing body of vocational education research and provides evidence-based recommendations for strengthening the alignment between vocational education and labor market needs. Therefore, this study aims to analyze the influence of teachers' pedagogical competence and school–industry partnerships (DUDIKA) on vocational high school graduate employability in Kendal Regency. Specifically, this study examines both the partial and simultaneous effects of these variables on graduate employability.

Method

This study employed a quantitative approach using an ex post facto correlational design to examine the influence of teachers' pedagogical competence and school–industry partnerships on vocational high school graduate employability. The ex post facto design was selected because the variables under investigation had naturally occurred and were not subject to experimental manipulation (Güngör & Geçikli, 2021; Client et al., 2021).

The study was conducted in seven public vocational high schools in Kendal Regency, Central Java, Indonesia. The research population consisted of 468 teachers. The sample comprised 216 teachers determined using the Slovin formula with a 5% margin of error. Proportional random sampling was used to determine the number of respondents from each school, while simple random sampling was employed to select individual participants.

Data were collected using a structured questionnaire measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Teachers' pedagogical competence (X_1) was measured using 36 items covering four dimensions: understanding learning foundations, instructional design, instructional implementation, and learning evaluation. School–industry partnerships (X_2) were measured using 36 items covering planning, organizing, actuating, and controlling dimensions of collaboration with DUDIKA. Graduate employability (Y) was measured through indicators related to employment outcomes, including employment status, job relevance, waiting period before employment, continuation to higher education, and entrepreneurship.

Prior to data collection, the instrument was piloted with 30 respondents outside the research sample. Item validity was assessed using Pearson Product Moment correlation, while reliability was evaluated using Cronbach's Alpha coefficient. Only valid and reliable items were retained for the final questionnaire. Data were collected through direct questionnaire distribution to participating teachers. Data analysis was performed using IBM SPSS Statistics version 27. Descriptive statistics

were used to summarize the characteristics of each variable. Prior to hypothesis testing, normality, linearity, heteroscedasticity, and multicollinearity tests were conducted. Simple linear regression was used to examine the partial effects of teachers' pedagogical competence and school–industry partnerships on graduate employability, while multiple linear regression was employed to analyze their simultaneous effects. Statistical significance was determined at the 0.05 level.

Result and Discussion

Data Description

The descriptive analysis was conducted on data collected from 216 teachers from public vocational high schools in Kendal Regency using IBM SPSS Statistics version 27. This study examined three variables: teacher's pedagogical competence (X_1), school–industry partnerships (X_2), and vocational graduate employability (Y). The results showed that vocational graduate employability was generally categorized as good, with a mean score of 147.83, indicating that graduates demonstrate relatively favorable employability outcomes, although improvement is still needed to increase the proportion of graduates in the very good category. Teacher's pedagogical competence was categorized as high, with a mean score of 162.49, a median of 163.00, and a standard deviation of 8.441, suggesting that respondents generally perceived teacher's pedagogical competence to be well developed and relatively consistent across schools. Similarly, school–industry partnerships were also categorized as high, with a mean score of 160.85, a median of 162.00, and a standard deviation of 8.843, indicating that collaboration between schools and industry is generally well established, although variations in partnership quality remain across institutions. Overall, the descriptive findings indicate that both independent variables are in favorable categories and may contribute positively to improving vocational graduate employability in Kendal Regency.

Results of Dimension Testing

The dimension testing results using Principal Component Analysis (PCA) indicate that all research variables demonstrate acceptable contributions from their respective dimensions, although with varying levels of strength. For vocational graduate employability (Y), most dimensions show high communalities, indicating strong contributions to the overall construct. The highest contribution is found in the finance, real estate, and business services dimension (0.906), while the lowest is in the continuation to further education dimension (0.422), suggesting a comparatively weaker relationship with the overall employability construct. For teacher's pedagogical competence (X_1), all dimensions demonstrate strong contributions, with instructional implementation showing the highest contribution (0.968), indicating its central role in shaping pedagogical competence, while instructional design shows the lowest contribution (0.886), although it remains within a strong category. For school–industry partnerships (X_2), all dimensions contribute moderately to strongly, with the planning dimension showing the highest contribution (0.834), indicating its importance in partnership effectiveness, while the controlling dimension has the lowest contribution (0.640), suggesting a relatively weaker contribution compared to other dimensions. Overall, these findings confirm that all dimensions are valid contributors to their respective constructs, with some dimensions playing more dominant roles in explaining the variables under study.

