



The Contribution of Principal's Managerial Competence and Teacher Performance to the Quality of Vocational Education in Mataram City

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ARTICLE INFO	ABSTRACT
Received April 13, 2026 Accepted June 27, 2026 Published June 30, 2026 Keywords: Principal Managerial Competence; Teacher Performance; Education Quality; Vocational Education; Mixed Methods	<i>This study goals to determine the extent to which the managerial competence of school principals and teacher performance influence the quality of education at State Vocational High Schools (SMKN) in Mataram City. This study applies a mixed methods approach with an explanatory sequential design involving 562 teachers from seven vocational high schools in Mataram City, with 85 teachers selected through purposive sampling. Data were acquired through questionnaires, observations, interviews, and documentation. The results indicate that principal managerial competence has a significant but small contribution on education quality, as shown by a significance value of 0.037 (< 0.05) and an effect size of 0.052. In contrast, teacher performance demonstrates a significant and moderate contribution, with a significance value of 0.000 (< 0.05) and an effect size of 0.266. Moreover, both variables simultaneously show a strong and significant contribution to education quality, supported by an F-test significance of 0.000 (< 0.05) and a combined effect size of 0.417, indicating a moderate contribution.</i>
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INTRODUCTION

Vocational education is an important instrument in shaping a professional workforce with technical skills and strong character. Vocational high schools are expected to acquire obtains that qualify for career. This effort requires efficient education management that is oriented towards continuous quality improvement.

Ningsih et al. (2021) stated that the principal, as an educational leader, plays a very important role in supporting teachers and students. Strong managerial competence provides direction for the planning, implementation, and evaluation of programs that support the

improvement of learning quality. As a manager at the school level, the principal should have the initiative to make plans or apply management principles in the implementation of learning in all situations, including during a pandemic. Teachers, as the implementers of education, are a dominant factor in achieving optimal learning outcomes through their dedication and professionalism. Husniati et al. (2022) stated that teacher performance can be observed when teachers carry out the learning process in the classroom, including their preparation in the form of semester programs and lesson planning. Teacher performance plays a strategic role in determining the quality of education in schools. Dewi et al. (2025) stated that the alignment between principals' leadership and teacher performance serves as a key foundation for building effective and high-performing educational institutions. The issue of leadership here is focused on the leader's ability to engage and foster the participation of members in order to achieve organizational goals (Jaelani et al., 2024).

Rudiatna (2022) explains that managerial derives from the term manager, referring to an individual who leads, plans, and organizes activities. In essence, a manager is responsible for directing, coordinating, and managing group efforts to secure targets capably and streamlined. In the educational context, the principal's managerial competence is crucial in organizing the school, formulating plans, and determining strategic directions to achieve shared goals within the school community (Tanjung et al., 2021).

Jaelani et al. (2022) describe performance as work achievement, implementation, results, or demonstrated output. Nugraha (2020) defines teacher performance as the magnitude of attainment in enacting educational mandates in line with assigned commitments, authority, and established standards within a specific period to achieve educational goals. Furthermore, performance refers to the quality and quantity of outcomes produced by an individual in fulfilling their responsibilities (Ananda, 2024; Ashlan et al., 2022).

Herlina et al. (2021) define attribute as the capacity of a assistance to gather user Requisites. In education, this concept extends beyond academic outcomes to include service standards, learning processes, and the institution's ability to satisfy stakeholders such as students, teachers, and the community. Meanwhile, Sallis, as cited in Purnomo & Maksum (2020), describes Total Quality Management (TQM) as a continuous improvement philosophy that equips educational organizations with practical tools to fulfill current and future stakeholder expectations. Mustari (2023) states that ideal education quality is characterized by high moral values among students, graduation rates, student competence, sufficient numbers of professional educators and educational staff who are able to adapt to the times, high school accreditation levels, as well as other factors such as a clear and implementable school vision and mission, curriculum, and fulfillment of the other eight national education standards. The concept of TQM in education involves the application of managerial principles that focus on process improvement, performance measurement, and individual empowerment to achieve optimal results (Indadihayati & Hariyanto, 2023).

The reality in the field shows that some public vocational schools in Mataram City have not fully optimized the managerial functions of the principal. Some principals still focus on routine administration without paying attention to the strategic aspects of educational quality development. Vertical communication between leaders and teachers has not been fully effective in building work collaboration. As a result, the learning process does not fully reflect the expected quality standards.

