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Principal Leadership and Graduate Quality in Agribusiness Vocational Schools Amid Digital Disruption in Papua Pegunungan

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ABSTRACT

This study examines the role of the school principal in ensuring graduate quality during the era of digital disruption at a state agribusiness and agrotechnology vocational secondary school in Lanny Jaya Regency, Papua Pegunungan, a frontier, outermost, and disadvantaged (3T) region. Employing a qualitative case study design, data were collected through in-depth interviews, participatory observation, and documentary study involving the school principal, teachers, education personnel, students, and industry partners, selected through purposive sampling. Data were analyzed interactively through data reduction, data display, and conclusion drawing, with validity established through source and method triangulation and member checking. The findings indicate that the principal ensures graduate quality through five interrelated strategies: enhancing teacher competence through training and digital-based learning innovation; providing and maintaining facilities and infrastructure aligned with vocational needs; developing an industry-responsive curriculum integrating local content and entrepreneurship; strengthening ongoing academic supervision and learning evaluation; and developing student potential through intracurricular, co-curricular, and extracurricular programs. These strategies collectively enhanced graduates' practical skills, work readiness, creativity, and technological adaptability. The study extends transformational and instructional leadership theory into an underexplored 3T vocational context, showing that leadership adaptability can partially offset persistent infrastructural constraints. Findings contribute theoretically by extending principal leadership models beyond urban and general educational settings, and practically by informing capacity-building and industry-collaboration policy for vocational schools in remote regions.

Keywords: Digital Disruption, Graduate Quality, Papua Pegunungan, Principal Leadership, Vocational Education

INTRODUCTION

Education constitutes a strategic instrument for enhancing the quality of human resources capable of competing at the local, national, and global levels. As the era of disruption unfolds, marked by rapid digital technological advancement, automation, and swiftly changing labor market demands, educational institutions are required to undertake comprehensive transformation. Such transformation encompasses curriculum renewal, improvement in learning quality, and the strengthening of educational leadership that remains adaptive to change. In this connection, Vutha (2026) demonstrates that digital leadership effectiveness among secondary school principals is closely tied to how consistently schools translate technological adoption into measurable improvements in teaching practice, a finding that underscores the growing relevance of leadership adaptability to technological change in shaping graduate competitiveness.

Vocational secondary schools (SMK), as vocational education institutions, play a strategic role in preparing graduates who are work-ready and possess competencies aligned with the needs of business and industry (DUDI). Agribusiness vocational schools in particular hold substantial potential in supporting food security and economic development based on local resources. Through experiential learning, students are equipped with technical skills such as crop cultivation, agricultural product processing, and agribusiness management. Ahmid et al. (2023) found that innovative characteristics, work readiness, and vocational self-concept jointly exert a significant effect on the employability of vocational college students, lending empirical support to the premise that practice-based learning approaches combined with industry-relevant competency development can meaningfully enhance graduate employability.

The advancement of modern agricultural technologies, such as smart farming, the Internet of Things (IoT), and the digitalization of agricultural product marketing, further strengthens the relevance of agribusiness vocational schools in addressing global challenges. Nurbayani et al. (2025) show that the integration of technology, knowledge management, and local wisdom substantially optimizes teacher performance in vocational education settings, suggesting that technological integration, when grounded in contextual and local knowledge, improves both learning quality and student work readiness. Agribusiness vocational schools therefore function not merely as providers of labor but also as drivers of innovative and sustainable agribusiness-based entrepreneurship. Graduate quality serves as a principal indicator of educational success in vocational schools, encompassing knowledge, skills, attitudes, and readiness to enter the workforce, and this is consistent with government policy under Permendikbud Nomor 34 Tahun 2018 concerning National Education Standards for SMK/MAK, which emphasizes alignment between graduate competencies and industry needs. Within this context,

the school principal holds a strategic role as an instructional leader responsible for improving the quality of education within the institution under their leadership.

School principal leadership constitutes a key factor in the successful improvement of graduate quality. Firmansyah et al. (2022) demonstrate that transformational leadership exerts a positive effect on organizational performance in vocational schools during the digital era, with this relationship mediated by knowledge management and organizational learning, thereby affirming that effective leaders are able to inspire, motivate, and drive positive change within an organization. Mataputun et al. (2024) noted that the capacity to adapt to changes in environment, technology, and market demand serves as a determining factor for organizations to remain relevant over the long term. A recent systematic review by Hallinger et al. (2025) further indicates that principals' instructional and transformational leadership behaviors significantly shape teacher performance and learning quality across diverse educational settings, while Chatzipanagiotou and Katsarou (2023) contends that adaptive and innovative leadership is essential in confronting the challenges of the disruption era. Nevertheless, the implementation of effective leadership in vocational schools, particularly in Frontier, Outermost, and Disadvantaged (3T) regions, continues to face various constraints. As noted by Pekei and Mataputun (2024), uneven digital literacy among teachers and students, together with limited internet access, has hindered the management of Management Information Systems (SIM) from making a meaningful impact on preparing graduates who are excellent and competitive.

