

Learning Leadership in Building a Culture of Information Technology in Elementary Schools

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ABSTRACT: *This paper aims to describe learning leadership in building a culture of information technology and utilizing it to improve the quality of elementary school organizations based on digital developments in Indonesia. This article uses a qualitative approach with a multi-case study method. Data were obtained from key informants, elementary school documents and books, as well as journals and articles that support the research on learning leadership in building a culture of information technology in the digital era. The findings show that principal's leadership plays a central role, not only by issuing policies but also by modeling, guiding teachers, and fostering collaboration that integrates technology into daily learning practices. This leadership focus transforms technology use into a sustainable school culture rather than a temporary response to the pandemic. The use of information technology is not only carried out in learning, but academic activities and school management have also begun to incorporate digital-based information technology. The learning leadership of school principals can be seen in their role in organizing the acculturation of information technology utilization through school policies and activity programs, especially in developing learning activities. Limitations include the fact that learning in the classroom is not fully digital-based, as elementary school learning still prioritizes face-to-face interactions between teachers and students. This study develops its setting and orientation by emphasizing leadership values in educational management. The study highlights the importance of the learning leadership of school principals in developing learning innovations at their schools, especially in the development of a digital-based information technology culture.*

Tulisan ini bertujuan untuk mendeskripsikan kepemimpinan pembelajaran dalam membangun budaya teknologi informasi dan pemanfaatannya untuk meningkatkan kualitas organisasi sekolah dasar berbasis perkembangan digital di Indonesia. Artikel ini menggunakan pendekatan kualitatif dengan metode studi multi-kasus. Data diperoleh dari informan kunci, dokumen dan buku sekolah dasar, serta jurnal dan artikel yang mendukung penelitian

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tentang kepemimpinan pembelajaran dalam membangun budaya teknologi informasi di era digital. Temuan penelitian menunjukkan bahwa kepemimpinan kepala sekolah memainkan peran sentral, tidak hanya dengan mengeluarkan kebijakan tetapi juga dengan menjadi teladan, membimbing guru, dan membina kolaborasi yang mengintegrasikan teknologi ke dalam praktik pembelajaran sehari-hari. Fokus kepemimpinan ini mengubah penggunaan teknologi menjadi budaya sekolah yang berkelanjutan alih-alih respons sementara terhadap pandemi. Penggunaan teknologi informasi tidak hanya dilakukan dalam pembelajaran, tetapi kegiatan akademik dan manajemen sekolah juga mulai menggabungkan teknologi informasi berbasis digital. Kepemimpinan pembelajaran kepala sekolah dapat dilihat dalam peran mereka dalam mengorganisir akulturasi pemanfaatan teknologi informasi melalui kebijakan dan program kegiatan sekolah, terutama dalam mengembangkan kegiatan pembelajaran. Keterbatasannya antara lain pembelajaran di kelas belum sepenuhnya berbasis digital, karena pembelajaran di sekolah dasar masih mengutamakan interaksi tatap muka antara guru dan siswa. Studi ini mengembangkan latar dan orientasinya dengan menekankan nilai-nilai kepemimpinan dalam manajemen pendidikan. Studi ini menyoroti pentingnya kepemimpinan pembelajaran kepala sekolah dalam mengembangkan inovasi pembelajaran di sekolah mereka, terutama dalam pengembangan budaya teknologi informasi berbasis digital.

Keywords: *Learning Leadership, School Principal, Organizational Culture.*

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I. INTRODUCTION

A conducive school climate, both physically and non-physically, is a prerequisite for effective learning (Marini et al., 2023; Wiyono et al., 2023). A safe and orderly school environment, high expectations, and optimism among school members, school health, and student-centered activities are conducive school climates that can foster students' learning motivation (Kemendikbud, 2018). Schools must be able to create a conducive educational climate and environment for efficient learning (Permendiknas No.19, 2007). To create effective learning, school principals should not only rely on resources and facilities but also on institutional and learning climates (Burhanuddin, 2019; Burhanuddin et al., 2018). Based on this elaboration, educational providers must be able to build a conducive learning atmosphere and process, as well as encourage learners to develop themselves (Abdurrahman et al., 2022; Lismayanti et al., 2023). To create a conducive school atmosphere, the school principal needs to organize the school environment so that interactions among school members proceed healthily and in line with the school's goals.

