



Principal Leadership Strategies for Enhancing Teacher Professionalism in Public Vocational High Schools in Merauke District, Indonesia

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ABSTRACT

This article reports a qualitative study on principal leadership strategies to strengthen teacher professionalism in public vocational high schools located in Merauke District, a remote 3T area in eastern Indonesia. Teacher professionalism is widely recognised as a key driver of vocational education quality, yet geographical isolation, limited resources, and uneven access to professional development still constrain improvement efforts. This study explores how principals design and enact leadership strategies under such conditions and how these strategies influence teachers' professional growth. The findings show that principals employ a hybrid leadership pattern combining instructional, transformational and participatory dimensions, operationalised through structured academic supervision, school-based and external professional development, emotional and moral support, teacher empowerment via collaborative learning communities, and partnerships with industry. These strategies positively shape teachers' discipline, sense of responsibility, pedagogical competence and collaborative culture, although effects remain uneven due to infrastructure constraints, varied motivation and limited digital readiness. The proposed model enriches vocational leadership theory and offers practical guidance for policymakers designing interventions in similar marginalised contexts across Indonesia.

INTRODUCTION

Teacher professionalism is widely regarded as a central determinant of education quality, encompassing pedagogical, professional, social and personal competencies that must be continually renewed through ongoing professional learning (Husamah et al., 2025; Mgaiwa & Milinga, 2024). In Indonesia, reforms such as teacher certification, the Professional Teacher Education Programme and various in-service initiatives have attempted to raise standards, yet the impact remains uneven across regions and school levels (Revina et al., 2023; Handayani et al., 2023). Vocational education is particularly affected because it must simultaneously address academic, technical and employability skills. Persistent disparities in access to high-quality professional development reveal that national policy alone is not sufficient; local leadership and school-level strategies play a decisive role in shaping how teachers grow professionally in their specific contexts. This study is situated within these ongoing efforts to build a stronger, more equitable culture of teacher professionalism in Indonesian vocational education.

Vocational high schools (Sekolah Menengah Kejuruan/SMK) occupy a strategic position in preparing skilled workers who can respond to the demands of Industry 4.0 and rapidly changing labour markets. Research shows that the professionalism of vocational teachers is a key factor in achieving graduate competence, as they are expected to integrate technical expertise, pedagogy and soft skills aligned with industrial needs and technological developments (Soenarto et al., 2020; Nurtanto et al., 2022). At the same time, employers' expectations concerning occupational standards, productivity and work ethic require that SMK curricula maintain strong relevance to contemporary workplace realities (Kamaludin et al., 2022). These demands imply that vocational teachers must not only master content and instructional strategies, but also continually update their knowledge of industry practices and labour market trends. The capacity of schools to support such development, however, depends heavily on the leadership and management exercised by principals in each institution.

Digital transformation in teaching and learning further increases the complexity of the professional role of SMK teachers. They are now expected to combine vocational practice with digital literacy and the ability to integrate technology into instruction. Studies in the Indonesian context indicate that teachers' beliefs about ICT, school-level support and the availability of infrastructure significantly influence the extent to which technology is used in teaching (Mukminin et al., 2019). Research on mobile and blended learning in vocational settings highlights the potential of digital platforms to enhance student engagement and autonomy when designed according to learners' needs and vocational characteristics (Setiawan et al., 2020; Sukatiman et al., 2020). In the post-pandemic period, educational supervision and professional guidance increasingly involve online modes and flexible arrangements (Mulyanti, 2023). Under these circumstances, teacher professionalism entails an ability to use technology reflectively and purposefully, rather than merely adopting tools in a superficial or compliance-driven way.

Within the school, the principal acts as the central instructional leader responsible for steering vision, culture and professional development. Empirical studies show that principal management and instructional leadership correlate positively with teacher competence, school quality and learning processes in vocational settings (Maisah et al., 2024; Tasrif et al., 2022; Surya Putra & Purwanto, 2025). Professional development programmes that are systematically planned, implemented and evaluated can enhance teachers' pedagogical and professional competencies when supported by effective leadership (Mulyana et al., 2023). For SMK principals, the challenge is to translate policy mandates into meaningful supervisory practices, school-based training and performance monitoring that actually strengthen classroom practice and professional identity. This requires a nuanced understanding of teachers' needs, the institutional context and external demands from industry and government.