Prerequisite Test Results

The prerequisite test results indicate that the data met all assumptions required for multiple linear regression analysis. The normality test using the Kolmogorov–Smirnov method showed a significance value of 0.200 (> 0.05), indicating that the residual data were normally distributed. The linearity test results confirmed that both independent variables had a linear relationship with the dependent variable. The heteroscedasticity test using the Glejser method indicated no heteroscedasticity problem, as the significance values for teacher’s pedagogical competence (X_1) and school–industry partnerships (X_2) were 0.056 and 0.330, respectively, both exceeding 0.05. Furthermore, the multicollinearity test showed that the independent variables met the required criteria, with a tolerance value of 0.763 (> 0.10) and a Variance Inflation Factor (VIF) value of 1.311 (< 10), indicating the absence of multicollinearity. Overall, these findings confirm that the regression model was statistically appropriate, free from assumption violations, and suitable for further hypothesis testing.

Hypothesis Testing

The Effect of Teacher’s Pedagogical Competence (X_1) on the Employment Absorption Rate of Vocational High School Graduates (Y)

The first hypothesis examines the effect of teacher’s pedagogical competence (X_1) on the employment absorption rate of public vocational high school graduates in Kendal Regency (Y). The results of the simple regression analysis using SPSS are presented in the following tables.

Table 1. Correlation between Teacher’s Pedagogical Competence (X_1) and Vocational High School (SMK) Graduate Employability (Y)

	Teacher’s Pedagogical Competence	Employment Absorption Rate
Pearson Correlation (Teacher’s Pedagogical Competence)	1	0,603**
Sig. (2-tailed)		0,000
N	216	216

Source: Processed data, 2026.

Based on Table 1, the correlation between teacher’s pedagogical competence and the employment absorption rate is positive, with a Pearson correlation coefficient (r) of 0.603. This indicates a strong relationship, referring to Sugiyono (2020: 184), which classifies correlation coefficients between 0.60–0.799 as strong. Thus, teacher’s pedagogical competence is strongly associated with the employment absorption rate of vocational high school graduates.

Table 2. Regression Coefficients of Teacher’s Pedagogical Competence (X_1) on Vocational High School (SMK) Graduate Employability (Y)

Model	B	Std. Error	Beta	t	Sig.
(Constant)	78,614	9,651		8,145	0,000
Teacher’s Pedagogical Competence	0,426	0,059	0,467	7,215	0,000

a. Dependent Variable: Vocational High School (SMK) Graduate Employability

Source: Processed data, 2026.

Table 2 presents the regression results. The constant value is 78.614, and the regression coefficient is 0.426. The regression equation can be written as $\hat{Y} = 78.614 + 0.426X_1$. This indicates that a one-

unit increase in teacher's pedagogical competence leads to an increase of 0.426 in the employment absorption rate. The t-test shows that $t_{count} = 7.215 > t_{table} = 1.652$, with a significance value of $0.000 < 0.05$. Therefore, teacher's pedagogical competence has a significant partial effect on the employment absorption rate.

Table 3. ANOVA Results: Teacher's Pedagogical Competence (X1) on Vocational High School (SMK) Graduate Employability (Y)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	4648,790	1	4648,790	52,061	0,000
Residual	8155,872	214	38,111		
Total	12804,662	215			

a. Dependent Variable: Vocational High School (SMK) Graduate Employability

b. Predictors: (Constant), Teacher's Pedagogical Competence

Source: Processed data, 2026.

Furthermore, Table 3 shows the ANOVA results, where $F_{count} = 52.061$ and $F_{table} = 3.84$ ($df_1 = 1$; $df_2 = 214$; $\alpha = 0.05$). Since $F_{count} > F_{table}$ ($52.061 > 3.84$) and the significance value is $0.000 < 0.05$, H_0 is rejected and H_a is accepted. This means that Hypothesis 1 is supported: teacher's pedagogical competence significantly affects the employment absorption rate of vocational high school graduates in Kendal Regency.

