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Principals' Digital Leadership Strategies in Improving Teacher Performance through Digital Supervision: A Phenomenological Qualitative Study

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Abstract

The digital transformation in education demands a paradigm shift in principal leadership, particularly in the implementation of teacher performance supervision. Conventional, administrative supervision is considered insufficiently adaptive to the demands of digital learning. This situation necessitates an in-depth study of principals' digital leadership strategies for improving teacher performance through digital supervision. This study aims to examine and understand in depth the digital leadership strategies of school principals in improving teacher performance through digital supervision based on the experiences of educational practitioners. This study employed a qualitative approach with a phenomenological design. Participants included school principals and teachers directly involved in digital supervision. Data were collected through in-depth interviews, observations, and documentation studies, then analyzed using phenomenological analysis to identify essential themes. The research results show that principals' digital leadership is realized through digital data-based supervision planning, collaborative supervision implementation, and ongoing reflective follow-up. These strategies have resulted in improved teacher performance in aspects of lesson planning, pedagogical reflection, and technology-based learning innovation. This study concludes that principals' digital leadership plays a strategic role in building an adaptive and sustainable professional supervision culture. The research's novelty lies in uncovering the subjective experiences of principals and teachers in digital supervision, positioning technology as an instrument of reflective leadership, not merely an administrative tool.

Keywords*:* Digital Leadership, Digital Supervision, Teacher Performance

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INTRODUCTION

The digital transformation in education has transformed the way schools are managed, including in terms of leadership and academic supervision. The use of digital technologies such as online learning platforms, teacher performance management systems, and data-driven supervision applications is increasingly becoming a part of school management practices[1]. This requires principals to act not only as administrators but also as digital leaders capable of integrating technology into the process of improving educational quality. A principal's digital leadership is understood as the ability to strategically utilize information technology to support decision-making, organizational communication, and teacher professional development. Various studies have shown that technology-adaptive leadership positively contributes to effective school management and improved teacher performance. Digital leadership practices enable principals to conduct supervision in a more systematic, transparent, and sustainable manner[2].

Teacher performance supervision is one of the principal's primary leadership functions, aimed at improving the quality of learning. Advances in digital technology have fostered the emergence of digital supervision, which utilizes online media, electronic evaluation instruments, learning recordings, and data-based feedback. Digital supervision provides teachers with greater space for reflection and expedites the follow-up process on supervision results [3]. Teacher performance in the context of digital education is measured not only by conventional pedagogical skills but also by professional competence in integrating technology into learning. Principals with strong

[1] Shoujian Duan, Yanli Yang, and Dongxiang Song, 'Digital Transformation of Higher Education: Research Status, Conceptual Connotation, and Analytical Framework', *Communications in Computer and Information Science*, 2447 CCIS (2025), doi:10.1007/978-981-96-3735-5_1; Adiwijaya Adiwijaya and others, 'Digital Transformation in Higher Education: Developing a New Framework', *Globalisation, Societies and Education*, published online 2025, doi:10.1080/14767724.2025.2520952; Le Kang and Xiaoyu Xu, 'Progress and Prospect of Digital Transformation of Higher Education in China: Bibliometric and Visualized Analysis', *Journal of Adult and Continuing Education*, 31.1 (2025), doi:10.1177/14779714241300086.

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digital leadership tend to be able to encourage teacher innovation, increase digital literacy, and refine teaching practices through collaborative and reflective supervision[4].

A qualitative phenomenological approach is widely used in educational leadership research to explore the subjective experiences of educational practitioners. Through this approach, principals' and teachers' experiences in implementing and receiving digital supervision can be deeply understood[5]. Phenomenological research allows researchers to capture the meanings, perceptions, and dynamics of digital leadership that cannot be captured through quantitative data alone. Theoretically, this research is based on transformational leadership theory and digital leadership theory. Transformational leadership emphasizes a leader's ability to inspire, motivate, and empower organizational members to achieve positive change. Digital leadership expands on this concept by emphasizing technological mastery, innovation, and digital-based change management as primary tools for improving teacher performance through adaptive and ongoing supervision.

Although principals' digital leadership has been widely discussed in the context of educational management, studies specifically exploring principals' concrete strategies for digitally supervising teacher performance are limited. Most research focuses on technology adoption or infrastructure readiness, while day-to-day leadership practices in digital supervision remain understudied[6]. Previous research has tended to use a quantitative approach that focuses on the relationship between leadership variables and teacher performance. This approach has not fully explained the subjective experiences of principals and teachers in implementing digital supervision, including the challenges, adaptations, and meanings constructed during the supervision process.