Empirical evidence from the Papua region reinforces these constraints. The findings of Munthe and Mataputun (2021) revealed that SMKN 3 Jayapura, Papua, had generally established partnerships with business and industry to improve graduate quality, although these partnerships had not yet been optimized; industry instructors were reported to be present only at the turn of the academic year, providing merely a general briefing on industry conditions rather than hands-on practical instruction. Collaboration among schools, communities, and business or industry at SMK Negeri 2 Tiom relies more heavily on local community potential, owing to limited access to formal industry in the highland region. Key supporting factors for such involvement include strong social relations and a shared sense of ownership over education, whereas inhibiting factors include economic limitations, educational literacy, language differences, and a lack of industry networks. Communication between schools and parents was found to be simple and contextual, reasonably effective in maintaining continuity of values between home and school, although still constrained by language differences and limited access to communication technology. This body of research concludes that parental and community involvement is adaptive and contextual in nature and contributes meaningfully to graduates' mental and social readiness for the workforce, although more sustainable reinforcement strategies remain necessary. Similarly, at the global level, disparities in educational quality between developed regions and remote areas

have been shown to affect graduate competitiveness adversely (OECD, 2022; UNESCO, 2023).

SMK Negeri 2 Agrobisnis dan Agroteknologi in Lanny Jaya Regency, Papua Pegunungan Province, is one such vocational education institution that plays an important role in preparing a skilled workforce in the field of agribusiness. Despite its considerable potential, the school faces various constraints that demand effective, innovative, and adaptive principal leadership in managing available resources. The urgency of this study is further underscored by the still suboptimal alignment between the competencies of SMK graduates and labor market needs, particularly in the Papua Pegunungan region, a condition that reflects a gap between vocational education policy and its implementation in practice. An in-depth study of school principal leadership strategies in bridging this gap is therefore necessary, so that graduate quality may be improved in a sustainable and contextually grounded manner. The novelty of this study lies in its focus on integrating transformational principal leadership with the context of agribusiness vocational education in 3T regions during the era of digital disruption. Unlike previous studies, which have generally been conducted in urban areas or in general, non-vocational schools, this study offers a contextual perspective grounded in the local conditions of Papua Pegunungan, a region with distinctive geographical, social, and economic characteristics.

Based on the foregoing discussion, this study aims to analyze the role of the school principal in ensuring the quality of SMK graduates in the era of disruption. The findings of this study are expected to offer theoretical contributions to the development of educational management science, as well as practical contributions as a basis for policy-making in improving the quality of vocational education, particularly in the Papua Pegunungan region.

RESEARCH METHODOLOGY

This study employed a qualitative approach using a case study design. The qualitative approach was selected for its capacity to generate an in-depth understanding of the phenomenon of school principal leadership in ensuring graduate quality, particularly within a complex and dynamic context such as vocational education in the era of disruption (Creswell & Poth, 2024). The case study design was used to intensively explore leadership practices within an actual and contextual setting. A recent systematic review of qualitative case study research in education by Khairiyah et al. (2026) confirms that this design remains the predominant methodological choice for studies seeking to understand processes, meanings, and lived experiences of actors within educational organizations, particularly when semi-structured interviews, observation, and document analysis are combined as primary data sources.

The research was conducted at SMK Negeri 2 Agrobisnis dan Agroteknologi, Lanny Jaya Regency, Papua Pegunungan Province. The research site was selected purposively, taking into account the characteristics of a school located in a 3T (frontier, outermost, and disadvantaged) region facing distinct challenges and possessing distinct potential for the development of agribusiness-based vocational education quality. The research subjects comprised the school principal, vice principal, teachers, and education personnel. Informants were determined using purposive sampling, whereby individuals considered to possess information relevant and pertinent to the research focus were selected. To enrich the data, this study also involved additional informants, including students, business and industry (DUDI) partners, and other relevant parties. Ahmad and Wilkins (2025) offer a comprehensive framework for the application of purposive sampling in qualitative inquiry, noting that this technique remains widely used across educational, business, and health-policy disciplines to obtain rich and contextually grounded data, provided that sampling criteria are defined with clarity and aligned to the study's objectives.

