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The Role of digital supervision in enhancing teacher performance in Indonesian secondary education

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Abstract

This study investigates how digital supervision improves teacher performance in Indonesian secondary schools. Eight SMA Labschool Universitas Syiah Kuala participants, including principals, supervisors, and teachers were interviewed using a qualitative method. NVivo 12 was used to analyze word frequencies, themes, and relationships. Findings reveal that digital supervision enhances teacher performance by improving technological and pedagogical competence, fostering creativity, and increasing administrative efficiency—tools like Google Classroom and Zoom support real-time feedback and collaboration. However, limited infrastructure, weak Internet connectivity, and digital skill gaps persist. The study concludes that digital supervision significantly improves teaching quality when backed by sufficient training and facilities. It recommends targeted digital training and improved infrastructure to optimize implementation.

Keywords

Digital supervision, educational technology, secondary education, teacher performance

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Introduction

The quality of secondary education in Indonesia continues to face systemic challenges, particularly regarding teacher performance. Teachers play a central role in determining student success, yet many struggle with outdated pedagogical practices, limited access to continuous professional development, and lack of timely support from school leadership. As a core function of educational leadership, supervision has traditionally served as a mechanism to enhance instructional quality through monitoring, mentoring, and feedback. However, conventional supervision often relies on physical presence and periodic visits, making sustaining consistent performance improvement across schools with diverse conditions challenging. In the era of rapid technological advancement, digital transformation is reshaping how educational systems operate. Across sectors, digital tools have demonstrated the capacity to improve efficiency, accountability, and responsiveness (Yu & Hwang, 2024). In education, digital supervision—using digital platforms to observe, evaluate, and support teaching practices—offers a promising alternative to traditional supervision. It enables real-time monitoring, supports asynchronous feedback, and facilitates data-informed decision-making, which is crucial in today's complex educational environment (Zhou et al., 2023).

Despite its potential, empirical research on digital school supervision remains limited, especially in low- and middle-income countries. Most literature still emphasizes conventional approaches, while studies that examine digital supervision in school-based contexts are sparse (Andreucci-Annunziata et al., 2022; Deussom et al., 2022). This gap is significant in Indonesia, where schools are increasingly encouraged to integrate technology as part of national policies such as *Merdeka Belajar* but often lack the systemic support to implement innovative supervision models effectively.

This study is situated at SMA Labschool Universitas Syiah Kuala. This secondary school has embraced various digital platforms in learning and administration but continues encountering challenges in optimizing teacher supervision. Preliminary observations indicate inconsistencies in the use of supervision tools, varied digital competencies among supervisors and teachers, and unclear digital feedback and evaluation protocols. Although the school benefits from a relatively better infrastructure compared to many public schools, it still struggles to integrate digital supervision into daily practices in a way that consistently improves teacher performance. These gaps present an opportunity to explore how digital supervision is perceived, practiced, and strengthened in a real-world educational setting. By investigating the role of digital supervision in enhancing teacher performance at SMA Labschool, this study aims to fill a crucial research gap and offer context-specific insights that may inform broader educational reforms. It contributes to the discourse on digital transformation in education by examining how leadership, infrastructure, and teacher readiness intersect in practically implementing supervisory innovations.

Methodology

This study employs a descriptive qualitative approach to explore how digital supervision is implemented and perceived in the context of Indonesian secondary education. A qualitative method is considered appropriate as it allows the researcher to capture the lived experiences,

meanings, and interpretations of participants involved in digital supervision, which cannot be quantified or generalized statistically. As stated by Creswell and Poth (2018), qualitative inquiry is best suited for studies that aim to understand complex social phenomena in natural settings through the perspectives of those who experience them. In this case, the focus is not only on the tools and processes of digital supervision but also on the human interactions, challenges, and institutional dynamics surrounding its implementation.

The study was conducted at SMA Labschool Universitas Syiah Kuala, a secondary school affiliated with a public university in Banda Aceh, Indonesia. The school was purposively selected due to its active efforts in adopting digital technologies for learning and administration, including supervision practices. Despite its relatively advanced digital infrastructure compared to many other public schools, the institution still struggles with several issues related to the integration and effectiveness of digital supervision. These include inconsistencies in using digital platforms for supervisory purposes, varying levels of digital competence among supervisors and teachers, and the absence of standardized procedures for conducting and responding to online supervision.