Collaborative supervision and professional learning communities have been identified as promising approaches for building teacher professionalism from within schools. Research on academic supervision in teaching factory-based SMK shows that high-quality supervision supports teachers in designing contextual learning, industrial practice and authentic assessment (Sembiring & Risamasu, 2024). Collaborative, dialogue-based supervision and school-based communities of practice have been found to enhance teachers' professional competence and commitment (Suryani et al., 2024; Smeplass, 2023). Participation in professional learning communities also supports novice teachers in navigating the challenges of their early careers and meeting professional standards (Mabunda & McKay, 2024). These findings suggest that principals who can foster collegial cultures and sustained collaborative learning create enabling conditions for continuous professional growth.

The challenge of strengthening teacher professionalism becomes even more complex in remote, frontier and disadvantaged regions such as Merauke in eastern Indonesia. Studies on teacher development in remote areas point to limited access to training, inadequate facilities and weak mentoring, all of which contribute to gaps in teacher competence and learning quality between regions (Sutomo & Siregar, 2022). Research on teacher education in Indonesia emphasises that existing qualification and professional programmes have not fully addressed contextual needs, particularly for teachers working in schools with constrained infrastructure and highly diverse cultural communities (Loeneto et al., 2022; Novita, 2022). In such environments, school leadership must be sensitive to local conditions and capable of tailoring professional development initiatives accordingly. Recent work on teacher induction also highlights the importance of leadership and school culture in helping novice teachers gradually meet professional standards (Tatik et al., 2025).

Against this backdrop, vocational high schools in Merauke face the dual challenge of meeting national standards of teacher professionalism while grappling with geographic isolation and resource constraints. Principals are expected to serve as instructional leaders, organisational managers and community brokers, while simultaneously responding to distinctive local realities. Yet little empirical research has examined how principals in remote

vocational schools actually design and implement leadership strategies to strengthen teacher professionalism, and how teachers experience these efforts in their daily work. This study addresses this gap by exploring principal leadership strategies in three public SMK in Merauke District and analysing their perceived impact on teachers' professionalism. The article aims to contribute to the literature on vocational school leadership in marginalised contexts and provide evidence-informed guidance for policy and practice.

METHOD

1. Research Design

This study employed a qualitative descriptive multi-site design to explore principal leadership strategies for enhancing teacher professionalism in public vocational high schools. A qualitative approach was chosen because the focus of the research was to understand processes, meanings and contextual dynamics in principals' leadership practices, without manipulating variables. The researcher acted as the primary instrument, engaging directly with participants through interviews, observations and document analysis. The data consisted mainly of words, actions and documentary artefacts, which were analysed inductively so that patterns, themes and categories could emerge from the empirical reality of the schools. This design allowed a holistic understanding of how leadership strategies are conceptualised, implemented and experienced in the natural settings of the three SMK.

2. Setting and Participants

The research was conducted in three public vocational high schools in Merauke District, Papua Selatan Province: SMK Negeri 1 Merauke, SMK Negeri 2 Merauke and SMK Negeri 3 Merauke. These schools were selected purposively because they: (1) offer vocational programmes with established linkages to industry; (2) have implemented various initiatives for teacher professional development; and (3) are led by principals who play strategic roles in managing vocational education in a remote 3T context. The study involved principals as key informants, teachers as main supporting informants, and vice principals (for curriculum or student affairs) as additional informants. Participants were selected using purposive and snowball sampling based on their roles, experience and relevance to the research focus, and data collection continued until information redundancy was reached.

3. Data Sources

Primary data were obtained directly from principals, teachers and vice principals through interviews and observations. Principals provided information on their leadership vision, academic and managerial supervision, professional development policies, partnerships with industry and strategies for addressing constraints. Teachers contributed perspectives on how leadership strategies were experienced in terms of support, expectations and changes in professional practice. Vice principals helped to verify and deepen information regarding the planning, implementation and monitoring of programmes at operational level. Secondary data were drawn from official documents such as school work plans, supervision schedules and reports, teachers' professional development records,

teacher performance appraisal reports, minutes of meetings, documentation of school-based professional learning communities and relevant local policy documents.

4. Data Collection Procedures

Data were collected using three main techniques: in-depth semi-structured interviews, observation and documentation.