Data collection techniques comprised in-depth interviews, participatory observation, and documentary study. Interviews were used to elicit information concerning the school principal's leadership strategies, policies, and practices. Observation was conducted to directly examine managerial activities and the learning process within the school. Documentation, meanwhile, was used to supplement the data through official documents such as school work plans, evaluation reports, and graduate achievement records. Consistent with Khairiyah et al. (2026), the combined use of these three techniques is intended to enhance the depth, richness, and validity of the data obtained from an educational case study.

Data were analyzed interactively through three principal stages, namely data reduction, data display, and conclusion drawing and verification. Bingham (2023) proposes a comparable structured process of qualitative analysis, integrating deductive and inductive coding with guided memoing and analytic questioning, to support the development of systematic, transparent, and auditable qualitative findings. The analytical process in this study was conducted concurrently with data collection, allowing the researchers to make adjustments and pursue further depth as the research progressed. This approach was considered effective in producing findings that are both systematic and scientifically defensible.

Data validity was tested through source triangulation and method triangulation. Source triangulation was conducted by comparing information obtained from various informants, while method triangulation was conducted by comparing the results of interviews, observation, and documentation. In addition, member checking was carried out to ensure that the data corresponded with the reality experienced by the informants. As Bingham (2023) emphasizes, the development of a clear audit trail through systematic coding and memoing is essential to establishing the dependability and overall trustworthiness of qualitative

findings. These measures were therefore essential to enhancing the credibility and validity of the research findings. This study also gave due attention to ethical considerations, including obtaining informed consent from informants, safeguarding the confidentiality of respondents' identities, and ensuring that the data were used solely for academic purposes. Accordingly, this study is expected to meet the quality standards of qualitative research, encompassing credibility, transferability, dependability, and confirmability.

RESULT AND DISCUSSION

The Role of the School Principal in Ensuring Graduate Quality through Human Resource Development

The findings of this study indicate that the school principal has undertaken directed planning for human resource development. This planning was carried out through the identification of teacher competency needs, particularly in the mastery of technology and skills relevant to the world of work, supported by internal training programs for teachers on the use of digital learning media such as Google Classroom and other online-based learning applications. In addition, the principal recommended that teachers participate in training organized by the Education Office, conducted periodic evaluations of student learning outcomes and graduation rates, and monitored graduate absorption into the workforce or into higher education, as reflected in the following excerpts from interviews In-1 and In-2:

“I consistently strive to make improvements in my leadership aimed at continuous change. What I mean by change here is conducting workshop-style training sessions. In addition, we hold sharing sessions among teachers after they attend training, so that the knowledge gained can be applied collectively.” (Saya selalu berusaha melakukan perbaikan-perbaikan dalam kepemimpinan saya yang bertujuan untuk perubahan terus menerus, perubahan yang dimaksud disini adalah melakukan pelatihan-pelatihan workshop. Selain itu, diadakan kegiatan berbagi praktik baik (sharing session) antar guru setelah mengikuti pelatihan, sehingga pengetahuan yang diperoleh dapat diterapkan secara bersama-sama).

“The principal always gives equal opportunities to the teaching staff, whether in terms of assignments or self-development... [The principal is] open to changes proposed by teachers to support the school's advancement in today's modern era, which is increasingly global in its impact.” (Kepala sekolah selalu memberikan kesempatan yang sama kepada dewan guru, baik dari penugasan, pengembangan diri...terbuka terhadap perubahan-perubahan yang diusulkan guru-guru untuk mendukung kemajuan sekolah di era modern sekarang yang semakin global dampaknya).

These findings indicate that the school principal has carried out directed human resource development planning through the identification of teacher

competency needs, particularly in the mastery of digital technology and skills relevant to the world of work. This finding demonstrates that the principal holds a strategic role as an instructional leader in confronting the era of digital disruption. The internal training program on digital learning media such as Google Classroom and other online-based learning applications represents a form of school adaptation to digital educational transformation. Research in educational management affirms that principals' digital leadership influences the enhancement of teacher professionalism, school digital culture, and learning effectiveness in vocational schools (Kurniati, 2025).

Furthermore, an adaptive principal is able to create a digital-based education ecosystem through the strengthening of teacher competence, the utilization of technology, and the development of a culture of innovation within the school (Wahyudin et al., 2025). The findings of Lobo et al. (2022) similarly indicate that principals who effectively implement entrepreneurial competencies, namely creating innovation, working hard, possessing strong motivation, persevering, and exhibiting entrepreneurial instinct, achieve favorable outcomes. The findings of this study further indicate that the principal not only organized internal training but also encouraged teachers to participate in training held by the Education Office, while conducting periodic evaluations of student learning outcomes, graduation rates, and graduate absorption into the workforce and higher education. This illustrates that the principal has implemented sustainable education quality management through ongoing evaluation and teacher competency development. Recent research explains that principal leadership oriented toward industry partnership and teacher competency enhancement can improve the relevance of graduate competencies to labor market needs (Makalao et al., 2026).