Eight participants were involved in the study, including the school principal, one external supervisor, two vice principals, and four teachers. The participants were selected using purposive sampling based on their active engagement in supervision processes, either as supervisors or as supervisees. According to Palinkas et al. (2015), purposive sampling is a widely used technique in implementation research when the goal is to obtain in-depth information from individuals who have direct knowledge or experience of the phenomenon under study. Each participant provided informed consent, and all interviews were conducted confidentially and respectfully. Data collection was carried out through semi-structured interviews. This format balanced structure and flexibility, enabling the researcher to explore specific themes while allowing participants to elaborate on their experiences and perspectives. Interview questions revolved around five main topics: participants' understanding of digital supervision, their experience using digital tools for supervision, their perceptions of its impact on teaching performance, challenges faced during implementation, and suggestions for improvement. Each interview lasted between 40 and 60 minutes and was recorded—with participants' consent—using a digital audio recorder. Field notes were also taken to capture non-verbal cues and contextual observations that could inform data interpretation.

All recorded interviews were transcribed verbatim and imported into NVivo 12, a qualitative data analysis software that facilitates systematic coding, categorization, and interpretation of textual data. NVivo was chosen due to its advanced capabilities in handling large qualitative datasets, visualizing relationships between concepts, and enabling rigorous thematic analysis. The analysis followed the framework outlined by Woolf and Silver (2018), emphasizing a five-level qualitative data analysis (QDA) method to transition from raw data to conceptual understanding. Initially, the researcher conducted open coding by labeling significant statements relevant to the research questions in the transcripts. These codes were then grouped into categories based on their conceptual similarities and further synthesized into broader themes.

The researcher utilized NVivo's Word Frequency tool to deepen the analysis and identify the most frequently mentioned terms across all interviews. This procedure helped to highlight core concepts and recurring concerns among participants, such as "feedback,"

"platform," "discipline," "monitoring," and "competence." The Word Tree feature was also used to explore the context in which specific key terms appeared—particularly "supervision"—to understand how participants used it in different relational or evaluative contexts. Furthermore, the Project Map tool visualized the relationships between digital tools, supervision actors, challenges, and outcomes. These visualizations supported identifying patterns and tensions within the digital supervision ecosystem at the school. Throughout the process, data validity and reliability were ensured through several strategies. Member checking was used by sharing summary interpretations with participants to verify accuracy and ensure their views were correctly represented. Peer debriefing was also conducted with fellow researchers to review coding decisions and thematic interpretations. Additionally, the researcher maintained an audit trail by documenting all analytic decisions and coding revisions, enhancing the transparency and dependability of the analysis. The use of NVivo 12 supported a more organized and efficient analysis and provided methodological rigor through digital tools that enable comprehensive text analysis, visualization, and theory-building. While traditional qualitative methods rely heavily on manual coding and thematic intuition, integrating software-assisted analysis enhances the credibility and clarity of findings. By triangulating manual insights with digitally derived data patterns, the researcher could construct a rich, multi-dimensional understanding of how digital supervision is practiced, perceived, and problematized within the school context.

Findings

This study investigates the role of digital supervision in enhancing teacher performance within a secondary education context in Indonesia. The researchers identified several key themes using qualitative data from eight participants, including school leaders and teachers, and analyzed them using NVivo 12. Multiple forms of visualization were generated to enrich the understanding of the data, one of which is the word cloud presented in Figure 1 below.

Figure 1. A *word cloud of dominant terms in digital supervision interviews*

Figure 1 presents a word cloud visualization of the most frequently occurring terms extracted from all transcribed interviews conducted in this study. The larger and bolder a word appears in the image, the more often participants mention it. This visual representation provides a macro-level overview of the discourse surrounding digital supervision as perceived by key actors in the school setting.

The most prominent word in this word cloud is "supervision," which confirms that the discussion consistently revolved around supervisory practices. This term is closely followed by "digital," "school," and "learning," emphasizing the strong connection between supervision and educational technology within the school environment. These dominant words reflect the central research concern and affirm that digital supervision is conceptualized not as a stand-alone practice, but as deeply embedded in teaching and learning processes.