In-depth interviews were conducted with principals, selected teachers and vice principals using interview guides aligned with the research questions. Questions explored leadership strategies in supervision, professional development, motivation, empowerment and industry partnerships, as well as perceived challenges and impacts on teacher professionalism. Interviews were conducted at the schools at mutually agreed times, audio-recorded with participants' consent and transcribed verbatim.

Observations were carried out to capture principals' leadership behaviour and the interactional dynamics between principals and teachers. The researcher observed, among others, classroom visits, supervisory follow-up meetings, staff meetings, professional development activities and daily school routines. Both non-participant and limited participant observation were used. Field notes documented chronological events, settings, interactions and preliminary reflections.

Documentation analysis was undertaken to obtain written evidence supporting and validating interview and observation data. Documents included school strategic and annual plans, supervision instruments and reports, teacher performance appraisal records, lists and certificates of training attended by teachers, records of teacher working groups and school-based professional learning communities, and memoranda of understanding with industry partners.

To support the procedures above, several auxiliary instruments were used, including interview guides for different categories of informant, observation sheets describing focal aspects of leadership practice, and documentation checklists to ensure systematic identification and review of relevant documents.

5. Data Analysis

Data were analysed inductively using Miles and Huberman's interactive model, encompassing three interrelated activities: data reduction, data display and conclusion drawing/verification. Data reduction began from the start of data collection and involved selecting, focusing, simplifying and organising raw data from interview transcripts, field notes and documents. Statements related to leadership strategies, supervision practices, professional development, industry partnerships, challenges and solutions were coded and grouped into initial categories. These categories were then refined, merged or subdivided as the analysis progressed.

In the *data display* stage, reduced data were organised in matrices, thematic summaries and narrative case descriptions for each school. Displays were used to explore relationships between leadership strategies and manifestations of teacher professionalism, and to compare patterns across the three schools.

Conclusion drawing and verification took place throughout the analysis. Provisional conclusions emerging from patterns in the data were checked against

additional evidence through further reading of transcripts, follow-up questions and cross-case comparison. Triangulation of sources (principals, teachers, vice principals) and techniques (interviews, observations, documents) was applied to enhance the robustness of findings.

6. Trustworthiness

Trustworthiness was ensured through credibility, transferability, dependability and confirmability. Credibility was strengthened via source and method triangulation, prolonged engagement in the field and member checks, whereby key findings and interpretations were fed back to participants for confirmation. Transferability was enhanced by providing rich, thick description of the school context, leadership practices and professional development processes, allowing readers to judge applicability to similar settings. Dependability was supported by maintaining an audit trail comprising research plans, field notes, analytic memos and documentation of methodological decisions, and by engaging in peer debriefing with academic supervisors. Confirmability was pursued by systematically linking interpretations to empirical data and maintaining a clear distinction between participants' accounts and the researcher's analytical commentary.

RESULTS

1. Overview of the Findings

Analysis of interview, observation and document data across the three SMK generated a set of themes concerning principal leadership strategies, challenges in strengthening teacher professionalism, responses to these challenges and perceived effects on teachers' professional practice. Coding and within-case analysis were followed by cross-case comparison to identify convergent and divergent patterns. Overall, the principals placed academic supervision, professional development facilitation, motivational support, teacher empowerment and industry partnerships at the centre of their leadership efforts. However, these strategies were enacted within a context marked by limited vocational facilities, geographical isolation and varying levels of teacher motivation and digital readiness.

2. Principal Leadership Strategies

The first major theme concerns principal leadership strategies to enhance teacher professionalism. All three principals viewed academic supervision as a key instrument for guiding teachers. Supervision was carried out through scheduled classroom observations, lesson plan reviews and post-observation conferences. Importantly, principals emphasised a developmental rather than punitive orientation: classroom visits were followed by reflective conversations in which strengths and areas for improvement were discussed and concrete steps for refinement were agreed. Supervision thus functioned as an ongoing coaching process rather than a one-off evaluative event.

A second cluster of strategies related to the facilitation of professional development. Principals actively supported teachers to participate in external training such as subject-based teacher working groups (MGMP), workshops organised by the district education office and relevant online courses. At the

same time, they initiated school-based professional learning through in-house training, peer sharing sessions and informal mentoring by more experienced teachers. Motivational support formed a third set of strategies: principals provided recognition, encouragement and moral support in staff meetings and individual interactions, particularly when teachers faced performance difficulties or personal challenges. These practices helped to build teachers' confidence and sense of being valued. A summary of leadership strategies and associated challenges is presented in Table 1.