Within the context of vocational education, the enhancement of teachers' digital competence also affects students' capacity to develop digital entrepreneurial skills and work readiness in the era of Industry 4.0 (Mahmudah et al., 2023). Accordingly, the principal's strategy in improving human resource quality constitutes an important factor in ensuring the quality of vocational school graduates, particularly in the Papua Pegunungan region, which faces challenges related to limited technological access and educational quality. In this regard, Mataputun (2022) noted that principals are expected never to cease expanding their knowledge and perspective, since the world continually offers periodic change and demands the capacity to adapt amid increasingly intense competition.

The Role of the School Principal in Ensuring Graduate Quality through the Availability of Facilities and Infrastructure

The findings indicate that the school principal holds a central role in ensuring graduate quality, not only through human resource development initiatives but also through the planning of procurement, utilization, and maintenance of supporting

facilities and infrastructure, as revealed in the following excerpts from interviews In-1, In-3, and In-4:

“The principal compiles a list of practical equipment needs, such as agricultural equipment, laboratory equipment, and digital media, and submits assistance proposals to the Education Office and to industry partners.”
(Kepala sekolah menyusun daftar kebutuhan alat praktik, seperti peralatan pertanian, laboratorium, dan media digital, serta mengajukan proposal bantuan ke dinas pendidikan dan pihak industry).

“The principal consistently attends to the school's needs to ensure the smooth running of the teaching and learning process, for example through the procurement of IT facilities, a computer laboratory, and other resources.”
(Kepala sekolah selalu memperhatikan kebutuhan sekolah demi terselenggaranya proses belajar mengajar dapat memberikan contoh yaitu pengadaan IT. Lab komputer dan sarana lain).

“We invite students and teachers to jointly maintain the facilities and infrastructure available at the school in order to support the smooth running of all learning processes, because without adequate facilities, educational quality cannot possibly be achieved, thereby fostering a disciplined school culture.” (Kami mengajak siswa, guru untuk secara bersama memelihara sarana dan prasarana yang ada di sekolah demi menunjang kelancaran semua proses pembelajaran karna tanpa sarana mutu pendidikan tindak mungkin terpenuhi sehingga menjadikan sekolah yang disiplin).

The findings indicate that the school principal plays an important role in improving educational quality through the provision and management of school facilities and infrastructure. The principal actively compiled requirements for practical equipment, laboratories, digital media, and information technology facilities to support the learning process in the vocational school. These efforts were pursued through assistance proposals submitted to the Education Office and through collaboration with industry partners. This finding is consistent with research indicating that effective management of facilities and infrastructure can support the enhancement of learning quality and educational quality in vocational schools. Adequate practical facilities enable students to gain learning experiences aligned with the needs of business and industry, thereby making graduate competencies more relevant to workforce demands (Humairah et al., 2026).

Furthermore, the procurement of technology-based facilities such as computer laboratories and digital media reflects the school's efforts to adapt to the era of digital disruption. The availability of digital facilities is essential to support technology-based learning and to enhance the digital skills of both students and teachers. Recent research explains that educational facilities and infrastructure constitute an important factor in supporting the success of the learning process and the improvement of vocational school graduate quality (Masri et al., 2023). The

principal also involved teachers and students in maintaining school facilities as a means of instilling a culture of discipline and shared responsibility. This measure reflects the application of participatory management in the administration of educational facilities, thereby enabling available resources to be utilized optimally and sustainably. With adequate and well-maintained facilities and infrastructure, the teaching and learning process becomes more effective and is able to enhance the quality of vocational school graduates, particularly in confronting the challenges of technological development and the world of work in the digital era.

The Role of the School Principal in Developing a Curriculum Aligned with Institutional Needs

The findings of this study indicate that the school principal has undertaken curriculum planning and adjustment, strengthened the workforce-linked (link and match) curriculum, integrated technology, and carried out curriculum evaluation and refinement. These measures were undertaken to ensure that the curriculum remains adaptive to institutional needs and to the demands of the disruption era. A relevant curriculum constitutes one of the principal factors in producing graduates who are competent, work-ready, and capable of adapting to technological developments and the needs of business and industry, as reflected in the following excerpts from interviews In-1, In-2, and In-5:

“Together with the curriculum development team, we plan and adjust the curriculum to align with the school's needs, students' characteristics, and developments in the world of work. We have incorporated relevant local content and integrated entrepreneurship material so that students are equipped with the ability to start their own independent businesses.” (Kami bersama tim pengembang kurikulum merencanakan dan menyesuaikan kurikulum agar sesuai dengan kebutuhan sekolah, karakteristik peserta didik, serta perkembangan dunia kerja. Kami menambahkan muatan lokal yang relevan dan mengintegrasikan materi kewirausahaan agar siswa memiliki kemampuan membuka usaha mandiri).