Additionally, frequently appearing words such as "teacher," "platform," "performance," "evaluation," "support," and "technology" offer extra information about the key dimensions of digital supervision practices. The word "teacher" highlights the targeted subject of supervision, suggesting that most actions, benefits, and challenges revolve around monitoring and developing teacher performance. The presence of "platform" and "technology" underscores the tools being used, ranging from Google Classroom to Zoom, WhatsApp, and Learning Management Systems (LMS), which were further detailed in subsequent figures (see Figure 2 in the following subsection).

Interestingly, words like "training," "discipline," "feedback," and "creativity" were also visible, pointing to broader themes related to professional development and the dual role of supervision: both evaluative and formative. Participants did not merely perceive supervision as a method for accountability, but also as a process that could empower teachers to become more innovative and reflective.

Moreover, several words such as "barriers," "connection," "devices," and "readiness" suggest emerging challenges. These terms indicate that while digital supervision has potential, its practical implementation still faces multiple technical and human-level limitations. These findings align with previous research, which emphasizes that digital transformation in education requires technological access, adequate support systems, and a shared culture of adaptability (Deussom et al., 2022; Zhou et al., 2023).

The word cloud also revealed subtle but meaningful contrasts in language. Terms like "traditional," "observation," and "classroom" reflect remnants of conventional supervision models, indicating that schools are currently in a transitional phase, combining both analog and digital strategies. Teachers' narratives suggested a cautious shift in supervisory culture, where digital tools provide opportunities for autonomy but also raise questions about clarity of evaluation criteria and fairness.

This visual (Figure 1) was placed early in the Results section to provide readers with a foundational understanding of the main narrative threads present in the qualitative data. It serves as a linguistic map that previews the following discussion, allowing readers to anticipate the major themes, recurring concepts, and tensions raised by participants. It also supports the interpretation that digital supervision, while widely acknowledged and positively viewed, is still evolving regarding policy clarity, technological equity, and user confidence.

The word cloud offers a practical summary of how digital supervision is being constructed in the language of school stakeholders. It reflects the central concepts of performance improvement, technology use, platform navigation, and evolving supervisory practices. Visualization contributes to a richer interpretation of the qualitative findings, illustrating that digital supervision is a procedural innovation and a linguistic and cultural shift in the education system.

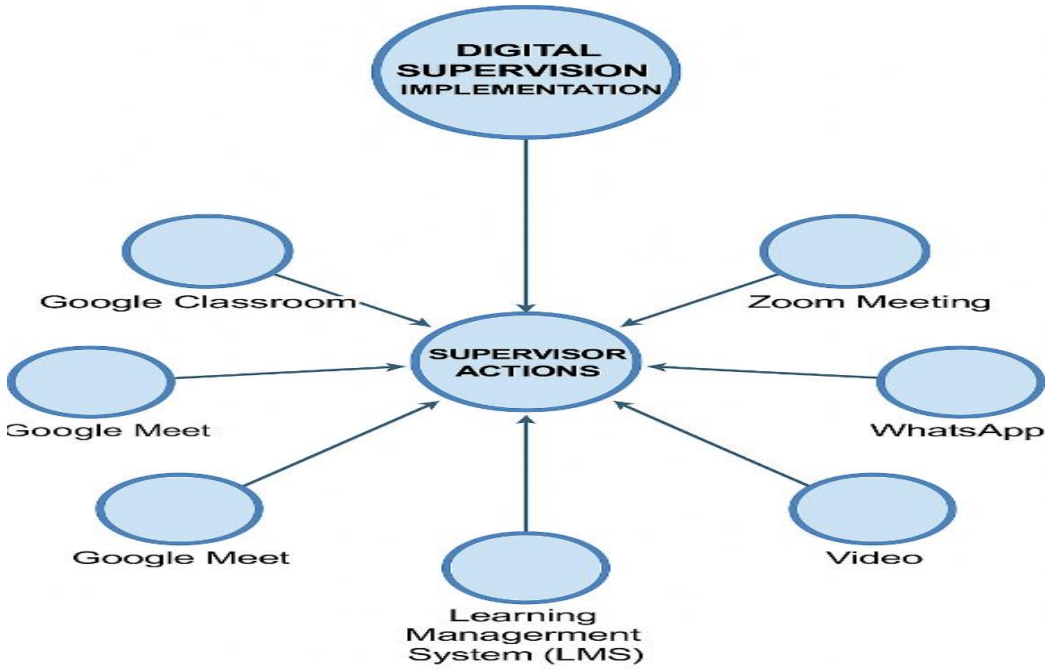
The interview results from the eight participants were identified from the statements of all eight participants. Dedek (Supervisor) views digital supervision as an effective tool for improving teacher performance. The most frequently mentioned benefits include enhanced creativity, time efficiency, and technological competence. However, several challenges remain, such as limited facilities and unstable internet connectivity. Rini (Principal) considers digital supervision an effective instrument for enhancing teacher performance. She highlights increased creativity, innovation, and teacher competence as the most common advantages. Digital platforms such as Google Meet, Google Classroom, and Microsoft Teams are popular tools used in supervision.