Empirical studies at the educational unit level also show variations in the implementation of digital supervision, influenced by school culture, teachers' digital competence, and the principal's leadership style. However, these varied experiences have

[4] Jarunee Kao-Ian, 'Developing an Innovative Leadership Model of School Administrators under a Multicultural Context', *Educational Process: International Journal*, 17 (2025), doi:10.22521/edupij.2025.17.386; Kürşat Kaya and others, 'The Roles of Collective Teacher Efficacy and Commitment in the Relationship Between Turkish Language Teachers' Job Satisfaction and School Principal Distributed Leadership', *SAGE Open*, 14.3 (2024), doi:10.1177/21582440241271136.

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not been widely documented using a phenomenological approach that seeks to understand reality from the perspective of educational practitioners[7]. The theoretical frameworks of digital leadership and modern academic supervision emphasize the importance of integrating technology, leadership, and teacher professional development. However, there is limited research linking these theoretical frameworks to empirical findings based on the direct experiences of principals and teachers, particularly in the context of digital supervision focused on improving performance.

A research gap lies in the lack of effective digital leadership strategies for school principals in supervising teacher performance, seen from the lived experiences of educational practitioners[8]. This gap opens up space for qualitative phenomenological research to provide a deeper and more contextual understanding. A deep understanding of principals' digital leadership strategies in supervising teacher performance is crucial because digital supervision is not simply the use of technology, but rather a leadership process involving interaction, reflection, and data-driven decision-making. This research is needed to explain how principals design, implement, and evaluate digital supervision in the real-world context of schools[9].

A qualitative phenomenological approach was chosen to explore the meaning of principals' and teachers' experiences in digital supervision. Through in-depth interviews and reflections on their experiences, this study seeks to understand the rationale behind the strategies used and their impact on improving teacher performance. This approach allows for contextual findings that cannot be uncovered through quantitative methods. The theoretical foundations of transformational leadership and digital leadership are used to explain how the principal's role as a change agent influences digital supervision practices. These theories emphasize the importance of vision, innovation, and teacher

[7] Abigail Emma Russell, Darren A. Moore, and Tamsin Ford, 'Educational Practitioners' Beliefs and Conceptualisation about the Cause of ADHD: A Qualitative Study', *Emotional and Behavioural Difficulties*, 21.1 (2016), doi:10.1080/13632752.2016.1139297; Catherine Antalek and others, 'Raising Educational Achievement for Students with Special Educational Needs: Perspectives on Evidence-Based Interventions from Educational Practitioners', *Mind, Brain, and Education*, published online 2025, doi:10.1111/mbe.70019; Elaine Sharplin, Laura Karabassova, and Marya Bekova, 'Educational Practitioners' Conceptualizations of the Nature, Impact and Challenges of Educational Research in Kazakhstan', *Asia Pacific Education Review*, 25.1 (2024), doi:10.1007/s12564-023-09900-x.

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empowerment in the process of improving performance, which serves as the rationale for this research[10].

The purpose of this study is to describe and analyze principals' digital leadership strategies for improving teacher performance through digital supervision, based on the real-life experiences of educational practitioners. The results are expected to provide theoretical contributions to the development of digital leadership studies and practical assistance to principals in designing adaptive, reflective, and sustainable supervision[11].

RESEARCH METHODS

This study employed a qualitative approach with a phenomenological design, aiming to deeply understand the experiences and meanings constructed by principals and teachers regarding the application of digital leadership in teacher performance supervision[12]. The phenomenological design was chosen because it allowed researchers to explore the subjective realities of the participants, particularly how digital leadership strategies are implemented, perceived, and interpreted within the context of digital supervision in the school environment.

The study population included all principals and teachers at educational institutions that have implemented digital-based supervision in academic activities. The sample was determined using a purposive sampling technique, with the criteria being principals who actively implement digital supervision and teachers who have participated in the supervision process. The study participants consisted of one principal and several teachers selected based on their direct involvement and experience in digital supervision[13].

The primary instrument in this study was the researcher herself, who served as data collector and analyst. Supporting instruments included semi-structured in-depth interview guidelines for principals and teachers, digital supervision activity observation sheets, and documentation in the form of supervision instruments, teacher performance evaluation reports, and records of digital platform use in the supervision process.

The research procedure began with a planning stage, which included determining the research location, identifying participants, and developing research instruments. Data collection was conducted through in-depth interviews, non-participant observation of digital supervision

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practices, and documentation studies. The data obtained were analyzed using phenomenological analysis techniques through data reduction, data presentation, and conclusion drawing to identify essential themes related to principals' digital leadership strategies for improving teacher performance.