“...the school has established partnerships with business and industry to align the competencies taught at school with workforce requirements. For example, adjusting practical materials to reflect modern agricultural techniques or the use of the latest equipment in the field of agrotechnology.” (...sekolah menjalin kerja sama dengan DUDI untuk menyelaraskan kompetensi yang diajarkan di sekolah dengan kebutuhan lapangan kerja. Misalnya, penyesuaian materi praktik agar sesuai dengan teknik pertanian modern atau penggunaan alat-alat terbaru di bidang agroteknologi).

“We, the teachers, are encouraged to use digital learning media such as instructional videos, online applications, and internet-based learning resources. To that end, periodic workshops are held involving all teachers to develop learning tools... aligned with student needs and the demands of the

times. The principal conducts evaluations based on student learning outcomes, feedback from teachers, and information from alumni or the workforce, in order to review the curriculum and adjust it to users' needs." (Kami guru-guru didorong untuk menggunakan media pembelajaran digital seperti video pembelajaran, aplikasi online, dan sumber belajar berbasis internet. Karena itu dilakukan workshop secara berkala yang melibatkan seluruh guru untuk menyusun perangkat pembelajaran,...sesuai kebutuhan siswa dan perkembangan zaman. Kepala sekolah melakukan evaluasi melalui hasil belajar siswa, umpan balik dari guru, serta informasi dari alumni atau dunia kerja untuk peninjauan kembali kurikulum untuk disesuaikan kebutuhan pengguna).

These findings indicate that the school principal holds an important role in developing a curriculum relevant to student needs and workforce demands. Curriculum planning was conducted collaboratively with the development team, incorporating adjustments to local content and the integration of entrepreneurship material to enhance students' capacity to establish independent businesses. This finding aligns with research emphasizing that vocational competencies grounded in practice-based, industry-relevant learning strengthen students' employability and readiness to meet workforce demands (Ahmid et al., 2023). Furthermore, collaboration with business and industry partners enables the alignment of practical competencies with technological developments, for instance in modern agricultural techniques and the use of current agrotechnology equipment, which directly supports students' work skills. In other words, vocational schools are expected to present a dynamic, industry-need-based curriculum that is flexible, contextual, and competency-based.

The utilization of digital learning media such as videos, online applications, and internet-based learning resources demonstrates the school's adaptation to the era of digital disruption. Teachers were involved in periodic curriculum meetings and workshops to develop learning tools aligned with student needs and contemporary developments. The principal also conducted ongoing curriculum evaluation through student learning outcomes, teacher feedback, and information from alumni and industry partners. This is consistent with findings that the integration of technology, knowledge management, and locally grounded practice can optimize teacher and institutional performance in vocational education (Nurbayani et al., 2025), thereby ensuring that graduates possess competencies aligned with industry demands. This strategy ensures that the curriculum not only meets academic standards but also enhances students' work readiness, creativity, and adaptability in the digital era.

The Role of the School Principal in Ensuring Graduate Quality through the Improvement of Learning Quality

The findings of this study indicate that the school principal plays a highly important role in ensuring graduate quality through the improvement of learning quality. This role is evident in various efforts, ranging from teacher coaching and the development of learning methods to the evaluation of student learning processes and outcomes, as revealed in the following excerpts from interviews In-1, In-5, and In-3:

“So that graduates of this school do not end up unemployed, teachers must be developed on a daily basis through various activities, whether through supervision, monitoring, or the provision of training.” (Bahwa supaya lusan sekolah ini tidak nganggur, maka guru-guru hari dibina melalui berbagai kegiatan baik melalui supervisi, monitoring, maupun pemberian pelatihan).

“We, the teachers, have begun implementing direct practice-based learning in the school garden, using instructional videos, and utilizing simple digital learning resources.” (Kami guru mulai menerapkan pembelajaran berbasis praktik langsung di kebun sekolah, menggunakan video pembelajaran, serta memanfaatkan sumber belajar digital sederhana).

“...The principal also evaluates the implementation of learning, both through student learning outcomes and through observation of the teaching and learning process. This evaluation serves as the basis for the ongoing improvement and refinement of the learning process.” (.... Kepala sekolah juga melakukan evaluasi terhadap pelaksanaan pembelajaran, baik melalui hasil belajar siswa maupun observasi proses belajar mengajar. Evaluasi ini menjadi dasar untuk memperbaiki dan menyempurnakan proses pembelajaran secara berkelanjutan).