Astriad (Vice Principal) regards digital supervision as crucial for improving teacher performance. Astriad views direct supervisory actions as the most influential factor. Furthermore, developing technological competence and promoting teacher collaboration are also considered essential. Hendra (Vice Principal) perceives digital supervision as a practical approach to enhance teacher performance. The most frequently mentioned benefits include improved creativity, innovation, and ease of communication. Nonetheless, aspects still require attention, particularly the availability of adequate technological infrastructure. Rizal (teacher) sees digital supervision as an effective means of enhancing teacher performance, especially in administrative efficiency. Additionally, improving teachers' professional competence and supervisors are important. However, broader utilization of digital technology in various teaching activities still needs attention.

Hawar (teacher) identifies digital supervision as an effective tool for improving teacher performance. The most influential factors are practical supervisory actions that foster teacher creativity and innovation. Moreover, the development of technological competence and the use of tools such as Microsoft Teams are also emphasized. Fazilah (teacher) also views digital supervision as a practical approach to enhance teacher performance. Direct supervisory actions are seen as the most impactful factor. Additionally, the development of technological competence and the use of platforms like Google Classroom are considered important. Rizayani (teacher) indicates that, based on the graph above, there is strong potential in utilizing digital technology—particularly Google Drive—to improve teacher competence. However, a considerable need remains for more intensive training related to technology use.

Based on these findings, the researcher developed a project map to demonstrate the implementation of digital supervision. This project map was developed based on the results of keyword theme coding in the interview data and serves to present and explore the relationships between data points in the implementation of digital supervision. The project map of digital supervision implementation is shown in Figure 2 below.

Figure 2. *Porject map of digital supervision implementation*



Based on the project map above, implementing digital supervision involves using technology, beginning with the supervisor's actions, representing the core of the supervision process. In this context, the supervisor engages in various efforts to achieve the primary goal of supervision, improving teacher performance. These efforts include monitoring, coaching, mentoring, communicating, providing feedback, and conducting teacher training.

The tools illustrated in the project map comprise several digital applications and platforms that supervisors use to carry out their duties. Google Classroom, for example, is employed to manage online classrooms, assign and collect administrative tasks, and provide teacher feedback. Zoom Meeting is commonly used for virtual meetings, such as coordination sessions, group discussions, or presentations. WhatsApp is a more informal channel for quick communication, reminders, or immediate responses. Google Drive enables sharing documents, files, and resources between supervisors and teachers via cloud storage. Google Meet offers video conferencing features similar to Zoom and is often used for virtual classroom observations or consultations. A learning management system (LMS) provides a more comprehensive online learning platform for managing instructional content, quizzes, and assessments. Microsoft Teams facilitates team collaboration through chat, video conferencing, and file sharing functionalities. Video platforms are also used to record and share visual content, such as demonstration lessons or video feedback.