Table 4. Model Summary and R Square Results: Teacher's Pedagogical Competence (X1) on Vocational High School (SMK) Graduate Employability (Y)

Model	R	R Square	Adjusted R Square	Std. Error
1	0,603	0,363	0,360	6,174

a. Predictors: (Constant), Teacher's Pedagogical Competence

Source: Processed data, 2026.

Table 4 reports an R Square value of 0.363, indicating that teacher's pedagogical competence contributes 36.3% to the employment absorption rate, while the remaining 63.7% is influenced by other factors outside this study. The correlation coefficient ($r = 0.603$) further confirms a strong relationship between the two variables. In conclusion, teacher's pedagogical competence has a strong and significant effect on the employment absorption rate of vocational high school graduates.

The Effect of School Partnerships with Industry (DUDIKA) (X2) on the Employment Absorption Rate of Vocational High School Graduates (Y)

The second hypothesis examines the effect of school partnerships with industry (DUDIKA) (X2) on the employment absorption rate of public vocational high school graduates in Kendal Regency (Y). The results of the simple regression analysis using SPSS are presented in the following tables.

Table 5. Correlation X2 and Y

	Partnership with DUDIKA	Employment Rate of Vocational High School Graduates
Pearson Correlation (Kemitraan dengan DUDIKA)	1	0,411**
Sig. (2-tailed)		0,000
N	216	216

*Correlation is significant at the 0.01 level (2-tailed)

Source: Processed data, 2026

Based on Table 5, the correlation between school–industry partnerships and the employment absorption rate is positive, with a Pearson correlation coefficient (r) of 0.411. This indicates a moderate relationship, referring to Sugiyono (2020: 184), which classifies correlation coefficients between 0.40–0.599 as moderate. Therefore, school partnerships with DUDIKA have a moderate association with the employment absorption rate of vocational high school graduates.

Table 6. Regression Coefficients of X_2 on Y

Model	B	Std. Error	Beta	t	Sig.
(Constant)	106,841	9,882		10,811	0,000
School-Industry Partnership	0,256	0,061	0,302	4,209	0,000

a. Dependent Variable: Vocational High School (SMK) Graduate Employability

Source: Processed data, 2026.

Table 6 presents the regression results. The constant value is 106.841, and the regression coefficient is 0.256. The regression equation can be expressed as:

$$\hat{Y} = 106.841 + 0.256X_2$$

This indicates that a one-unit increase in school–industry partnerships leads to an increase of 0.256 in the employment absorption rate. The t-test shows that $t_{\text{count}} = 4.209 > t_{\text{table}} = 1.652$, with a significance value of $0.000 < 0.05$. Thus, school partnerships with DUDIKA have a significant partial effect on the employment absorption rate.

Table 7. ANOVA Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	2162,792	1	2162,792	17,715	0,000
Residual	10641,870	214	49,728		
Total	12804,662	215			

a. Dependent Variable: Vocational High School (SMK) Graduate Employability

b. Predictors: (Constant), School-Industry Partnership

Source: Processed data, 2026

Furthermore, Table 7 shows the ANOVA results, where $F_{\text{count}} = 17.715$ and $F_{\text{table}} = 3.84$ ($df_1 = 1$; $df_2 = 214$; $\alpha = 0.05$). Since $F_{\text{count}} > F_{\text{table}}$ ($17.715 > 3.84$) and the significance value is $0.000 < 0.05$, H_0 is rejected and H_a is accepted. This means that Hypothesis 2 is supported: school partnerships with DUDIKA significantly affect the employment absorption rate of vocational high school graduates in Kendal Regency.

Table 8. Model Summary and R Square Results

Model	R	R Square	Adjusted R Square	Std. Error
1	0,411	0,169	0,165	7,051

a. Predictors: (Constant), School-Industry Partnership

Source: Processed data, 2026.

Table 8 reports an R Square value of 0.169, indicating that school–industry partnerships contribute 16.9% to the employment absorption rate, while the remaining 83.1% is influenced by

other factors outside this study. The correlation coefficient ($r = 0.411$) further confirms a moderate relationship between the two variables. In conclusion, school partnerships with DUDIKA have a moderate but significant effect on the employment absorption rate of vocational high school graduates.