RESULT AND DISCUSSION

Research data was obtained from one principal and eight teachers directly involved in implementing digital supervision. Secondary data indicates that the school has been using digital platforms such as the Learning Management System, Google Workspace, and digital form-based supervision instruments for the past two years. The frequency of supervision increased from once per semester to once per month after the implementation of the digital system.

Interviews with the principal revealed a shift in leadership patterns in supervision. "Supervision no longer requires a formal schedule; I can monitor teaching materials and teacher reflections in real time through the school's digital platform," the principal stated. This statement demonstrates a shift from administrative supervision to digital data-driven supervision. The first teacher shared a positive experience regarding supervision transparency. "We can see the supervision assessment indicators from the start because everything is already in the system, so supervision feels fairer and clearer," she said. This data indicates that digital supervision increases the transparency of the teacher performance evaluation process. The second teacher emphasized time efficiency. "Supervision used to take a long time, but now I just upload the teaching materials and reflections, and then I get written feedback from the principal," she said. This finding indicates that digital supervision has impacted the effectiveness of the supervision process. The third teacher revealed a change in work motivation. "Because supervision is carried out routinely and documented, I feel more motivated to improve the quality of learning," she explained. This statement demonstrates the relationship between digital supervision and improved teacher psychological performance.

Table 1. Secondary Data on the Implementation of Digital Supervision

Aspects of Digital Supervision	Before Digital	After Digital
Frequency of supervision	1x/semester	1x/month
Media supervision	Manual	Digital platform
Feedback forms	Oral	Written & recorded
Performance documentation	Physical archives	Digital data

Descriptive data shows that principals' digital leadership has a direct impact on a more structured and sustainable supervision system. The use of technology enables principals to consistently carry out their supervisory functions without being bound by time and space constraints. Statements from principals and teachers indicate that digital leadership strategies focus not only on the use of technology but also on changing supervisory interaction patterns. Principals act as facilitators of professional reflection through data-driven feedback, rather than simply administrative evaluators. These findings

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demonstrate that digital supervision is a leadership instrument that encourages accountability and improves the quality of learning. The digitalization of supervision strengthens the principal's position as a learning leader who is adaptive to technological change.

Interview data analysis identified three key themes in the principals' digital leadership strategies: data-driven supervision planning, collaborative supervision implementation, and digital reflection-based follow-up. These three themes emerged consistently across the principals' and teachers' experiences. The theme of data-driven supervision planning was demonstrated through the use of digital tools to map teacher needs. "I look at previous supervision data to determine the focus of the next coaching," said the principal. This finding demonstrates the use of data as a basis for decision-making. The theme of collaborative supervision was evident in teacher involvement in the reflection process. "We were invited to discuss after receiving the supervision results, not immediately assessed," said one teacher. This practice reflects participatory digital leadership. The theme of reflective follow-up was evident in the use of digital journals and online discussion forums. "After supervision, we wrote teaching reflections and received follow-up feedback from the principal," explained another teacher. These data confirm the sustainability of digital supervision.