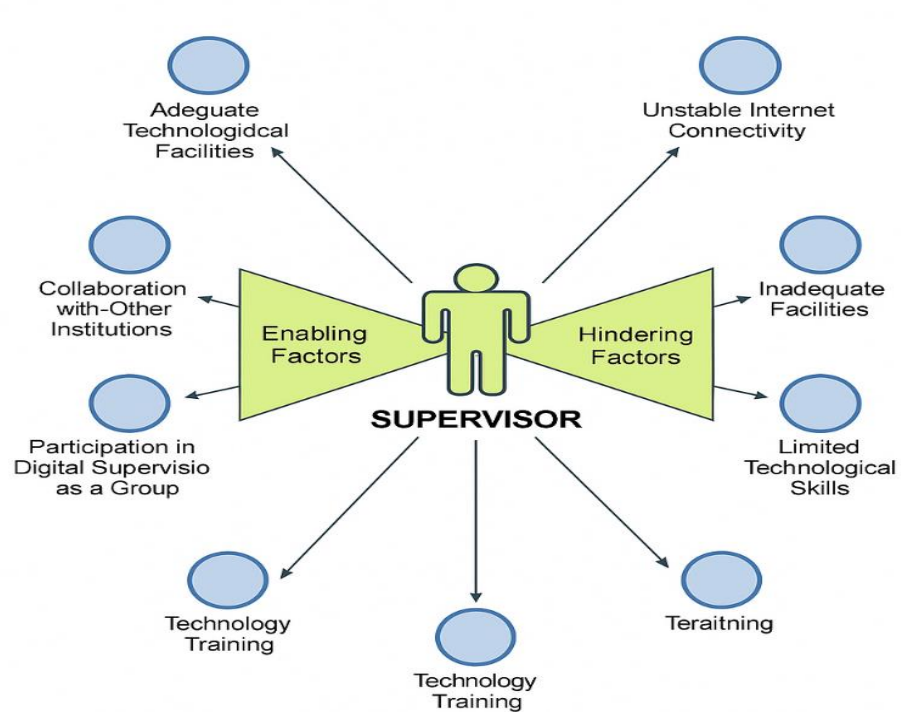
The digital supervision process typically begins with the supervisor identifying the goals and targets of the supervision program. Following this, the supervisor selects the appropriate digital tools according to the intended outcomes and the needs of the teachers. Once the tools are in place, the supervisor executes various actions: delivering feedback either in written form

or via recorded videos; observing online teaching sessions through platforms like Zoom or Google Meet; providing instructional materials through Google Drive or LMS; initiating collaborative discussions using instrument, such as Google Meet or Microsoft Teams; and collecting data on teacher performance through forms or quizzes integrated within LMS platforms. Afterwards, the data is analyzed, and recommendations for improvement are offered. The supervisor then continues to monitor teachers' performance regularly over time.

This project map shows how digital supervision can be conducted effectively using various digital tools, ultimately allowing supervisors to support and enhance teacher performance more efficiently. However, the success of this digital supervision process hinges on several influencing factors, both supportive and inhibitive, as the researchers discussed in the following section.

The implementation of digital supervision in secondary schools is influenced by enabling and hindering factors, which determine the extent to which such practices can be effectively adopted. These findings were synthesized from participant interviews and are visualized in Figure 3 below.

Figure 3. *Supporting and hindering factors of digital supervision*



As shown in the diagram, the central role of the supervisor is directly influenced by two major dimensions: enabling factors (left side) and hindering factors (right side). Each set of factors contains several key variables consistently mentioned by participants during interviews and coded during thematic analysis.

Among the enabling factors, adequate technological facilities are the most influential. These include access to essential hardware, Internet connectivity, software, and a stable digital

infrastructure. When these resources are available, supervisors and teachers can better carry out digital supervision tasks efficiently and confidently. Technological facilities support accessibility, allow real-time feedback, streamline administrative processes, and create new opportunities for collaboration and innovation in pedagogy.

Another important enabling element is technology training. The presence of equipment alone is insufficient unless it is accompanied by systematic training that improves educators' digital literacy. Several participants emphasized the significance of structured training programs for boosting confidence, minimizing technical errors, and enabling teachers to explore creative teaching methods through digital platforms. In this regard, training serves as capacity building and a motivational tool for professional growth.

Furthermore, collaboration with external institutions, such as training centers, universities, or technology companies is crucial for enriching the digital supervision ecosystem. These partnerships offer schools access to resources such as licensed software, technical support, and high-quality training modules while also expanding the professional networks of teachers and supervisors. The diagram also illustrates other supporting elements like group participation in digital supervision, which fosters peer learning and promotes a culture of collective accountability and innovation.

On the other side of the diagram, the hindering factors are equally significant in determining the challenges faced during digital supervision. The most prominent issue reported was limited technological skills among teachers and supervisors. Many participants admitted to difficulties operating digital platforms, managing online tools, or adapting to new technologies, ultimately reducing confidence and inconsistently using supervision systems.

Another key constraint is the inadequacy of facilities. Some schools still lack essential hardware or functional Internet networks, making it difficult to conduct even basic digital tasks such as document sharing, video conferencing, or online monitoring. Participants noted that these infrastructural limitations often disrupt the efficiency and consistency of supervisory practices.