Initial observations at seven public vocational schools in Mataram City reveal a clear gap between expectations for educational quality and managerial practices in the field. Some

principals still focus on administrative matters without emphasizing strategic planning and continuous quality control. This situation has resulted in weak coordination and poor communication between administrators and teachers. As a result, the implementation of education quality improvement programs has not reflected consistent performance in every educational unit.

The fact shows that the implementation of principals' managerial competencies is not yet fully in line with the ideal concept. Many principals still focus on routine management without strengthening their strategic leadership functions. Teacher performance also does not fully reflect professional standards due to weak coaching and continuous supervision. Ananta et al. (2026) stated that optimal teacher performance is influenced by various factors, both internal and external, including work experience, technical skills, educational level, the leadership style of the principal, work motivation, and job satisfaction. Mudena et al. (2017) stated that teacher performance can be observed and measured based on the competency specifications that must be possessed by teachers. This gap between expectations and reality creates a disparity that impacts the quality of education. This disparity shows that the quality of education is not yet fully supported by strong managerial leadership and optimal teacher performance. Previous studies tend to examine the variables of leadership or teacher performance separately. Studies on the simultaneous contribution of both are still limited.

Several studies have identified a strong association among headmaster, teacher performance, and education quality. Research by Piranggada et al. (2025) shows that principals' managerial functions significantly enhance school effectiveness by fostering a collaborative work culture. Meanwhile, Herros (2025) highlights that teacher performance is shaped by principal support through motivation, supervision, and career development. Maulidin & Lukitasari (2024) found that schools with integrated quality management systems showed simultaneous improvements in academic and non-academic achievements. Fadillah (2024) highlights the importance of principals' ability to manage change and innovation, while Karyatin et al. (2024) emphasize the limitations of quantitative approaches in explaining the contextual and psychological factors behind principals' managerial behavior. Dewi et al. (2025) prove that the mandate of the headmaster influences a positive work culture in vocational high school environments. Nasar and Majir (2022) assert that the principal's interpersonal skills increase teacher loyalty and work enthusiasm. These findings provide a strong empirical basis that managerial skills and teacher performance have a real contribution to upgrading the level of education.

Previous studies indicate that principals' managerial competence shapes the efficacy of school management and overall achievement. Principals with strong managerial skills can foster a positive work climate and establish well-organized systems. These outcomes highlight the strategic implication of managerial leadership in refining education quality. However, many studies still examine these factors in isolation. The new insight of this study lies in its integrated inquiry of the contributions of principals' managerial competence and teacher performance to education quality. It examines not only the individual effects of each variable but also their combined influence. This approach offers a more comprehensive view of the key factors shaping education quality, providing both theoretical and practical contributions.

Furthermore, the quality of education at SMK Negeri Kota Mataram needs to be improved in line with national policies on vocational education revitalization. Global challenges require schools to produce graduates with strong character, skills, and high

competitiveness. Rapid changes in the industrial world pressure educational institutions to adapt to future workforce needs. The quality of principal management and teacher performance are determining factors in the success of this transformation.

This topic was selected due to the urgent need to improve education quality, which depends on effective school leadership and strong teacher performance. Principal managerial competence plays a key role in shaping policy direction and managing resources efficiently, while teacher performance directly influences the learning process and student outcomes. The interaction between these two factors forms a fundamental basis for achieving quality education.

The findings of this study are predicted to facilitate as a foundation for developing strategies to enhance principals' managerial competence. Insights on teacher performance can guide the design of ongoing professional development programs. Together, these results offer a comprehensive perspective on efforts to improve education quality, positioning the research as a practical instrument for strengthening the education system. Based on this urgency, the study aims to examine the influence of principal managerial competence on the quality of vocational education in Mataram City, assess the effect of teacher performance on education quality, and analyze the combined impact of both variables on the quality of vocational education in Mataram City.

METHOD

This study used a mixed-method and using an explanatory sequential design to obtain a thorough and integrated understanding of causal relationships or correlations identified in the quantitative phase and strengthened through qualitative findings.