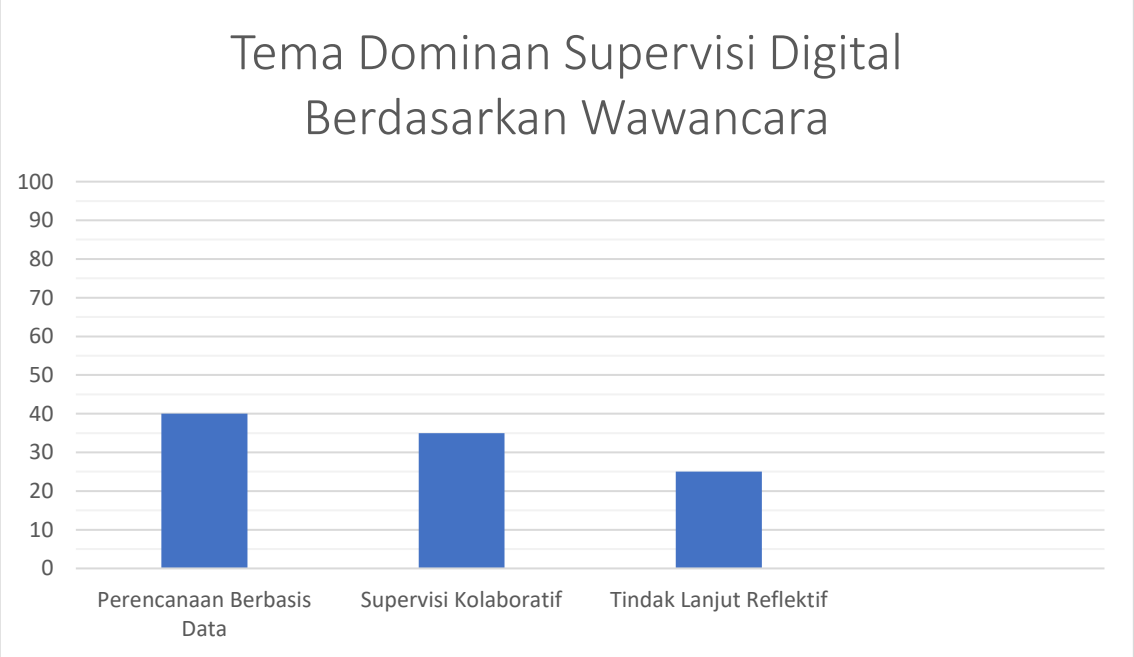


Figure 1. Chart of dominant Themes of Digital Supervision Based on Interviews

The themes identified indicate that principals' digital leadership serves as a key driver of supervisory culture change. Data-driven planning reflects the principal's ability to utilize technology as a strategic leadership tool. Collaborative supervision demonstrates a shift in power relations within supervision from control to professional mentoring. Principals position themselves as learning partners for teachers, not simply performance assessors.

Digitally-based reflective follow-up strengthens the sustainability of teacher performance improvement. Supervision does not stop at evaluation but continues with digitally documented and measurable coaching.

The relationship between principals' digital leadership and improved teacher performance is evident in the link between digital supervision strategies and changes in teachers' professional behavior. Interview data and documentation indicate that the use of digital platforms enables principals to monitor teacher performance development in a continuous, evidence-based manner. This data relationship is also evident in the link between the intensity of digital supervision and increased teacher pedagogical reflection. Teachers who received more frequent digital feedback showed improvements in the development of teaching materials and the variety of learning methods. These findings indicate that digital supervision serves as a mechanism for ongoing development. The connection between primary and secondary data demonstrates that digital leadership is not merely a technical capability, but a leadership strategy that influences the school's work culture. Digital supervision serves as a bridge between the principal's leadership vision and teachers' classroom learning practices.

One case study demonstrates how a principal implemented digital supervision based on a reflective cycle. The principal established an online supervision schedule, asked teachers to upload teaching materials, and conducted learning observations through video recordings of lessons. Teachers involved in the case study shared experiences of significant change. "After the digital supervision, I was asked to write a teaching reflection and discuss it online with the principal," said one teacher. This process demonstrates that digital supervision facilitates continuous teacher professional learning. Supervision documentation in this case study demonstrates improvements in the quality of lesson planning and teacher use of digital media. Digital supervision records serve as an archive of teacher performance development that can be reviewed periodically.

The case study explains that the principal's digital leadership acts as a driver of change through reflection-based supervision and professional dialogue. Digital supervision not only assesses outcomes but also deeply explores teachers' learning processes. A continuous and documented supervisory approach encourages teachers to be more accountable for their professional performance. The principal uses digital data as a basis for coaching, not simply as a control tool. These findings reinforce the understanding that digital supervision is an effective leadership strategy for improving teacher performance, particularly in the planning, implementation, and reflection aspects of learning.

Table 2. Relationship between Digital Leadership Strategy and the Impact of Teacher Performance

Digital Leadership Strategy	Forms of Digital Supervision	Impact on Teacher Performance
Data-based supervision	Digital instruments	More systematic planning

Collaborative supervision	Online discussion	Pedagogical reflection increases
Reflective follow-up	Digital journal	Learning innovation

The overall relationship between the data indicates that the principals' and teachers' experiences in digital supervision formed a shared meaning of digital leadership as a professional development practice. This meaning was developed through reflective interactions, the use of digital data, and ongoing communication. Data analysis was conducted phenomenologically through stages of bracketing to suspend the researcher's assumptions, horizonalization to identify important statements from the interview results, grouping meanings into essential themes, and compiling textural and structural descriptions of participants' experiences. This process resulted in an in-depth understanding of the essence of digital leadership in teacher performance supervision. Data validity was tested through credibility through triangulation of sources and techniques, transferability through the presentation of a detailed description of the research context, dependability through audits of the research process, and confirmability by maintaining the objectivity of the data based on documentation and interview recordings. These steps ensured that the research findings were scientifically accountable

The research findings indicate that principals' digital leadership plays a significant role in improving teacher performance through structured, ongoing, and data-driven digital supervision. Supervision practices are no longer limited to administrative evaluations but have evolved into a reflective and collaborative professional development process[14]. Key findings demonstrate that digital leadership strategies are realized through digital data-driven supervision planning, collaborative supervision implementation, and reflective follow-up using online platforms. This strategy encourages teachers to improve the quality of lesson planning, pedagogical innovation, and professional responsibility. The experiences of principals and teachers indicate that digital supervision creates a new work culture that is more transparent and accountable. Teacher performance improves along with the increased frequency of feedback, performance documentation, and reflection space facilitated by the principal's digital leadership[15].

