

# School Principals' Perception of the Challenges and Opportunities of School Digitalization

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## Abstrak

Penelitian ini bertujuan untuk menganalisis secara mendalam persepsi kepala sekolah di Indonesia terkait dualisme antara tantangan manajerial dan peluang pedagogis yang dihadirkan oleh digitalisasi sekolah, serta bagaimana persepsi tersebut memengaruhi strategi kepemimpinan digital mereka. Metodologi: Penelitian ini menggunakan desain kualitatif eksploratif dengan pendekatan fenomenologi interpretatif. Subjek penelitian (kepala sekolah) dipilih melalui teknik purposive dan maximum variation sampling untuk mencakup beragam konteks geografis dan jenjang sekolah. Pengumpulan data dilakukan melalui wawancara mendalam, kuesioner semi-terbuka, observasi, dan analisis dokumen, kemudian dianalisis secara tematik. Hasil: Persepsi dualistik kepala sekolah mengkristal menjadi tiga Tipologi Pola Pikir Digital (Digital Mindset Typologies), yang menjadi kebaruan utama (novelty) penelitian ini, yaitu: Visionary-Adaptive, Pragmatic-Selective, dan Conventional-Resistive. Tantangan utama berpusat pada kendala manajerial (resistensi sumber daya manusia dan alokasi anggaran BOS), sedangkan peluang lebih difokuskan pada pembelajaran yang dipersonalisasi. Implikasi Praktis: Temuan ini mendorong Kementerian Pendidikan untuk merancang ulang program pelatihan Kepemimpinan Digital yang terdiferensiasi berdasarkan tipologi pola pikir, serta merevisi kebijakan pendanaan agar lebih fleksibel. Kontribusi: Secara teoretis, penelitian ini memperkaya literatur kepemimpinan digital dengan menghadirkan model persepsi yang terkontekstualisasi dengan realitas Indonesia, yaitu Model Kepemimpinan Digital Adaptif (Adaptive Digital Leadership).

**Kata kunci:** Kepemimpinan Digital, Persepsi Kepala Sekolah, Tipologi Pola Pikir Digital, Keseimbangan Manajerial-Pedagogis, Digitalisasi Sekolah.

## Abstract

This study aims to deeply analyze Indonesian school principals' perceptions regarding the dualism of managerial challenges and pedagogical opportunities presented by school digitalization, and how these perceptions influence their digital leadership strategies. Methodology: Using an Exploratory Qualitative Design with an Interpretive Phenomenology approach, research subjects (school principals) were selected via Purposive and Maximum Variation Sampling to cover diverse geographical contexts and school levels. Data was collected through in-depth interviews, semi-open questionnaires, observation, and document analysis, then analyzed thematically. Results: The dualistic perception of school principals crystallized into three Digital Mindset Typologies (Visionary-Adaptive, Pragmatic- Selective, and Conventional-Resistive), which represents the study's primary Novelty. The main challenges centered on managerial constraints (HR resistance and BOS budget allocation), while opportunities focused on personalized learning. Practical Implications: The findings urge the Ministry of Education to redesign differentiated Digital Leadership training programs based on the mindset typologies and to revise funding policies for greater flexibility. Contribution: Theoretically, this study enriches the digital leadership literature by presenting a model of perception contextualized to the Indonesian reality (Adaptive Digital Leadership).

**Keywords:** Class Observation Management, Academic Supervision, Teacher Performance

## 1. INTRODUCTION

School digitalization understood as the comprehensive integration of information and communication technology (ICT) into administrative systems, governance structures, and instructional practices has become a strategic cornerstone of contemporary educational reform worldwide. Global institutions such as the OECD and UNESCO consistently

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underscore that digital transformation is fundamental to strengthening educational resilience, equity, and long-term competitiveness (Oktaviani & Marliana, 2021; Herdina & Ningrum, 2023). Established scholarship affirms that digitalization possesses transformative capacity to streamline administrative processes, personalize learning pathways, and democratize access to high-quality educational resources. The adoption of Learning Management Systems (LMS), virtual collaboration platforms, and digital repositories has demonstrably enhanced student engagement while increasing instructional adaptability (Anggriawan, 2019; Aleksius, et al., 2022).

Within Indonesia, the acceleration of digital initiatives was significantly propelled by policy directives from the Ministry of Education and Culture, particularly during and following the COVID-19 pandemic. This period necessitated rapid ICT adoption across schools, frequently under conditions of limited preparedness. Empirical studies highlight that adequate infrastructure and device accessibility constitute indispensable foundations for successful digital implementation. Nevertheless, beyond technical prerequisites, principal leadership emerges as the decisive determinant of digitalization trajectories. School leaders function as strategic change agents responsible for articulating a coherent digital vision, mobilizing resources, fostering teacher engagement, and cultivating institutional readiness. Accordingly, the sustainability and effectiveness of digital transformation are intrinsically linked to principals' perceptions, competencies, and leadership orientations.