Many factors can influence the quality of the learning process in building a good school life character, one of which is the use of technology and information (Aula et al., 2020; Laksana et al., 2024). This is certainly in line with the ongoing development in the education world, which continues to evolve in response to global changes (Wiyono, 2017). The development of science and information technology has made social change more dynamic (Yalçinkaya et al., 2021), enabling the world of education to keep pace

with changes in globalization (Susar et al., 2023). Globalization in the industrial revolution stage 4.0 has transcended borders between countries (Octaviany et al., 2023). Information and communication systems have changed in an all-digital environment, with changes in capital economic strategies, environmental quality awareness, technology-based work efficiency, flexible creative and innovative structures and institutions, and the growth of global entrepreneurship (Arifin, 2019). These various capabilities make it necessary for the world of education to reorient and restructure to produce resources that are insightful and globally competitive (Ikhwan et al., 2023; Syam, 2019). Education in the industrial era 4.0 must change itself and adapt to globalization in the digital era.

The challenge of education in the era of digitalization is to adapt to changes in literacy from reading, writing, and arithmetic to new forms of literacy, such as data, technology, and human literacy (Moreno-Morilla et al., 2021; Syam, 2019). Advances in digital information technology do not necessarily replace the multiple roles of humans (educators); rather, information technology is used for the benefit of education (Arifin, 2019). Schools, as one of the agents of change in the field of education, should be able to utilize digital media to improve both school productivity and performance (Alalwan et al., 2020; Bafadal et al., 2019). In addition to being a learning resource, digital media can be utilized by schools in various ways, including in learning, school governance, and school services (Arifin, 2019; Gogus & Saygin, 2019).

The world of education, particularly schools, is part of the digital literacy community that seeks and utilizes information through digital media (Fadhli et al., 2022; Harker-Schuch et al., 2020). Schools, as information seekers, aim to acquire knowledge for learning and provide services and information for the school community (Hanafi et al., 2023). Digital information technology can also be utilized by teachers and students as a medium in the learning process (Arifin, 2019; Laroche, 2020). Both teachers and students must be able to use information technology effectively for learning and develop skills to create digital media-based learning tools, such as websites and other educational applications (Mayudho & Supriyanto, 2020).

Responsive, adaptive, and reliable educational human resources are key elements in addressing the challenges of the digital-based industrial revolution 4.0 era (Arifin, 2019; Maisyaroh et al., 2020). Principals, as educational leaders, must recognize that social and digital technologies have reshaped the patterns of education and teaching in schools (Iman et al., 2023; Syam et al., 2023). Digital transformation should be implemented by schools through a mindset that embraces the development of digital technology (List, 2019). Schools must leverage various opportunities to narrow the digital divide and cultivate a culture of digital education transformation (Sanfo, 2020). School principals must understand that digital technology can be used both internally and externally to improve communication, foster collaboration, and drive innovation in education management (Dacholfany et al., 2024). Additionally, as educational leaders, principals must be able to nurture and create a supportive environment for the school community (Basthomi et al., 2023). They must also be capable of developing a focused and effective culture of technology and information suitable for the elementary education level (Burhanuddin et al., 2018). In advancing technology and information in schools, principals must foster strong, positive relationships between values and beliefs, personal values and norms, behaviors and beliefs, as well as norms and behaviors within the school community (Gogus & Saygin, 2019; Karpudewan, 2019).

Based on the preliminary study results, this research explores the unique use of information technology in elementary schools. It focuses on three schools in Yogyakarta, chosen for their varied approaches to integrating technology into education. The study emphasizes the principal's role in shaping a technology-driven learning culture, highlighting the importance of early technology adoption at the elementary level.