The study involved a population of 562 teachers from seven vocational high schools in Mataram City, with a sample of 85 teachers picked using purposive sampling. Data were retrieved via questionnaires, observation, interviews, and documentation. The questionnaires were designed to measure the contribution of principal managerial competence and teacher performance to education quality in a structured and comprehensive way. In addition, non-participant observation was conducted directly in the school environment, where the researcher acted solely as an observer without engaging in the observed activities. Data collection through semi-structured interviews was undertaken directly with principals and some teachers at vocational high schools in Mataram City. Documentation was carried out by collecting various official documents.

RESULT AND DISCUSSION

Principal's Managerial Competence

Table 1. Descriptive Analysis of the Principal's Managerial Competence

Statistics		
X1		
N	Valid	85
	Missing	0
Mean		90.01
Median		90.00
Mode		100
Std. Deviation		8.204

Range	30
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The descriptive data of the principal's managerial competence questionnaire showed 85 valid respondents without missing data, indicating that the quality of the research data collection was consistently maintained. The mean score of 90.01 was very close to the median of 90.00, indicating a stable score distribution within the high competence category based on respondents' perceptions. The mode of 100 demonstrated that the highest frequency was at the maximum score, reflecting strong appreciation of the school leader's conceptual, technical, and interpersonal abilities. The standard deviation of 8.204 and the range of 30 indicated moderate variation in responses, reflecting differences in teachers' professional experiences in assessing the effectiveness of the managerial practices implemented.

Teacher Performance

Table 2. Descriptive Analysis of Teacher Performance

Statistics		
X2		
N	Valid	85
	Missing	0
Mean		88.82
Median		89.00
Mode		100
Std. Deviation		8.033
Range		28

The descriptive data of the teacher performance questionnaire showed 85 valid respondents without missing data, reflecting the consistency of the overall research data collection process. The mean score of 88.82 was close to the median of 89.00, indicating a relatively balanced distribution of scores within the high-performance category. The mode of 100 indicated that the highest frequency was at the maximum score, reflecting very positive perceptions of the implementation of professional duties. The standard deviation of 8.033 and the range of 28 showed moderate variation in responses, indicating differences in performance intensity based on teaching experience, pedagogical competence, and the professional commitment of each teacher.

Education Quality

Table 3. Descriptive Analysis of Education Quality

Statistics		
Y		
N	Valid	85
	Missing	0
Mean		87.98
Median		88.00
Mode		80
Std. Deviation		7.832
Range		36

Based on the descriptive data of the education quality questionnaire, the number of valid respondents was 85 without missing data, reflecting the completeness of the research instrument responses. The mean score of 87.98 was very close to the median of 88.00, indicating a relatively symmetrical distribution of scores at a high level of quality perception. The mode of 80 showed a dominant tendency of responses within the good assessment category, while the standard deviation of 7.832 indicated moderate variation in responses among participants. The score range of 36 demonstrated a fairly wide difference in assessments, reflecting the heterogeneity of perceptions regarding educational quality based on professional experience, performance expectations, and the level of understanding of national education standard indicators.

Partial Test (t-test)

Table 4. t-test of the Effect of Principal's Managerial Competence and Teacher Performance on Education Quality

Coefficients^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	18.058	6.561		2.752	.007
	X1	.216	.102	.227	2.121	.037
	X2	.568	.104	.582	5.452	<.001

The results indicate that a t-value of 2.121 and a significance level of $0.037 < 0.05$, confirming that the proposed hypothesis is accepted. In addition, teacher performance demonstrates a much stronger influence, with a t-value of 5.452 and a significance level of $0.000 < 0.05$, indicating a strongly significant relation and reinforcing the corresponding hypothesis.

Simultan Test (F-test)

Table 5. F Test of the Effect of Principal's Managerial Competence and Teacher Performance on Education Quality

ANOVA^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3030.925	2	1515.462	58.588	<.001 ^b
	Residual	2121.029	82	25.866		
	Total	5151.953	84			

The table establish a significance value of 0.000, which is below 0.05, revealing that the F-test is valid. This result confirms that principal managerial competence and teacher performance jointly have a meaningful impact on the quality of vocational education in Mataram City.

Multiple Regression Equation

The multiple regression analysis produces the equation $Y = 18.058 + 0.216X_1 + 0.568X_2$, which reflects the meaningful role of both principal managerial competence and teacher performance in shaping education quality. The positive coefficients for each independent variable indicate a direct and aligned effect on the dependent variable.