Despite widespread acknowledgment of its potential and structural requirements, substantial gaps persist in the literature, particularly concerning the subjective and contextual dimensions of digital transformation. There remains limited in-depth exploration of how principals across educational levels elementary, junior high, and senior high/vocational and across diverse geographical settings in Indonesia conceptualize digitalization beyond infrastructural concerns. Notably underexamined is the manner in which principals reconcile managerial imperatives such as ICT budgeting, cybersecurity governance, and resistance to change with pedagogical aspirations, including digital curriculum innovation and instructional quality enhancement. Existing studies predominantly foreground teacher adoption patterns or student outcomes, thereby underrepresenting the principal's integrative and strategic function in digital governance.

Furthermore, the long-term sustainability of post-pandemic digital models and the formulation of contextually responsive professional development strategies remain insufficiently scrutinized. While contemporary international scholarship increasingly advances digital leadership as an emergent theoretical framework positioning principals as architects of innovation ecosystems, data-informed decision-making, and digital citizenship such paradigms are largely derived from contexts characterized by advanced infrastructure. Consequently, they often fail to capture the structural disparities and practical dilemmas confronting Indonesian school leaders, who must navigate inequitable access, limited ICT literacy, and regionally uneven development.

This research makes a distinctive contribution by examining digitalization from both managerial and pedagogical perspectives through the lens of school principals. Rather than viewing challenges and opportunities as separate issues, the study explores how principals strategically integrate, prioritize, and balance these dimensions within their leadership practice. Key innovations include the managerial–pedagogical synthesis, which analyzes how principals navigate infrastructural, fiscal, and human resource constraints while leveraging digital tools to promote curriculum innovation and personalized learning, and digital mindset

mapping, which identifies principal typologies such as adopter, resistor, or visionary that influence the direction and pace of digital transformation. The practical implications are significant, informing the development of context-sensitive digital leadership programs that combine technical skills with strategic change management, as well as evidence-based ICT investment frameworks to guide hardware acquisition, teacher capacity-building, and digital content development in alignment with local needs. The study contributes theoretically by proposing an interpretive model of principal perception that supports an Adaptive Digital Leadership paradigm suitable for developing contexts, methodologically by employing qualitative-exploratory in-depth interviews to capture nuanced decision-making processes, and practically by offering actionable recommendations for equitable, sustainable, and strategically coherent digital transformation across Indonesian schools. Anchored in these contributions, the central research question examines how principals perceive the challenges and opportunities of school digitalization and how these perceptions shape their strategies to advance sustainable institutional transformation.

## 2. METHOD

This study adopts an Exploratory Qualitative Design grounded in an Interpretive Phenomenological approach to gain an in-depth understanding of school principals' lived experiences and subjective interpretations regarding the challenges and opportunities of digitalization. The research participants ranging from three to five principals were selected through Purposive Sampling combined with Maximum Variation Sampling, ensuring representation across different educational levels and geographical contexts (urban and rural). This strategy was intended to capture the heterogeneity of principals' digital mindsets and leadership orientations (Oe, Yamaoka, & Ochiai, 2022).

Data collection employed a source triangulation strategy to strengthen the depth and credibility of findings. The primary method consisted of in-depth interviews, which explored how principals negotiate and balance managerial and pedagogical dimensions in digital transformation. These interviews were complemented by semi-open questionnaires to map initial perceptions and identify digital mindset typologies. In addition, direct observation was conducted to verify the availability and condition of digital infrastructure, while document analysis was utilized to examine institutional records particularly those related to ICT budget allocation and policy planning.

Data analysis followed the thematic analysis framework of Miles and Huberman, encompassing three systematic stages: data reduction, data display, and conclusion drawing/verification. Through this analytical process, recurring patterns, central themes, and digital mindset typologies were identified and interpreted within their contextual settings (Ayu, et al., 2023).

To ensure research rigor and trustworthiness, validity was reinforced through source and method triangulation, as well as member checking, whereby participants were invited to review and confirm the accuracy of interpretations. These procedures ensured that the findings authentically represented the principals' subjective realities and experiential meanings regarding digital transformation in their schools.

### **3. RESULT AND DISCUSSION**

#### ***3.1 Findings on the Dualistic Perception of Digitalization***

The findings reveal that principals' perceptions of digitalization are inherently dualistic and deeply contextual, encompassing both managerial challenges and pedagogical opportunities.