Unstable Internet connectivity remains a widespread challenge, particularly in some geographic areas. Weak or interrupted connections delay access to digital content and interrupt ongoing virtual observations, communications, or assessments. Such an issue reduces the reliability and effectiveness of the digital supervision process, leading to frustration and decreased engagement from supervisors and teachers.

Figure 3 illustrates that while using digital tools in supervision offers promising avenues for performance enhancement, its success largely depends on addressing the identified barriers and reinforcing the enabling factors. For digital supervision to thrive, a comprehensive and sustained effort is needed to build digital capacity, strengthen infrastructure, and cultivate a collaborative culture within and beyond the school environment.

Discussion

The findings of this study reveal that digital supervision has become an integral component in enhancing teacher performance, particularly in the context of Indonesian secondary education. This aligns with the global trend toward digital transformation in

education, where digital platforms increasingly support supervisory processes to improve efficiency, accountability, and pedagogical quality.

The central outcome of this study highlights that supervisors at SMA Labschool use various digital tools such as Google Classroom, Microsoft Teams, Zoom, and LMS platforms to observe, monitor, guide, and evaluate teacher performance. These practices are aimed at administrative efficiency, cultivating teacher creativity, improving communication, and enabling real-time feedback. This finding resonates with the assertion by Wu et al. (2023) that digital transformation in education leads to improved service quality, scalability, and sustainability in institutional performance.

One significant insight is that adequate supervision depends not solely on tool availability but on how well supervisors use them to provide pedagogical leadership. As emphasized in the interviews, digital supervision extends beyond compliance monitoring; it fosters continuous professional development and learning among teachers. Similar findings were reported by Dube and Hlalele (2022), who showed that remote supervision enabled timely feedback and facilitated reflective practice, particularly in resource-constrained settings.

Another notable theme from the current study is the multifactorial nature of digital supervision success. The project map and hierarchical diagrams developed from thematic coding indicate that several supporting factors influence its effectiveness. Among them, adequate technological infrastructure emerged as the most potent enabler. When schools provide reliable Internet connectivity, hardware, and technical platforms, supervisors and teachers can engage meaningfully with digital supervision activities. This result reflects the findings of Zhang et al. (2023), who emphasized that the success of digital systems in public institutions is strongly correlated with ICT infrastructure readiness.

Likewise, technological training significantly shaped teachers' motivation and competence. The study indicated that teachers who received targeted training were more confident and engaged in using digital platforms, confirming prior studies such as Nasution et al. (2022), who observed that digital literacy training directly correlates with improved professional performance among Southeast Asian educators.

Conversely, the study identified three major obstacles to digital supervision: (1) limited technological competence, (2) inadequate facilities, and (3) unstable internet networks. Teachers lacking basic ICT skills expressed difficulty navigating learning management systems or conducting online interactions. This barrier echoes the global concern identified by Tawafak et al. (2023), who warned that digital gaps in teacher training would hinder the implementation of educational technologies across developing countries.

Unstable internet connectivity further complicates synchronous interactions such as live observations or virtual coaching sessions. This challenge aligns with Feng et al. (2022), which found that low network quality could significantly disrupt the educational experience and reduce participation in digital learning environments.

Despite the widespread adoption of platforms like Google Meet and Microsoft Teams, the study underscores the necessity for contextual adaptation of digital supervision tools. Some teachers found it challenging to align platform functions with Indonesian curriculum needs or to manage digital fatigue from prolonged screen time. This complexity mirrors the argument by Hämäläinen et al. (2023), who noted that digital supervision must consider pedagogical alignment and teacher well-being to remain effective.

A vibrant contribution to this study lies in its integration of project maps and concept mapping, which visualizes how supervisors navigate between support and constraints. The model indicates that digital supervision is not a linear process but an iterative and adaptive cycle involving planning, implementation, feedback, and follow-up. In this sense, digital supervision mirrors the principles of adaptive learning systems, where data-driven decisions improve responsiveness and precision in educational leadership. This conclusion is consistent with the systems-thinking approach proposed by Ayob et al. (2022), where digital leadership requires dynamic, feedback-based strategies to optimize school human capital.