The Simultaneous Effect of Teacher's Pedagogical Competence (X_1) and School-Industry Partnerships (X_2) on Vocational High School Graduate Employability (Y)

To examine the simultaneous effect of teachers' pedagogical competence and school-industry partnerships on graduate employability, a multiple linear regression analysis was conducted. The results are presented in Table 9.

Table 9. Multiple Regression Analysis Predicting Graduate Employability

Predictor	B	SE	β	t	p
Constant	47.838	9.050	—	5.286	< 0.001
Teachers' Pedagogical Competence	0.482	0.056	0.527	8.547	< 0.001
School-Industry Partnerships	0.134	0.054	0.154	2.497	0.013

Table 10. Model Summary

R	R ²	Adjusted R ²	F	p
0.617	0.381	0.375	65.598	< 0.001

As shown in Table X, the multiple regression model was statistically significant, $F(2, 213) = 65.598$, $p < 0.001$. The model yielded a correlation coefficient (R) of 0.617 and a coefficient of determination (R²) of 0.381, indicating that 38.1% of the variance in graduate employability was explained by the combined contribution of teachers' pedagogical competence and school-industry partnerships. The adjusted R² value of 0.375 suggests that the explanatory power of the model remained stable after accounting for the number of predictors included in the analysis. The regression equation obtained from the analysis was:

$$\hat{Y} = 47.838 + 0.482X_1 + 0.134X_2$$

This equation indicates that an increase of one unit in teachers' pedagogical competence is associated with an increase of 0.482 units in graduate employability, while an increase of one unit in school-industry partnerships is associated with an increase of 0.134 units in graduate employability, assuming other variables remain constant.

The findings demonstrate that teachers' pedagogical competence and school-industry partnerships jointly contribute to improving vocational high school graduate employability. These results suggest that graduate employability is influenced by both internal educational processes and external institutional support. While pedagogical competence reflects the quality of instructional practices within schools, school-industry partnerships represent the extent to which educational programs are aligned with workplace requirements and labor market expectations.

The significant simultaneous effect observed in this study supports the view that vocational education outcomes are shaped by the interaction between learning quality and industry relevance. Teachers with strong pedagogical competence are more capable of designing effective learning experiences, facilitating competency development, and creating learning environments that support students' readiness for employment. At the same time, effective school-industry partnerships provide students with opportunities to gain authentic workplace experience through internships, curriculum synchronization, teaching factory programs, industrial visits, guest teaching activities,

and graduate placement services. Together, these factors contribute to the development of technical competencies, soft skills, and work readiness that are essential for employability.

An important finding of this study is that teachers' pedagogical competence emerged as the strongest predictor of graduate employability, as reflected by its standardized coefficient ($\beta = 0.527$), which was substantially higher than that of school–industry partnerships ($\beta = 0.154$). This result suggests that instructional quality exerts a more direct influence on graduate employability than institutional collaboration alone. One possible explanation is that students interact with teachers continuously throughout the educational process, whereas industry partnership activities tend to occur periodically and within specific programs. Consequently, pedagogical competence has a more sustained impact on students' competency development, problem-solving abilities, learning motivation, and career readiness.

Nevertheless, the significant contribution of school–industry partnerships confirms the importance of implementing the link-and-match principle in vocational education. Strong collaboration between schools and DUDIKA enables educational institutions to better understand labor market demands and adapt learning programs accordingly. Through industry engagement, students gain exposure to workplace culture, professional standards, and current technological developments, thereby reducing the gap between educational outcomes and employer expectations.

The results of this study indicate that improving graduate employability requires a comprehensive strategy that integrates both pedagogical excellence and strong industry collaboration. Efforts focused solely on strengthening partnerships without improving instructional quality may limit the effectiveness of vocational education programs. Likewise, effective teaching alone may not fully prepare students for labor market demands if learning experiences are not supported by meaningful industry engagement. Therefore, vocational schools should simultaneously invest in continuous teacher professional development and sustainable school–industry partnerships to maximize graduate employability outcomes.