From a managerial standpoint, the most salient challenge concerns resource constraints. The majority of principals particularly those in rural settings perceive the allocation of ICT funding from the BOS (School Operational Assistance) scheme as relatively rigid, especially regarding device maintenance and technological upgrades. Beyond technical limitations, resistance among senior teachers emerges as a significant non-technical barrier. Principals report that transforming entrenched mindsets and alleviating the perceived burden of adapting to new digital platforms represent substantial obstacles. Additionally, concerns regarding limited human resource capacity in managing data security and mitigating cyber risks further complicate digital implementation.

Conversely, principals articulate highly positive perceptions regarding the pedagogical potential of digitalization. A primary opportunity lies in the facilitation of personalized learning through Learning Management Systems (LMS), enabling content differentiation aligned with students' diverse needs and supporting the implementation of the Kurikulum Merdeka. Digitalization is also viewed as enhancing administrative efficiency, thereby allowing teachers to reallocate time and energy toward instructional improvement. Furthermore, principals recognize the potential of global digital collaboration networks to strengthen both teacher professionalism and student competencies (Purwantiningsih & Suharso, 2019).

#### ***3.2 Digital Mindset Typologies and Leadership Strategies***

A central and novel contribution of this study is the identification of three distinct Digital Mindset typologies, each shaping how principals balance challenges (C) and opportunities (O) within their leadership strategies:

1) Visionary–Adaptive (Optimal: C → O)

Principals in this category demonstrate a transformational orientation. They perceive ICT-related challenges as catalysts for innovation rather than impediments. Strategically, they prioritize internal capacity-building initiatives and actively pursue supplementary funding sources to maximize digital curriculum innovation. Their approach aligns with contemporary conceptions of transformational digital leadership, characterized by proactive cultural change and strategic visioning.

2) Pragmatic–Selective (Balanced: C ↔ O)

This group adopts a utilitarian stance, selecting cost-effective and accessible technologies primarily to enhance administrative efficiency. While acknowledging pedagogical opportunities, they implement innovation cautiously and selectively, guided by immediate institutional needs rather than long-term transformation.

3) Conventional–Resistive (Passive: C → O)

Principals within this typology tend to emphasize infrastructural barriers such as unstable electricity or internet connectivity as justification for limiting ICT adoption. Digital tools are utilized mainly for compulsory reporting requirements, with minimal pursuit of pedagogical innovation. This orientation reflects broader issues of infrastructural inequity and uneven digital literacy in certain Indonesian contexts.

### ***3.3 Findings Diverging from Global Literature***

Although many findings correspond with established international research, several aspects diverge from trends observed in developed countries:

- **Limited Emphasis on Evidence-Based Decision-Making**  
Unlike global models that prioritize data analytics for strategic planning, most principals particularly those in the Pragmatic and Conventional categories view digitalization primarily as a functional tool for administrative efficiency rather than as a mechanism for data-driven institutional transformation.
- **Minimal Focus on Digital Citizenship**  
The cultivation of digital citizenship is not explicitly framed as a pedagogical priority. Instead, principals remain predominantly focused on subject-matter achievement and instructional differentiation.
- **Access Over Innovation Priority**  
For the Conventional Resistive typology, fundamental access challenges (electricity and internet stability) overshadow considerations of transformative curriculum innovation, revealing a distinct hierarchy of digital needs within the Indonesian educational landscape.

This study concludes that principals' perceptions of digitalization are dualistic and crystallize into three Digital Mindset typologies Visionary Adaptive (C → O), Pragmatic–Selective (C ↔ O), and Conventional–Resistive (C → O) each exerting a direct influence on digital leadership strategies. The dominant challenges are managerial in nature, particularly related to BOS funding rigidity and resistance among senior teaching staff. Meanwhile, the most significant opportunities are perceived within the pedagogical domain, especially in personalized learning and administrative streamlining.

The practical implications underscore the need for the Ministry of Education and Culture to redesign differentiated Digital Leadership training programs tailored to principals' mindset typologies and infrastructural realities. Additionally, policy reforms should consider greater flexibility in ICT budget allocation, particularly for maintenance and cybersecurity provisions.

For future research, it is recommended to conduct quantitative investigations assessing the effectiveness of each Digital Mindset typology's balancing strategy specifically its impact on teacher competence and student learning outcomes. Further inquiry should also examine adaptive leadership models that facilitate a transition from functional digital efficiency toward comprehensive evidence-based decision-making, thereby addressing the current perceptual gap identified in this study.