Effect Size of Principal's Managerial Competence on Education Quality

An effect size of 0.052 reflects the practical impact of the principal's managerial competence on education quality. According to Cohen's classification, this value is categorized as a small effect, suggesting that managerial competence alone provides only a limited explanation of variations in education quality. Although statistically significant, its real contribution to improving vocational education quality in Mataram City.

Effect Size of Teacher Performance on Education Quality

An effect size of 0.266 reflects the practical impact of teacher performance on education quality. This value is classified as a moderate effect, indicating that teacher performance influences a meaningful duties in explaining variations in education quality. These results affirm that enhancing teacher performance supports to improving the quality of vocational education in Mataram

Effect Size of Principal's Managerial Competence and Teacher Performance on Education Quality

An effect size of 0.417 represents the combined practical outcome of principal managerial competence and teacher performance on education quality. According to Cohen's criteria, this value is categorized as a moderate effect, indicating that both variables jointly provide a substantial contribution. This result confirms that improvements in vocational education quality in Mataram City.

The Influence of Principal's Managerial Competence on the Quality of Vocational Education in Mataram City

The partial t-test results show a t-value of 2.121 with a significance level of 0.037 (< 0.05), indicating that the principal's managerial competence has a statistically significant outcome on education quality. This statistical significance shows that the influence did not occur by chance, but rather is a relationship that can be generalized to the research population. Theoretically, these results support Mintzberg's managerial role theory in Indayani and Andriani (2018), which emphasizes the mandate of the principal as a decision authority, coordinator, and controller of organizational quality. Conceptually, these results are in line with Fayol's management functions in Jeka and Indriyani (2024), which emphasize the continuity between planning, organizing, motivating, and controlling in achieving organizational goals.

Although statistically significant, an effect size of 0.052 indicates that the practical influence of principals' managerial competence on education quality is small based on Cohen's criteria. This finding indicates that principals' managerial competence makes a real contribution, but is not yet dominant in practical terms in improving education quality. This condition reflects that education quality is the result of the interaction of various factors, not determined by a single variable. This reinforces Katz's view in Mahmud et al. (2021) that principals' managerial skills must be supported by other factors such as teacher performance and work environment in order to produce a greater impact. Thus, the small practical influence does not diminish the significance of the managerial role, but rather shows the complexity of the education quality system.

Furthermore, interviews with teachers and principals provided strong qualitative support for these quantitative findings. Principals at SMKN Kota Mataram were assessed as capable of developing needs-based school plans, coordinating program implementation, and conducting systematic quality monitoring and evaluation. Teachers stated that the clarity of policy direction and managerial consistency of the principal made it easier for them to carry out their teaching duties optimally. These findings clarify that managerial competency indicators such as planning, organizing, communicating, and controlling have been implemented functionally. Conceptually, the results of these interviews reinforce Fayol's management function theory, which places the principal as the main controller of the continuity of the quality of educational organizations. These findings are coherent with prior research by Mahmud et al. (2021), highlighting a strong relationship between principals' managerial skills and the effectiveness of quality management in educational institutions.

The managerial competence of school principals contributes significantly to the quality of vocational education in Mataram City through the strengthening of a well-planned, organized, and quality-oriented management system. This contribution is evident in the ability of school principals to develop strategic plans based on school needs, allocate resources effectively, and ensure that each program runs according to the predetermined performance targets. Through structured coordination and clear communication, principals are able to align the vision, mission, and operational steps of the entire school community to create productive work synergy. In addition, continuous control and evaluation practices help maintain the consistency of the quality of education, administration, and educational services as a whole.

The Influence of Teacher Performance on the Quality of Vocational Education in Mataram City

The study findings reveal that teacher performance has a highly significant effect on education quality, as indicated by a t-value of 5.452 and a significance level of 0.000 (< 0.05). This confirms that teacher performance plays a very strong statistical duty in shaping the quality of vocational education in Mataram City. Conceptually, this result is in line with the task-based performance theory according to Uno and Nina Lamatenggo (2022), which emphasizes that the successful implementation of teachers' professional duties directly determines the quality of educational outcomes.

An effect size value of 0.266, which falls into the moderate influence category based on Cohen's criteria. This value indicates that teacher performance makes a strong and practically meaningful contribution to explaining variations in education quality. This condition shows that teacher performance is a variable that has a high leverage effect on the quality of education.