These findings contribute to the existing literature by demonstrating that graduate employability is influenced not only by educational quality or industry collaboration independently but also by their combined effect. The study provides empirical evidence that strengthening teachers' pedagogical competence and expanding school–industry partnerships should be considered complementary strategies for enhancing vocational graduate employability and supporting the successful transition of graduates into the labor market.

Discussion

This study demonstrates that teacher's pedagogical competence and school–industry partnerships significantly contribute to the employability of vocational high school graduates in Kendal Regency, both individually and simultaneously. These findings reinforce the view that vocational graduate employability is not determined by a single institutional factor, but rather by the interaction between internal educational quality and external collaboration with industry (Yulianti & Raharja, 2025). The stronger contribution of teacher's pedagogical competence compared to school–industry partnerships suggests that employability begins with effective instructional processes, while institutional partnerships function as complementary mechanisms that strengthen labor market readiness.

The present findings are consistent with previous research emphasizing the central role of pedagogical competence in improving educational quality and student outcomes (Supiyanti et al.,

2024). Studies have consistently shown that teacher's pedagogical competence influences not only classroom effectiveness but also broader learning achievements, competency development, and student preparedness for real-world challenges (Supardi U.S. & Henhen Herdiana, 2024). In vocational education contexts, this relationship becomes particularly significant because employability depends heavily on whether learning experiences successfully translate theoretical knowledge into practical and applicable competencies (Jakarta Timur et al., 2021). The positive effect identified in this study supports the argument that pedagogical competence functions as a bridging mechanism between academic instruction and labor market expectations.

The mechanism underlying this relationship lies in teacher's ability to design contextualized learning, implement competency-based instructional strategies, and evaluate student development in ways that align with vocational demands (Rasman et al., 2022). In employment-oriented education, pedagogically competent teachers do not merely transmit information; they create structured learning experiences that develop technical capability, problem-solving skills, adaptability, and workplace-oriented attitudes. This explains why teacher's pedagogical competence emerged as the stronger predictor in the regression model. The findings suggest that improving vocational employability requires strengthening classroom instructional quality as a strategic foundation, rather than focusing exclusively on institutional policy or external collaboration.

The significant contribution of school–industry partnerships also supports existing scholarship on the link and match paradigm in vocational education. Prior studies have emphasized that collaboration between schools and industry improves curriculum relevance, facilitates workplace exposure, and reduces competency mismatches between graduates and employer expectations (Maulina & Yoenanto, 2022). The present study confirms this relationship by demonstrating that partnerships with Dunia Usaha, Dunia Industri, dan Dunia Kerja (DUDIKA) positively influence graduate employability (Fitriani & Jaelani, 2026). Through internships, teaching factories, curriculum synchronization, guest instruction, and recruitment facilitation, such partnerships provide students with authentic exposure to workplace environments that cannot be fully replicated within classrooms (Shafariah & Gofur, 2025).

However, the relatively smaller contribution of school–industry partnerships compared to pedagogical competence offers an important theoretical insight. While industry collaboration remains important, its effectiveness appears to depend partly on the school's internal instructional capacity. External partnerships alone may not guarantee improved employability unless supported by effective teaching practices that prepare students to meaningfully engage with workplace learning opportunities. This finding challenges simplistic assumptions that industry collaboration automatically translates into employability gains, suggesting instead that external engagement must be integrated with strong pedagogical systems.

The simultaneous effect of both independent variables further highlights that graduate employability should be understood as a multidimensional educational outcome shaped by interconnected internal and external mechanisms. Teacher's pedagogical competence contributes to the development of knowledge, skills, and adaptive learning capacity, while school–industry partnerships provide experiential validation and labor market alignment. Their combined influence indicates that workforce readiness emerges not from isolated interventions, but from systemic integration between instructional quality and institutional collaboration.

The unexplained variance in the regression model also suggests that employability remains influenced by broader factors beyond the scope of this study, including student motivation, technical specialization, soft skills, labor market dynamics, economic conditions, institutional infrastructure, and career guidance services (Darmanto et al., 2025). This reinforces the understanding that graduate employability is not solely an educational construct, but also a socio-economic phenomenon shaped by both educational processes and external labor market realities.