## **Discussion**

The study's findings indicate that school principals' perceptions of digitalization are dualistic, encompassing both managerial challenges and pedagogical opportunities. From a managerial perspective, the most prominent constraint concerns limited resources, particularly the relatively rigid allocation of ICT funds from the BOS (School Operational Assistance) program for device maintenance and technological upgrades (Raharjo & Wibowo, 2024). Additionally, resistance among senior teachers poses a significant barrier, as mindset transformation and adaptation to new digital platforms are often perceived as additional burdens (Widodo & Purnomo, 2024). Limited human resource capacity in

managing data security and mitigating cyber risks further complicates digital implementation (Huang & Li, 2024).

From a pedagogical standpoint, principals perceive digitalization as highly beneficial, particularly in supporting personalized learning through Learning Management Systems (LMS), which allow content differentiation tailored to students' needs and support the implementation of the Merdeka Curriculum (Aleksius et al., 2022; Anggriawan, 2019). Digitalization also improves administrative efficiency, enabling teachers to devote more time to enhancing instructional quality (Purwantiningsih & Suharso, 2019). Furthermore, global digital collaboration networks are recognized as opportunities to strengthen teacher professionalism and student competencies (Almarashdeh & Ababneh, 2023).

This study identifies three Digital Mindset typologies influencing principals' digital leadership strategies: (1) Visionary Adaptive, which views ICT-related challenges as catalysts for innovation and prioritizes internal capacity building and additional funding; (2) Pragmatic–Selective, which adopts a cautious approach emphasizing administrative efficiency through the selective adoption of accessible technologies; and (3) Conventional–Resistive, which focuses on infrastructural barriers and uses technology primarily for mandatory reporting, with minimal pursuit of pedagogical innovation (Nugroho et al., 2021; Suryadi & Wulandari, 2023).

These findings differ from global literature, where many international models emphasize data-driven decision-making and the development of students' digital literacy. In Indonesia, principals tend to perceive digitalization primarily as an administrative tool rather than a mechanism for data-based institutional transformation (Smith & Jones, 2024; Chen & Wang, 2023). For the Conventional–Resistive typology, fundamental access challenges, such as electricity and internet connectivity, take precedence over curriculum innovation, reflecting a different hierarchy of digital needs in the Indonesian educational context (O'Connell & Smith, 2023).

The practical implications of these findings highlight the need for the Ministry of Education and Culture to design differentiated digital leadership training programs tailored to principals' mindset typologies and infrastructural realities. In addition, ICT budget policies should be reformed to allow greater flexibility for maintenance and cybersecurity provisions (Raharjo & Wibowo, 2024). Future research is recommended to adopt a quantitative approach to assess the effectiveness of each Digital Mindset typology's balancing strategy, particularly regarding teacher competence and student learning outcomes, as well as to explore adaptive leadership models that facilitate a transition from functional digital efficiency toward evidence-based decision-making (Lim et al., 2022; Wang & Gao, 2023).

#### **4. CONCLUSION**

This study ultimately affirms that principals' perceptions of digitalization are inherently dualistic, crystallizing into three distinct Digital Mindset typologies Visionary–Adaptive ( $C \rightarrow O$ ), Pragmatic–Selective ( $C \leftrightarrow O$ ), and Conventional–Resistive ( $C \rightarrow O$ ) each of which significantly shapes their digital leadership strategies. These typologies determine how school leaders interpret, prioritize, and respond to the dynamic interplay between challenges and opportunities in the digital transformation process.

A central finding indicates that the most pressing obstacles are managerial in nature, particularly the rigidity of BOS fund allocations and resistance among senior teaching staff toward technological adaptation. In contrast, the most promising opportunities are perceived

within the pedagogical sphere, especially in fostering personalized learning environments and enhancing administrative efficiency to optimize instructional focus.

The practical implications underscore the necessity for the Ministry of Education and Culture to develop differentiated Digital Leadership training frameworks tailored to principals' specific mindset typologies and infrastructural contexts particularly for those categorized as Pragmatic–Selective and Conventional–Resistive. Furthermore, policy reforms should address the need for more flexible funding mechanisms that accommodate ICT maintenance, system upgrades, and cybersecurity management to ensure sustainable digital implementation.

For future research, it is recommended that scholars undertake quantitative investigations to evaluate the effectiveness of the balancing strategies employed by each Digital Mindset typology, particularly regarding their measurable impact on teacher competence and student learning outcomes. Additionally, subsequent studies should examine adaptive leadership models designed to facilitate a strategic transition from functional digital utilization toward comprehensive evidence-based decision-making an area that remains a notable perceptual and practical gap within the current findings.

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