Furthermore, interviews with school principals and teachers provided strong qualitative support for these quantitative findings. School principals reported that teachers at SMKN Kota Mataram demonstrated a high level of responsibility in learning design, the application of industry-based models, and continuous interpretation of learning evidence. Teachers were also assessed as being active in developing learning innovations, utilizing digital media, and aligning content to the necessities of the world of work. These findings clarify that the teacher performance indicators used in the study have been implemented in practice. Theoretically, the results of these interviews reinforce Skinner's behaviorist theory in

Ritonga and Prasetyo (2019), which emphasizes that consistent and focused teacher behavior will produce quality educational outcomes.

The suitability of teacher performance indicators with education quality can also be seen from the alignment of research findings with Elger's academic performance theory. This theory states that teacher academic performance is reflected in learning effectiveness, student engagement, and learning achievement.

Teacher performance has a very significant and meaningful influence on the quality of vocational education in Mataram City. Strong quantitative findings are consistently supported by interview results that describe professional and adaptive teacher performance practices in response to vocational education demands. The consistency between the research results, teacher performance theory, and previous studies indicates that teacher performance is a key construct in the education quality improvement system. With a moderate effect size, teacher performance has been proven to have a real and strategic contribution to improving education quality.

Teacher performance contributes significantly to the quality of vocational education in Mataram through improvements in the quality of learning processes that are planned, measurable, and oriented towards student competency achievement. Teachers' professionalism in developing teaching materials, applying industry-based learning methods, and conducting continuous evaluations creates learning experiences. This contribution is reflected in increased student engagement, academic discipline, and more consistent achievement of graduate competency standards. In addition, teachers' ability to utilize technology and learning innovations enriches teaching strategies, making the educational process more adaptive and contextual.

Furthermore, teacher performance also plays a role in building a productive and collaborative academic culture in the school environment. Commitment to self-development, participation in competency improvement activities, and willingness to reflect on learning encourage the creation of a continuous quality improvement system. This contribution strengthens the integration between curriculum planning, learning implementation, and learning outcome evaluation as a mutually supportive whole. Thus, teacher performance not only has a direct impact on student learning outcomes but also serves as a strategic foundation for maintaining consistency and sustainability in the quality of education at SMKN Kota Mataram.

The Influence of Principal's Managerial Competence and Teacher Performance on the Quality of Vocational Education in Mataram City

The findings indicate that a significance value of $0.000 < 0.05$ confirms a statistically significant joint consequence of principal managerial competence and teacher performance on education quality. This shows that both variables empirically operate in combination to enhance the quality of vocational education in Mataram City. The result aligns with Tripitasari et al. (2023), who emphasize that education quality improves when school management and teacher performance are well integrated. It also supports Tukiran (2020), highlighting teacher performance as a central feature in the system of education quality control.

An effect size of 0.417 indicates that the joint association of principal managerial competence and teacher performance on education quality falls within the moderate category based on Cohen's criteria. This suggests that their influence is not only statistically significant but also practically meaningful. These findings highlight the importance of synergy between

strategic planning and learning implementation. Theoretically, these results are in line with Deming's view in Dwisusanti and Mukhroji (2025), which emphasizes that the quality of an organization's output is largely determined by the quality of the work processes of its key implementers.

Furthermore, interviews with school principals and teachers reinforced these quantitative findings by providing empirical evidence in the field. School principals reported that quality program planning, learning supervision, and teacher performance evaluations were carried out in a structured and continuous manner. Teachers also revealed that the principal's managerial guidance encouraged them to increase discipline, learning innovation, and active student involvement. These qualitative findings show that the indicators of managerial competence and teacher performance used in the study have been implemented in practice. This clarifies the causal relationship between the research variables and the resulting quality of education.

The results of this study integrate with and strengthen prior study by Tripitasari et al. (2023) and Tukiran (2020), highlighting the critical role of an integrated approach to quality improvement in education. Total Quality Management (TQM) theory according to Sallis in Tripitasari et al. (2023), which emphasizes the involvement of all school components in quality improvement. The principle of Total Quality Control according to Feigenbaum in Tukiran (2020) is also reflected in the control of the learning activity through supervision and evaluation of teacher performance.