Table 1. Summary of leadership strategies and professionalism challenges

Theme	Sub-theme	Summary of empirical finding
Leadership strategies	Academic supervision	Principals carry out scheduled classroom observations, review lesson plans, provide written and oral feedback, and follow up with individual coaching sessions to help teachers refine their planning, teaching and assessment.
Leadership strategies	Professional development	Principals facilitate teachers' participation in MGMP, district- and school-based workshops, and in-house training, and encourage them to share materials and experiences in regular professional learning forums.
Leadership strategies	Motivation and support	Principals give verbal recognition in meetings, express appreciation for teachers' efforts, offer informal counselling when difficulties arise and use encouraging messages to sustain teachers' confidence and commitment.
Professionalism challenges	Limited facilities	Teachers and principals report incomplete and outdated practical equipment and limited vocational laboratory space, which restrict the implementation of planned practice-based learning activities in several subjects.
Professionalism challenges	Low participation of some	Principals note that a number of teachers are reluctant to attend training or engage fully in school initiatives, citing workload, family responsibilities and scepticism about the benefits of professional development.

3. Challenges in Strengthening Teacher Professionalism

Despite principled efforts, principals encountered significant constraints. A recurring issue was the inadequacy of facilities and resources for vocational practice. Laboratories and workshop equipment were often incomplete or outdated, which limited teachers' ability to implement practice-based learning

aligned with industry standards. Teachers reported that they sometimes could not conduct practical sessions as planned due to missing tools or materials, and principals acknowledged that budget limitations and procurement delays hindered facility upgrades.

Another challenge related to geographical remoteness. Merauke's distance from provincial centres and uneven transport infrastructure meant that opportunities for centrally organised training were relatively scarce, and travel costs could be high. These factors reduced the frequency with which teachers could access external professional development. Furthermore, principals observed variability in teachers' motivation and willingness to engage in development activities. While some teachers were highly committed, others were reluctant to attend training or participate fully in school-based programmes, citing workload, family responsibilities or a perception that training would not significantly change classroom realities.

4. Strategic Responses of Principals

In response to these challenges, principals developed adaptive strategies that leveraged internal resources and local opportunities. Recognising the limitations of external training, they prioritised school-based professional development by organising in-house workshops, subject-based discussions and peer observation cycles. Experienced teachers were encouraged to share exemplary lesson plans, teaching media and assessment tools with colleagues, generating a culture of mutual learning. Where possible, principals invited external experts from the district education office or nearby institutions to contribute to these activities.

To mitigate the constraints of remoteness, principals increasingly promoted the use of digital platforms for professional learning and communication. Teachers were encouraged to join online communities, webinars and short courses relevant to their vocational fields. Simple communication applications were used to share learning materials and coordinate activities. Principals also sought to strengthen partnerships with local businesses and industry actors to create opportunities for teacher internships, joint projects and curriculum alignment discussions. These initiatives aimed to update teachers' technical knowledge and ensure that their teaching reflected contemporary workplace practices. Motivationally, principals combined firm expectations with empathetic support, using both collective forums and individual conversations to encourage teachers to participate in development activities and to acknowledge progress.

5. Effects on Teacher Professionalism

Participants reported that leadership strategies had tangible, albeit uneven, effects on teacher professionalism. Principals, teachers and vice principals observed improvements in teachers' discipline and sense of responsibility, reflected in greater punctuality, more consistent lesson planning and increased adherence to school routines. Teachers described becoming more aware of professional standards and expectations, and several credited supervisory feedback and professional development activities with helping them to refine their teaching strategies.

From a pedagogical perspective, teachers increasingly adopted more varied

instructional methods, including group work, discussion, project-based tasks and contextually oriented practical activities. School-based professional learning communities facilitated the exchange of ideas and materials, fostering a more collaborative climate among teachers. Some teachers began integrating digital tools into their teaching, although digital readiness and infrastructure varied across individuals and schools. Overall, principals and teachers perceived a gradual strengthening of professional identity, characterised by greater commitment to students' learning and a willingness to engage in reflective practice. However, they also recognised that change was not uniform: a subset of teachers remained less responsive, and structural constraints continued to limit the full realisation of desired professional standards.