This study contributes to vocational education research in several important ways. First, it provides empirical evidence that integrates pedagogical competence and school–industry partnerships within a single explanatory model of graduate employability, offering a more focused perspective on vocational workforce readiness. Second, it highlights the stronger role of instructional quality relative to external collaboration, which provides practical insight for institutional improvement strategies. Third, the findings contribute to the growing discourse on vocational education effectiveness in emerging industrial regions, particularly within the Indonesian context where alignment between vocational education and labor market needs remains a critical policy concern.

Several practical implications emerge from these findings. For vocational school leaders, strengthening teacher professional development should become a strategic priority, particularly in contextual pedagogy, competency-based learning, and industry-oriented instructional design. For policymakers, partnership programs with industry should be designed not merely as formal collaborations, but as sustainable and operational learning ecosystems that actively enhance graduate readiness. For industry stakeholders, meaningful engagement with vocational schools should extend beyond recruitment toward active participation in curriculum development, workplace training, and competency validation.

This study has several limitations that should be considered when interpreting the findings. First, the measurement of graduate employability was based on teachers' perceptions rather than objective graduate outcomes obtained through tracer studies, employer evaluations, or employment records. Consequently, the findings reflect perceived employability conditions and should not be interpreted as direct evidence of actual labor market outcomes. Second, the study was conducted exclusively in public vocational high schools within Kendal Regency, Indonesia. Therefore, the results may be influenced by local educational, economic, and industrial characteristics and may not be directly generalizable to other regions or institutional contexts. Third, the regression model explained 38.1% of the variance in graduate employability, indicating that a substantial proportion of employability-related outcomes may be influenced by other factors not included in this study, such as technical competencies, employability skills, student motivation, labor market conditions, career guidance services, and socioeconomic background. Accordingly, the findings should be interpreted as evidence of perceived relationships among the variables rather than definitive causal explanations of graduate employability outcomes.

Future research should expand the analytical model by incorporating additional determinants such as technical competency, student motivation, employability skills, institutional resources, and labor market conditions. Comparative studies across regions, institutional types, and stakeholder groups would also provide a broader understanding of vocational graduate employability in diverse contexts.

Overall, this study suggests that, based on teachers' perceptions, pedagogical competence and school–industry partnerships are associated with more favorable graduate employability outcomes. However, these findings should be interpreted cautiously because they reflect perceived employability rather than objective employment outcomes derived from tracer studies or employer assessments. In rapidly changing labor market environments, vocational education institutions must move beyond isolated interventions toward systemic models that connect classroom learning with workforce realities.

Conclusion

This study found that, based on teachers' perceptions, teachers' pedagogical competence and school–industry partnerships are positively associated with vocational high school graduate employability in Kendal Regency. Both variables demonstrated significant individual and simultaneous relationships with perceived graduate employability, with teachers' pedagogical competence showing a stronger association than school–industry partnerships. These findings suggest that employability-related outcomes in vocational education may be influenced by both internal educational processes and external institutional collaboration. The study contributes to the vocational education literature by integrating pedagogical competence and school–industry partnerships within a single analytical framework, thereby providing a more focused understanding of factors associated with perceived graduate employability. The findings further indicate that strengthening instructional quality and maintaining meaningful collaboration with DUDIKA may support vocational education programs in responding to labor market expectations. Consequently, the study highlights the potential importance of balancing educational quality and industry engagement within vocational education settings.

However, the findings should be interpreted cautiously because the study relied on teacher-reported perceptions rather than objective employability indicators obtained through tracer studies, employer evaluations, or actual employment records. Therefore, the results reflect perceived employability conditions and should not be generalized as direct evidence that pedagogical competence and school–industry partnerships improve actual graduate employment outcomes. In addition, the study was conducted exclusively in public vocational high schools within Kendal Regency, which may limit the generalizability of the findings to other educational and regional contexts. The regression model also explained only part of the variation in perceived graduate employability, suggesting that other factors such as technical competence, employability skills, student motivation, labor market conditions, institutional resources, and socioeconomic background may also play important roles. Future research is therefore recommended to incorporate multiple stakeholder perspectives, including graduates and employers, and to utilize objective employability measures across broader geographical settings in order to provide a more comprehensive understanding of vocational graduate employability.

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