II. METHOD

This study employs a qualitative approach using a multi-case method (Ikhwan, 2021). The research was conducted at one state elementary school and two private elementary schools in Yogyakarta City, Indonesia. Data sources for this research include selected experienced informants, documents related to the research focus, books, as well as scientific journals and articles, both nationally and internationally, that relate to learning leadership in building a technology and information culture in the digital era (Ulfatin, 2022). Data analysis was conducted during the data collection process. The data were examined and grouped according to their relevance to the research focus, checked for accuracy, and then analyzed using the interactive analysis model by Miles et al. (2014), which involves data reduction, data display, data condensation, and conclusion drawing. The data validation technique used in this research is triangulation. Triangulation is a data validity technique that involves comparing data from different sources, methods, investigators, or theories to enhance the accuracy of the findings.

III. RESULT AND DISCUSSION

The leadership of the school principal significantly impacts various aspects, including the psycho-social environment, school-community relationships, teacher characteristics, curriculum quality, and school climate. A positive school climate, which is essential for enhancing student health and well-being, is shaped by the principal's efforts to foster effective communication among school members, committees, and parents (Syam et al., 2023). This collaborative commitment is crucial for promoting school health, improving social interactions, and achieving both academic and non-academic success (Hanafi et al., 2023).

The Covid-19 pandemic outbreak across Indonesia has begun to change the landscape of educational management in schools, shifting the focus to using information technology as a key component in organizing the learning process. Learning activities that were originally conducted face-to-face by teachers and students in the classroom have now transitioned to digital-based formats, utilizing information technology media.

**Table 1. Changes in the learning process
at Elementary Schools in Yogyakarta City**

Location	Case
State elementary school	Learning patterns shifted from face-to-face to online, utilizing information technology such as digital social media. Initially, this caused technological difficulties due to the lack of prior use of information technology in classroom learning. This was compounded by insufficient information technology infrastructure in public

	elementary schools and inadequate educator resources.
Private elementary school	The pandemic initially disrupted classroom learning patterns, but over time, learning adapted to the use of information technology, utilizing social media and online applications like WhatsApp, Google Meet, and Google Classroom. This transition was supported by sufficient information technology infrastructure and human resources, most of whom were already familiar with digital media.

The changes in the learning process in the two cases above reflect the implementation of the Department of Education, Youth, and Sport of Yogyakarta City's policy, which mandated that elementary school students continue their learning from home to mitigate the impact of the Covid-19 pandemic. This policy was designed to address the challenges posed by the pandemic. Additionally, the Department of Education, Youth, and Sport of Yogyakarta City provided training and support to school principals and teachers on the use of information technology for learning, offering gradual facilitation in the form of Wi-Fi infrastructure for each public elementary school.

The shift in learning patterns eventually led to the gradual integration of technology into learning activities, transitioning from initial use to becoming a regular part of the school routine. This phase of technology adoption extended to academic activities and school governance. The move from offline, face-to-face learning to online learning, facilitated by information technology, also saw the active participation of parents as key stakeholders in the school community. Parents assisted students with the use of technology at home, helping them access lessons via platforms such as WhatsApp, Google Meet, or Google Classroom.

The adoption of information technology continued even after the Covid-19 pandemic was declared over and new health protocols were introduced. The Department of Education, Youth, and Sport of Yogyakarta City issued a Circular Letter, mandating that at least one hour of each school day be dedicated to digital literacy. In response to this directive, elementary schools implemented a policy requiring one hour of digital-based learning every day, using the internet to enrich learning resources for students.

This is where the principal's leadership plays a crucial role in organizing and overseeing the implementation of information technology programs in schools. For instance, the development of the school website, aimed at promoting, socializing, and disseminating information about school programs, was led by the principal with the support of the school's digitalization development team. However, in public elementary schools, the provision of information technology infrastructure was carried out in stages, which meant that the use of information technology for learning was initially limited to grades 5 and 6. Based on field research findings, the relationship between the leadership of school principals and the integration of information technology into daily school activities in Yogyakarta City can be described as follows.