Moreover, the social dimension of supervision, particularly collaborative networks with external institutions, emerged as a vital support mechanism. Schools that partnered with universities or tech companies had better access to expert training, learning resources, and sustainable support. This reinforces the importance of collaborative governance, a principle emphasized in a study by Lim and Chan (2021) that concluded that institutional partnerships enhance innovation potential in digital education ecosystems.

Theoretically, these findings expand the understanding of constructivist digital supervision, where the learning experience is co-constructed through dialogue, interaction, and scaffolding between supervisors and teachers. This supports Vygotsky's sociocultural theory, which underlines the role of social interaction and mediation in professional development. Digital platforms, when used effectively, provide the scaffolds needed for reflective teaching, thereby increasing autonomy and accountability.

However, the study also notes caution: technology is not a panacea. While digital supervision tools are promising, their impact depends on pedagogical intentionality, user adaptability, and systemic support. In the Labschool context, clear objectives, responsive leadership, and professional trust underpinned the success of digital supervision. This finding corresponds with the position of Kafyulilo et al. (2020), who warned against techno-centrism and advocated for holistic supervision practices rooted in shared goals and values.

Digital supervision is a multidimensional process that intertwines technological, institutional, and human factors. For digital supervision to truly enhance teacher performance, it must go beyond digital tools and aim to build a sustainable culture of feedback, learning, and collaboration. Moving forward, educational policymakers and school leaders should consider these insights when designing supervision systems that are both scalable and sensitive to local contexts.

Conclusion and Recommendations

The results of this study reveal that digital supervision significantly enhances teachers' professional capabilities, efficiency, and adaptability in the face of educational challenges, especially in the post-pandemic era, where remote and hybrid learning has become increasingly relevant.

Digital supervision allows supervisors to perform essential tasks such as observation, mentoring, communication, and feedback through digital tools and platforms. These include Google Classroom, Zoom, Microsoft Teams, WhatsApp, and Learning Management Systems (LMS), which collectively improve administrative efficiency, foster innovative teaching methods, and support ongoing teacher development. Participants in the study consistently

highlighted how the use of these tools has streamlined reporting processes, enhanced the quality of communication, and allowed for more flexible monitoring of teaching performance.

The study also identifies several enabling factors that contribute to the success of digital supervision. These include adequate technological infrastructure, access to digital devices and Internet connectivity, and training programs that build teachers' digital competencies. Moreover, collaboration with external institutions such as universities and technology providers has helped enrich the supervisory process by offering professional development opportunities and technical support.

However, despite these positive aspects, the study also uncovers critical barriers that hinder the optimal implementation of digital supervision. These include limited digital literacy among some educators, inadequate access to reliable Internet, and infrastructural gaps in specific school environments. These challenges can lead to inconsistent implementation of digital tools, reduced teacher motivation, and ultimately, a diminished impact on teaching quality.

The findings also suggest that the effectiveness of digital supervision depends mainly on the supervisors' leadership and ability to adapt to technological innovations. Supervisors who demonstrate proactive leadership, provide continuous feedback, and facilitate teacher collaboration tend to foster more meaningful improvements in teacher performance. In this context, digital supervision is not merely a technical shift, but also a cultural transformation in how leadership and mentoring are practiced in education.

Therefore, the researchers propose several recommendations to optimize the impact of digital supervision. First, schools must invest in stable digital infrastructure and ensure equal access for all stakeholders. Second, regular and structured digital training programs should be institutionalized to bridge the competence gap. Third, supervision models must be redesigned to integrate synchronous and asynchronous methods that are adaptable to different school contexts. Lastly, policymakers should support systemic reforms integrating digital supervision into national education quality assurance frameworks.

In conclusion, digital supervision emerges as a transformative strategy to elevate teacher performance. While challenges remain, its potential to drive continuous professional development, foster collaboration, and build a responsive educational ecosystem is evident and promising particularly when supported by strategic planning, strong leadership, and sustainable investment in digital capacity. To further strengthen its implementation, it is recommended that schools develop integrated digital supervision frameworks tailored to their specific contexts, encourage peer-to-peer digital mentoring programs to support capacity building among teachers, and collaborate with educational technology experts to update digital tools and practices continuously. These steps can ensure that digital supervision becomes a sustainable, scalable, and impactful part of Indonesia's educational transformation.

Disclosure Statement

No potential conflict of interest was reported by the authors.

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