The study findings confirm that the quality of vocational education in Mataram City is significantly shaped by the managerial competence of school principals and the performance of teachers. Strong quantitative findings are consistently supported by interview results that describe effective management and learning practices. Testing of the grand theory of TQM according to Sallis, TQC according to Feigenbaum, and TQM according to Deming shows consistency between theory and empirical reality in the field. With a large effect size, the contribution of these two variables is proven to be significant and strategic in progressing the quality of education.

The managerial competence of school principals and teacher performance make a significant contribution to the quality of vocational education in Mataram City. School principals play a role in establishing clear policy directions through needs-based planning, efficient resource organization, and measurable monitoring and evaluation systems, thereby creating accountable school management. At the same time, teachers translate these policies into adaptive, innovative, and relevant teaching practices that meet the demands of the world of work, so that the educational sequence manages properly at the classroom level. This synergy creates continuity between the design of quality programs at the managerial level and their implementation in daily academic activities.

This collaborative contribution is also evident in the formation of a collective culture of quality that emphasizes work discipline, continuous reflection, and the use of educational data as a basis for strategic decision-making. Systematic leadership encourages teachers to improve their professional competence, while optimal teacher performance strengthens the effectiveness of school management policies. The harmonious interaction between managerial control functions and learning performance results in improved consistency in process standards, quality of educational services, and graduate competency achievements. Thus, the managerial competencies of school principals and teacher performance contribute as

complementary strategic foundations in realizing structured and sustainable improvements in educational quality at SMKN Kota Mataram.

CONCLUSION

This study concludes that principals' managerial competence and teacher performance represent important determinants in improving the quality of vocational education in Mataram City. The empirical findings demonstrate that principals' managerial competence has a significant but relatively limited contribution to education quality, indicating that leadership capacity remains an essential foundation but requires stronger strategic implementation to generate broader educational impacts. In contrast, teacher performance shows a more substantial contribution, highlighting the critical role of teachers as the primary actors responsible for implementing learning processes and achieving educational outcomes.

Furthermore, the combined influence of principals' managerial competence and teacher performance demonstrates a significant contribution to education quality. These findings indicate that improving vocational education quality cannot rely solely on administrative leadership or individual teacher performance, but requires an integrated management approach that connects strategic school leadership, professional development, effective supervision, and continuous quality improvement practices.

The qualitative insights reinforce that effective principals contribute through strategic planning, resource management, policy direction, and the establishment of a collaborative work culture, while teachers translate these managerial directions into adaptive and innovative learning practices. Therefore, strengthening vocational education quality requires continuous investment in leadership capacity development and teacher professionalism to ensure that educational institutions are capable of responding to the changing demands of society and the labor market.

This study provides theoretical and practical implications by emphasizing the importance of an integrated perspective in understanding education quality improvement. From a theoretical perspective, the findings contribute to the discussion on educational management by demonstrating the interconnected roles of leadership and teacher performance. Practically, the results provide insights for policymakers and educational institutions in designing strategies related to leadership development, teacher empowerment, and sustainable quality improvement programs.

LIMITATIONS AND FUTURE RESEARCH RECOMMENDATIONS

This study has several limitations that should be considered when interpreting the findings. First, the research was conducted within the context of public vocational high schools in Mataram City, involving a relatively limited number of respondents from seven institutions. Therefore, the findings may not fully represent vocational education conditions in other regions with different institutional, cultural, and socioeconomic characteristics.

Second, although this study employed a mixed-methods approach, the quantitative analysis focused primarily on principals' managerial competence and teacher performance as predictors of education quality. Other potential influencing factors, such as organizational culture, teacher motivation, learning facilities, digital transformation readiness, school innovation capacity, and stakeholder involvement, were not examined comprehensively.

Third, the study relied partly on self-reported data from teachers, which may introduce subjective perceptions regarding managerial competence, teacher performance, and education quality. Future studies could strengthen research validity by incorporating broader perspectives from principals, students, parents, industry partners, and education policymakers.

Future research is recommended to expand the research scope by involving vocational schools from different regions and institutional backgrounds to improve the generalizability of findings. Subsequent studies may also adopt longitudinal research designs to examine how changes in leadership practices and teacher performance influence education quality over time. In addition, future research should consider developing more comprehensive models that integrate organizational, technological, and environmental factors to provide a deeper understanding of sustainable quality improvement in vocational education.

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