The findings indicate that the school principal plays an active role in improving learning quality through teacher coaching, academic supervision, monitoring, training, and ongoing learning evaluation. These efforts are evident in the implementation of direct practice-based learning in the school garden, the use of instructional videos, and the utilization of simple digital learning resources. This finding indicates that the principal functions not merely as an administrator but also as an instructional leader capable of encouraging teachers to become more creative, innovative, and adaptive to technological developments (Sartika, 2024). Recent research explains that principals' academic supervision has a significant influence on the improvement of learning quality, as it assists teachers in systematically refining the planning, implementation, and evaluation of learning.

Furthermore, the implementation of practice-based learning and the utilization of digital media indicate a transformation in learning that is relevant to the needs of vocational education in the era of digital disruption. Within the context

of vocational schools, practical learning is essential for enhancing students' work competencies to align with the needs of business and industry. The use of digital media and technology-based learning resources also helps develop twenty-first-century skills, such as creativity, collaboration, and digital literacy among students. Recent research affirms that digital-based learning supervision can enhance teacher competence, learning effectiveness, and overall school quality (Gunawan et al., 2025). The principal also evaluated student learning outcomes and observed the teaching and learning process as a basis for the continuous improvement of learning. This is consistent with research indicating that evaluation and supervisory follow-up constitute important factors in creating learning that is effective, innovative, and oriented toward the improvement of graduate quality (Rumapea, 2025).

Role of the School Principal in Ensuring Graduate Quality through the Development of Student Potential

The findings of this study indicate that the school principal holds a strategic role in developing student potential as one of the efforts to improve graduate quality, through identifying students' potential and interests, providing self-development programs, strengthening practical skills and life skills, and fostering motivation and character development, as revealed in the following excerpts from interviews In-1, In-3, and In-5:

"...as an effort to improve graduate quality, the development of student potential focuses not only on academic aspects but also on skills, attitudes, and readiness to face the challenges of the disruption era, which is marked by continuous technological change and workforce demands." (...sebagai upaya meningkatkan mutu lulusan, pengembangan potensi peserta didik tidak hanya berfokus pada aspek akademik, tetapi juga pada keterampilan, sikap, serta kesiapan menghadapi tantangan era disrupsi yang penuh dengan perubahan teknologi dan tuntutan dunia kerja).

"On various occasions, the principal encourages us, the teachers, to identify students' potential, interests, and talents from an early stage. This identification serves as the basis for formulating learning strategies and developing student competencies." (Kepala sekolah dalam berbagai kesempatan mendorong kami/guru untuk mengenali potensi, minat, dan bakat siswa sejak awal. Identifikasi ini menjadi dasar dalam menyusun strategi pembelajaran dan pengembangan kompetensi peserta didik).

"The principal facilitates a range of self-development programs, whether intracurricular, co-curricular, or extracurricular, to optimize student potential, build character, and provide motivation so that students are more enthusiastic about learning and developing their potential, so that our graduates are not only technically skilled but also possess a professional, creative, and independent attitude." (Kepala sekolah memfasilitasi berbagai

program pengembangan diri, baik intrakurikuler, kokurikuler maupun ekstrakurikuler, untuk mengoptimalkan potensi peserta didik, membina karakter dan pemberian motivasi agar siswa lebih bersemangat dalam belajar dan mengembangkan potensi diri, agar lulusan kita tidak hanya terampil secara teknis, tetapi juga memiliki sikap profesional, kreatif, dan mandiri).

The findings of this study indicate that the school principal holds a strategic role in the development of student potential through an approach oriented not only toward academic aspects but also toward the strengthening of skills, character, creativity, and student work readiness. The principal encouraged teachers to identify students' interests, talents, and potential from an early stage so that learning strategies could be tailored to student needs and abilities. This finding is consistent with research indicating that principals' transformational leadership can create a learning environment that supports the development of twenty-first-century competencies, such as creativity, communication, collaboration, and critical thinking among students (Handayani et al., 2025). Moreover, effective principal leadership also influences the sustained enhancement of student learning motivation, independence, and character development (Wahyudi et al., 2020).