DISCUSSION

The findings demonstrate that principal leadership strategies in public SMK in Merauke make a substantive contribution to strengthening teacher professionalism through academic supervision, facilitated professional development, motivational support and partnerships with industry. This resonates with studies showing that strong instructional leadership in vocational schools is positively associated with teacher performance and the quality of teaching and learning (Nellitawati et al., 2024; Setiyono et al., 2025). Research has also indicated that principals' managerial competence and support for teachers' professional growth significantly influence learning quality at secondary level (Retnawati et al., 2025). International evidence further suggests that relationships between principal leadership and teacher professional learning may be both linear and non-linear, mediated by teacher self-efficacy (Thien & Liu, 2024). Taken together, these findings reinforce the conclusion that well-planned, consistently implemented and learning-oriented leadership, supported by a collaborative school climate, is a key lever for enhancing teacher professionalism in remote vocational schools.

One of the study's key findings is the centrality of academic supervision as a principal strategy for developing teacher professionalism. In the Merauke schools, supervision involves planned classroom observations, constructive feedback and reflective follow-up, enabling teachers to improve lesson planning, instructional practices and assessment. Studies in Indonesian schools show that instructional leadership focused on monitoring teaching and learning can significantly enhance teacher self-efficacy and performance (Elfira et al., 2024; Khoirotun Nisa & Aslamiah, 2024). Research elsewhere has underscored the role of instructional leadership behaviour in shaping teachers' engagement in sustained professional learning (He, 2024). In the Merauke context, supervision that is dialogic and improvement-oriented rather than punitive encourages teachers to be receptive to feedback and to integrate it into their classroom practice. This approach supports the development of a professional culture in which teaching is viewed as an object of joint inquiry, rather than a purely individual responsibility, and where lesson planning is grounded in evidence about students' needs.

The principals also act as key facilitators of teacher professional development

through the provision of both external and school-based learning opportunities. Their efforts align with research on vocational and technical education that stresses the importance of combining industry-based training, mentoring and institutional support to strengthen teachers' pedagogical and vocational competencies (Philogene et al., 2024; Bian & Siththada, 2024). Strategies for developing TVET teachers in the digital age emphasise reflective practice, collaboration and the integration of educational technologies into professional development programmes (Zhou et al., 2024). In Merauke, principals' facilitation of MGMP participation, workshops and in-house training expands teachers' access to current pedagogical and vocational knowledge, even when opportunities are geographically limited. Participation in these learning spaces appears to enhance teachers' confidence, broaden their perspectives and consolidate their professional identities as vocational educators.

Motivational strategies are another salient dimension of principal leadership in the study schools. Principals seek to sustain teacher commitment through recognition, moral support and empathetic communication, particularly in response to challenges and setbacks. Evidence from Indonesian and international studies indicates that leaders who provide clear vision, positive feedback and acknowledgement of teachers' efforts can foster higher levels of self-efficacy and job performance (Elfira et al., 2024; Xie et al., 2025). Research on leadership in inclusive and innovative schools has further highlighted the importance of humanistic and relational dimensions of leadership in cultivating positive school climates and collaborative cultures (Ferreira et al., 2025). In the Merauke SMK, leadership that combines firmness with empathy helps to build interpersonal trust, encouraging teachers to accept new demands, engage in professional learning and persevere in the face of resource constraints. Principals thus become reference figures not merely as administrators, but as professional mentors and moral anchors for teachers.

Teacher empowerment through school-based learning communities and participation in decision-making processes is another distinctive feature of leadership in the Merauke schools. Teachers are involved in planning supervision programmes, choosing training themes and collectively reflecting on teaching practices. Research on teacher development in remote Indonesian regions has emphasised the effectiveness of school-based learning communities and collaborative supervision in sustaining professional growth where formal training is limited (Sutomo & Siregar, 2022). Studies of TVET systems likewise show that communities of practice and professional networks help to strengthen teachers' identities as lifelong learners (Philogene et al., 2024; Bian & Siththada, 2024). In this study, principals foster collegial cultures through regular forums and informal discussions that enable teachers to voice ideas, provide constructive critique and co-construct higher professional standards. Such participatory processes reduce dependence on top-down directives and cultivate a sense of shared ownership over school improvement efforts.