The findings of this study align with previous research, which found that technology-based leadership positively contributes to the effectiveness of academic supervision and enhances teacher professionalism. Similarities are evident in the use of technology as a tool to strengthen the principal's instructional leadership function. The difference lies in the phenomenological approach, which highlights the subjective experiences of

[14] Russell, Moore, and Ford, 'Educational Practitioners' Beliefs and Conceptualisation about the Cause of ADHD: A Qualitative Study'; Wang and others, 'The Effect of Digital Supervision of China Basic Medical Insurance on Out-of-Pocket Expenditure: Evidence from Quasi-Natural Experiment'.

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educational practitioners. While previous research has focused more on quantitative relationships between variables, this study explores the meaning, perceptions, and dynamics of digital leadership from the perspectives of principals and teachers. The novel contribution of this study lies in mapping contextual and practical digital leadership strategies within digital supervision. The results not only demonstrate impact but also explain how and why these strategies work within the school context.

The results of this study indicate a paradigm shift in supervision from a control approach to a reflection-based professional development approach. Digital supervision demonstrates that technology can strengthen professional relationships between principals and teachers. These findings also indicate that digital leadership is not merely a technological requirement, but a strategic necessity in modern school management. Principals who are able to utilize technology reflectively tend to be more effective in encouraging improved teacher performance. The shift in supervision culture to a more open and collaborative one marks the emergence of school leadership that is adaptive to digital transformation. The results of this study reflect the readiness of educational institutions to respond to the challenges of the digital era through innovative leadership practices.

The theoretical implications of this research lie in strengthening the concept of digital leadership as an integral part of instructional leadership. Digital supervision broadens understanding of the principal's role in managing teacher performance in the technological era. Practical implications are evident in the importance of developing the principal's digital competency as an instructional leader. The results indicate that effective digital supervision requires skills in data analysis, online communication, and facilitating professional reflection. Policy implications include the need for institutional support for the implementation of digital supervision in schools. Providing infrastructure, ongoing training, and regulations that support digital leadership are crucial factors in improving educational quality.

This research finding is based on the flexibility and continuity afforded by conventional supervision. Technology enables principals and teachers to interact more intensively, without being bound by time and space. The use of digital data in supervision promotes objectivity and clarity of performance indicators. Teachers understand supervisory expectations more transparently, thereby increasing motivation and commitment to improving the quality of learning. Digital leadership, oriented toward collaboration and reflection, builds professional trust between principals and teachers. This trust is a key factor explaining improved teacher performance in digital supervision.

The results of this study open up opportunities to develop a digital supervision model based on reflective leadership that can be adapted across various school contexts. This model can serve as a practical reference for school principals in managing teacher performance. Further research can expand the study by involving more educational units and school levels to strengthen the transferability of the findings. A mixed approach can

also be used to combine qualitative depth with quantitative strength. Utilizing the results of this study is expected to encourage the transformation of school leadership toward more adaptive, data-driven practices oriented toward continuous teacher professional development.

CONCLUSION

The most important finding of this study demonstrates that principals' digital leadership serves not only as a driver of technology adoption but also as a substantive strategy for improving teacher performance through reflective, collaborative, and data-driven digital supervision. The key distinction of this study lies in the disclosure of the experiences of principals and teachers, who perceive digital supervision as a continuous professional development process, not simply an administrative evaluation.

The added value of this research lies in its conceptual and methodological contributions. Conceptually, this study strengthens the understanding of digital leadership as an integral part of instructional leadership in the era of educational transformation. Methodologically, the use of a qualitative phenomenological approach provides in-depth analysis of the subjective experiences of educators rarely explored in technology-based supervision research.

This study's limitations lie in the limited scope of participants within a single school context, making the results unable to be broadly generalized. Further research is recommended to involve various educational levels and contexts and combine qualitative and quantitative approaches to more comprehensively test the effectiveness of a digital leadership-based digital supervision model.

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