The principal also facilitated intracurricular, co-curricular, and extracurricular programs to optimize student potential, so that graduates are not only academically excellent but also possess a professional attitude and readiness to face the world of work. Within the context of vocational education, the development of student competencies must be integrated with the needs of business and industry, particularly in the era of digital disruption, which demands the capacity to adapt to technological developments. Komariah et al. (2026) explain that school leadership that is adaptive to digital developments can enhance the competence and work readiness of vocational school students. Furthermore, the development of soft skills through co-curricular and extracurricular activities has been shown to be effective in enhancing students' creativity, communication skills, and independence (Nurhidayati et al., 2024). The strengthening of digital literacy and character development undertaken by the principal further contributes to shaping graduates who are disciplined, creative, and prepared to compete in the workforce during the era of digital transformation (Budi, 2020; Idrus et al., 2026).

The Impact of the School Principal's Role in Ensuring the Quality of Vocational School Graduates in the Era of Disruption

The findings of this study indicate that the principal's role in enhancing human resources, providing facilities and infrastructure, developing a curriculum aligned with user needs, improving learning quality, and developing student potential has had a positive impact on graduate quality in the era of disruption, evident across several aspects, as reflected in the following excerpts from interviews In-1, In-2, and In-3:

“...Graduates demonstrate improved practical skills, readiness to enter the world of work, and the ability to adapt to technology. Students are able to carry out agricultural practices independently, manage production outcomes, and demonstrate confidence in entrepreneurial activities.” (...Lulusan menunjukkan keterampilan praktik yang lebih baik, kesiapan menghadapi dunia kerja, dan kemampuan beradaptasi terhadap teknologi. Siswa mampu melaksanakan praktik pertanian secara mandiri, mengelola hasil produksi, dan menunjukkan kepercayaan diri dalam kegiatan wirausaha).

“Graduates show improvement in the areas of skills, work attitude, and readiness to face the world of work. This indicates that human resource development efforts constitute an effective strategy for ensuring graduate quality, particularly in vocational schools oriented toward work readiness. Students have become more skilled in practice, possess greater confidence, and are able to adapt to work environments or independent enterprises.” (Lulusan menunjukkan peningkatan dalam aspek keterampilan, sikap kerja, dan kesiapan menghadapi dunia kerja. Hal ini menunjukkan bahwa upaya peningkatan SDM merupakan strategi yang efektif dalam menjamin mutu lulusan, terutama di SMK yang berorientasi pada kesiapan kerja. Siswa menjadi lebih terampil dalam praktik, memiliki kepercayaan diri, serta mampu beradaptasi dengan lingkungan kerja atau usaha mandiri).

“Graduates whose potential has been optimally developed are better prepared to face workplace challenges, more creative in solving problems, and possess a high degree of independence. Students are able to produce agricultural products independently, run small businesses, and demonstrate technical abilities in line with local industry standards, reflecting sound work readiness and adaptive capacity.” (Lulusan yang potensinya dikembangkan secara optimal lebih siap menghadapi tantangan dunia kerja, lebih kreatif dalam menyelesaikan masalah, dan memiliki kemandirian yang tinggi. Siswa mampu menghasilkan produk pertanian mandiri, menjalankan usaha kecil, dan menampilkan kemampuan teknis sesuai standar industri lokal, menunjukkan kesiapan kerja dan kemampuan adaptasi yang baik).

These findings indicate that the improvement of vocational school graduate quality depends not solely on academic ability but also on the development of practical skills, work attitude, creativity, and student independence. Graduates equipped with direct practical experience, entrepreneurial ability, and technological adaptability demonstrate greater readiness to enter the workforce or to run independent businesses. In the era of globalization and technological disruption, vocational education no longer functions merely as a provider of labor but has become a strategic actor within the global labor market, capable of competing across various industrial sectors (Prasetya et al., 2024). This finding is consistent with research emphasizing the importance of practice- and competency-based vocational education, wherein students who gain practice-based learning

experiences demonstrate higher work readiness and greater capacity to adapt to dynamic industry demands (Ahmid et al., 2023).

Furthermore, teacher human resource development through training and supervision has a significant impact on students' skills and work readiness; academic supervision has been shown to significantly enhance teacher competence (Tanta et al., 2025). Principals who encourage teachers to implement practice-based learning strategies, utilize technology, and foster student character development directly enhance the competencies of vocational school graduates, consistent with evidence that transformational leadership mediated by knowledge management and organizational learning improves vocational school performance during the digital era (Firmansyah et al., 2022). Other research similarly indicates that student involvement in entrepreneurial practice and independent production management enhances confidence, creativity, and problem-solving ability, all of which serve as indicators of work readiness in the era of digital disruption. Accordingly, human resource development strategies within schools and competency-based practice constitute key factors in producing vocational school graduates who are professional, creative, independent, and adaptive to industry and technological demands.