Partnerships with industry form a further pillar of leadership strategies in the SMK studied. Principals work to build and maintain linkages with businesses and industrial partners, creating opportunities for teacher internships, industrial

visits and curriculum alignment. Research on vocational education stresses that close collaboration with industry is essential for updating teachers' technical skills and maintaining the relevance of vocational curricula (Philogene et al., 2024; Zhou et al., 2024). Evidence from Indonesian schools also shows that teacher professionalism, when combined with innovative models such as blended learning, can significantly improve student learning outcomes (Hasyim et al., 2025). In Merauke, principal-led partnerships help bridge the gap between school and workplace, enabling teachers to align teaching content and learning tasks with contemporary occupational demands. This, in turn, strengthens the credibility of SMK as trusted providers of vocational education in the eyes of both communities and employers.

The geographical and infrastructural context of Merauke presents significant challenges for principal leadership. Limited facilities, isolation from major centres and uneven technological infrastructure shape what is possible in terms of professional development and school innovation. Studies of teacher development in remote Indonesian regions highlight the need for locally driven innovations such as community-based supervision and philanthropic support to mitigate limited formal training (Sutomo & Siregar, 2022). Research in Merauke itself suggests that improving teacher competence requires a combination of affirmative policy, leadership committed to mentorship and cross-institutional partnerships (Adolfina & Rahmawati, 2025). Emerging work on digital leadership also points to the potential of principals' strategic use of technology to expand access to professional learning, even where infrastructure is constrained (Zeng et al., 2025). In this study, principals' adaptive capacity – manifested in creative use of school-based training, digital tools and local networks – appears crucial to sustaining progress in teacher professionalism despite structural limitations.

Notwithstanding these efforts, the findings also reveal that not all teachers benefit equally from leadership strategies. Some continue to display lower levels of participation in training, limited digital readiness and inconsistent administrative discipline. This reflects broader patterns identified in the literature, where high professional competence does not automatically translate into consistently high-quality teaching without strong cultures of reflection and accountability (Setiyono et al., 2025). Other studies report varied responses to professional development demands, especially when organisational support and incentives are uneven (Nellitawati et al., 2024; Hasyim et al., 2025). In Merauke, principals respond through intensive dialogue, individual mentoring and proportionate enforcement of rules, seeking to maintain motivation while ensuring that professional standards are upheld. Such a balanced approach can help to align expectations and support teachers' psychological well-being over time.

The study also points to the gradual emergence of digital elements in principals' leadership practices. Some principals use online communication groups, digital repositories for teaching materials and simple applications for reporting and coordination. Recent research shows that principals' digital leadership influences teachers' capacity to integrate advanced technologies,

including artificial intelligence, particularly when accompanied by AI-focused professional development (Zeng et al., 2025). Other work suggests that instructional leadership and teacher self-efficacy mediate the relationship between leadership and teachers' engagement in professional learning, including in technology-related domains (Thien & Liu, 2024; Xie et al., 2025). In Merauke, principals' stepwise introduction of technology, adapted to the availability of devices and connectivity, allows teachers to view digital tools as opportunities rather than burdens. Gradual change enables experimentation, learning from mistakes and the incremental building of digital competence that is realistic for remote vocational schools.

Theoretically, the findings suggest that principal leadership in the Merauke SMK combines elements of transformational, instructional and participatory leadership. Principals articulate and model values, drive pedagogical improvement through supervision, and involve teachers in decision-making about school programmes. Studies on innovative and inclusive schools indicate that leadership which integrates vision, collaboration and capacity-building is effective in fostering strong learning cultures (Ferreira et al., 2025). Research in Indonesian schools similarly finds that instructional leadership combined with teacher participation in decision-making can enhance work commitment and teaching performance (Khoirotun Nisa & Aslamiah, 2024; Elfira et al., 2024). In this study, the hybrid leadership pattern appears well-suited to the demands of remote vocational contexts, where principals must both inspire and support teachers, while working within significant resource constraints. The model emerging from Merauke contributes to a more contextualised understanding of vocational school leadership in the Indonesian periphery.