The findings of this study largely support and extend the body of research introduced earlier in this article, while also revealing points of contrast that sharpen its contribution. In relation to leadership theory, the finding that the principal's transformational orientation, manifested through directed human resource planning, digital adoption, and sustained teacher coaching, translated into improved graduate readiness lends direct empirical support to Firmansyah et al. (2022), who demonstrated that transformational leadership improves vocational school performance when mediated by knowledge management and organizational learning. The present study extends that finding by showing how this mediating mechanism operates concretely within a 3T (frontier, outermost, and disadvantaged) setting, where infrastructural and connectivity constraints, rather than absent leadership will, are the primary obstacles to translating knowledge management into practice. Similarly, the finding that digital leadership shaped teachers' adoption of online learning tools corroborates Vutha (2026), who found that digital leadership effectiveness among secondary school principals depends on consistent translation of technological adoption into classroom practice; this study extends that conclusion into an agribusiness vocational context that Por's research on general secondary schools did not address.

With respect to instructional leadership, the finding that academic supervision and continuous evaluation improved learning quality is consistent with Hallinger et al. (2025), whose systematic review confirms that principal instructional leadership behaviors significantly shape teacher performance and learning quality across diverse settings. This study extends that literature by situating instructional leadership within a vocational, practice-based curriculum rather than the general

academic settings that dominate the PIMRS literature Hallinger and colleagues reviewed. However, the findings also depart from Pekei and Mataputun (2024), who reported that uneven digital literacy and limited internet access in 3T regions largely prevented Management Information Systems from meaningfully supporting graduate readiness. The present study found that, despite comparable infrastructural constraints, the principal's use of low-bandwidth digital tools such as Google Classroom and instructional videos, combined with community and industry collaboration, still yielded measurable gains in student work readiness. This suggests that leadership adaptability can partially offset the structural barriers Pekei et al. identified, qualifying rather than contradicting their conclusion.

Finally, the finding that practice-based learning, industry collaboration, and student potential development jointly enhanced employability supports Ahmid et al. (2023), who established that innovative characteristics, work readiness, and vocational self-concept significantly predict employability among vocational college students, and extends Nurbayani et al. (2025) by showing that the integration of technology with local wisdom, effective in their study of teacher performance optimization, applies equally well to student-facing outcomes such as entrepreneurial confidence and technical competence. Taken together, these convergences and contrasts indicate that this study both reinforces the established link between principal leadership and vocational graduate quality and extends it into an under-researched geographical and institutional context, namely agribusiness vocational education in Indonesia's Papua Pegunungan region during the era of digital disruption.

CONCLUSION

This study demonstrates that the school principal holds a highly strategic role in ensuring graduate quality at SMK Negeri 2 Agrobisnis dan Agroteknologi Lanny Jaya, Papua Pegunungan, particularly in confronting the challenges of the era of digital disruption. This role is manifested through the enhancement of teacher and education personnel competence via training, mentoring, and digital-based learning innovation; the provision of facilities and infrastructure that support vocational learning; the development of a curriculum adaptive to the needs of students and industry; the implementation of ongoing learning supervision and evaluation; and the development of student potential through intracurricular, co-curricular, and extracurricular activities. These strategies have been shown to contribute to the enhancement of practical skills, work readiness, creativity, and graduates' capacity to adapt to technological developments and workforce demands, thereby extending transformational and instructional leadership theory into the underexplored context of agribusiness vocational education in a frontier, outermost, and disadvantaged (3T) region.

These findings carry both theoretical and practical implications. Theoretically, the study affirms that principal leadership in vocational schools located in 3T regions functions not merely administratively but also transformationally and adaptively in building a culture of quality within vocational education, offering a contextual refinement of leadership models that have predominantly been developed and tested in urban or non-vocational settings. Practically, the findings indicate that school principals need to strengthen collaboration with business and industry, continuously enhance teachers' digital competence, and develop curricula grounded in local and industry needs, so that graduate quality becomes increasingly relevant to workforce demands in the digital era. In addition, local governments and education policymakers need to support the provision of technology-based learning facilities and capacity-building programs for principal leadership in remote regions, given that leadership adaptability alone cannot fully offset persistent infrastructural constraints.

This study is subject to certain limitations, as it was conducted at a single vocational school using a case study approach, meaning its findings cannot yet be broadly generalized across the entire context of vocational education in Indonesia. Furthermore, this study focused primarily on the internal perspective of the school and did not incorporate direct evaluation from business and industry regarding graduate quality. Future research is therefore recommended to involve a larger number of schools across different 3T regions, employ a mixed-methods or comparative case study design, and examine the relationship between principal leadership and the rate of graduate absorption into the workforce, so as to strengthen the generalizability and predictive value of the findings reported here.

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