From a policy perspective, the results point to the need for stronger support for principal development, especially in 3T regions. International and regional research indicates that principals' instructional leadership competence is a key predictor of teachers' engagement in professional development and innovation (He, 2024). Studies also highlight the combined influence of leadership quality, infrastructure and teacher development on learning outcomes (Retnawati et al., 2025; Bian & Siththada, 2024). The Merauke case suggests that leadership preparation programmes for SMK principals should include modules on academic supervision design, school-based professional learning communities, industry partnership management and adaptive leadership in resource-poor settings. Systematic, tiered training supported by mentoring and performance-based evaluation could strengthen school management and teacher professionalism more broadly. Such measures would help ensure that local leadership strategies are reinforced rather than undermined by broader system conditions.

The study is not without limitations. The qualitative multi-case design, while providing rich contextual insights, encompasses only a small number of schools in one district and therefore does not aim for statistical generalisation. Methodological literature on qualitative research underlines that such studies privilege depth of understanding over breadth of coverage (Mantula et al., 2024). Research on school leadership in Merauke indicates that local socio-cultural

dynamics significantly shape leadership practices (Erny, 2025). Qualitative investigations into technology-assisted supervision similarly emphasise the importance of examining diverse contexts to refine leadership models (Gunadi, 2025). Future research employing mixed or quantitative designs across more schools and regions would help to test and extend the model proposed here. Developing quantitative instruments sensitive to local conditions, alongside qualitative inquiry, would provide a stronger evidential base for policies aimed at enhancing teacher professionalism in vocational schools across Indonesia.

CONCLUSION

This study examined principal leadership strategies for enhancing teacher professionalism in three public vocational high schools in Merauke District, a remote region in eastern Indonesia. The findings show that principals adopt a multi-faceted set of strategies centred on learning improvement, including structured academic supervision, facilitation of professional development, motivational and moral support, teacher empowerment through collaborative learning communities and partnerships with industry. Supervision is conducted in a developmental manner, followed by reflective dialogue and practical guidance, encouraging teachers to refine lesson planning, teaching methods and assessment practices. Taken together, these strategies position principals as instructional leaders who mobilise teachers to develop their professional capacities despite 3T constraints.

The results also indicate that teacher professionalism has improved in several important dimensions. Teachers demonstrate higher levels of discipline and responsibility, more systematic lesson preparation and greater readiness to carry out teaching in line with standards. Many are more actively engaged in professional development programmes, both within and beyond the school. Collaborative working cultures have emerged through learning communities, planning forums and shared reflection, supporting the exchange of ideas and mutual critique. Although not all teachers have progressed at the same pace, the overall pattern suggests that consistent, context-aware leadership has contributed to strengthening the professional identity and work ethic of vocational teachers in Merauke.

At the same time, principals continue to face structural and personal challenges that shape the reach of their efforts. These include limitations of vocational facilities and equipment, geographical remoteness, restricted access to external training, variations in teachers' motivation and uneven digital readiness. Such factors risk constraining the expansion and equalisation of professional development opportunities. Principals respond through adaptive strategies such as school-based training, use of simple digital tools for learning and communication, strengthened industry partnerships and individualised support for teachers. Viewing constraints as prompts for innovation enables them to design locally suitable solutions for vocational schools in frontier and coastal areas.

Theoretically, the leadership pattern identified combines transformational, instructional and participatory elements. Principals function as vision carriers,

technical leaders of learning and facilitators of teacher participation in school decision-making. This hybrid approach appears effective in building a robust teacher learning culture, increasing shared ownership of school policies and encouraging active engagement in professional development. From a policy standpoint, the study suggests the need for leadership development programmes explicitly oriented towards learning-centred leadership, community-building, industry collaboration and adaptive management in 3T contexts. In doing so, the study offers both conceptual and practical contributions to the design of context-responsive leadership models for vocational schools in eastern Indonesia.

Finally, the study's qualitative, context-specific design means that its findings are not intended to be generalised mechanically to all SMK. Nonetheless, the detailed portrayal of context, processes and leadership strategies in the Merauke schools can inform practitioners and policymakers working in similar settings. Further research using mixed-methods or quantitative approaches with larger and more diverse samples would be valuable in testing relationships between leadership strategies, teacher professionalism and learning outcomes on a broader scale. Even so, the present study underlines that visionary, relational and adaptive principal leadership is a critical lever for raising vocational teacher professionalism in remote regions.

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