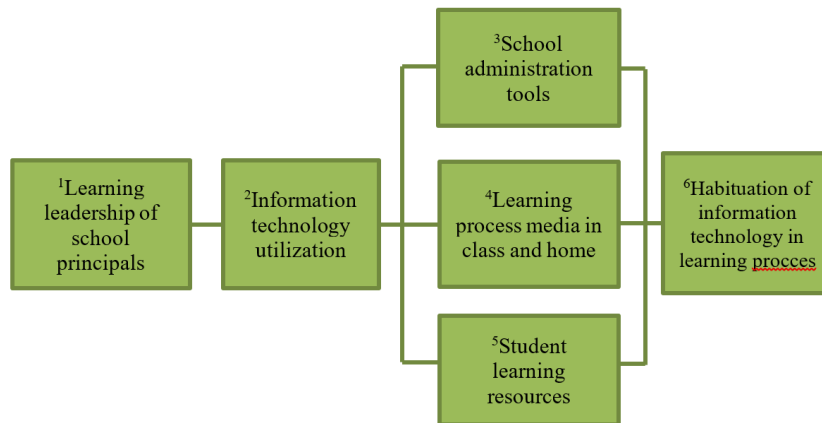


Figure 1. The pattern of the relationship between school principals' learning leadership and the habituation of information technology

Table 2. Description of figure 1

Item	Description
Learning leadership of school principals	Leadership in education involves managing, guiding, and empowering teachers and other resources to achieve learning goals.
Information technology utilization	The use of information technology to complete tasks and improve the performance of human resources in schools, particularly related to the implementation of the learning process.
School administration tools	A combination of interconnected components for recording, organizing, and allocating activities using technology and information-based tools to achieve school objectives.
Learning proses media in class and home	A learning method that combines synchronous (in-class) and asynchronous (self-directed at home) learning, which can be done at any time.
Student learning resources	Learning materials that can be accessed by students using technology and information tools without the need for face-to-face interaction. These resources include discussions, consultations, assignments, exercises, exams, and other learning activities delivered entirely online.
Habituation of Information Technology in learning process	The process of changing the behavior of all individuals in the school (headmasters, teachers, students, educational staff, and others) to regularly use ICT as part of their routine.

The findings suggest that the use of information technology in the digital era should become an integral part of school culture, with principals, educators, and students practicing it as a daily behavior, tradition, and habit. Every school has its own set of values, norms, beliefs, and habits that define its identity. Schools shape and develop a unique personality that reflects this identity. To build an innovative school culture, schools must instill values, norms, beliefs, and habits that align with the expectations of the school community.

As educational leaders, principals must nurture and support the school community. They must foster a school culture that aligns with the values, beliefs, and behaviors within the school (Karpudewan, 2019). An innovative school culture is characterized by a dynamic and engaging atmosphere that encourages positive behavior, entrepreneurship, and the enthusiasm of organizational members. Members of the school community will be motivated to work creatively, embrace challenges, and take risks (Burhanuddin, 2019).

Socialization is key to strengthening and maintaining school culture, particularly in terms of habituating digital technology usage. Through socialization, school members learn the values, attitudes, and expectations that shape school life. This process helps members adjust to the rules and values embedded in the school culture, enabling them to adapt and feel comfortable within the school environment. Furthermore, the habituation of digital technology usage as a core part of school culture must be communicated continuously to all members so that it becomes an ingrained behavior and habit that represents the school's identity.

Digital transformation begins with a mindset that embraces ongoing digital technological advancements. In school organizations, this transformation promotes the development of students' abilities in communication, computation, collaboration, and critical thinking. Digital learning content will gradually replace printed textbooks, contributing to positive changes in the learning system. Therefore, principals must establish a strong foundation for digital transformation in school management and learning processes, helping educators and learners improve learning effectiveness.

This study also shows that digital competence is an integral part of academic literacy, requiring the development of information and communication technology literacy. Information technology has transformed the way children learn by offering opportunities to read and write texts in social spaces (Moreno-Morilla et al., 2021). Learners' progress in digital literacy is rapid, with different digital literacy skills and competencies developing at varying rates (Lazonder et al., 2020).

Principals, as innovative learning leaders, must possess competencies in learning vision, culture, environment, and school-community relations to ensure that schools can adapt to the digital information technology landscape (Bafadal et al., 2019). Principals must recognize the potential of developing innovative technology to inspire creative ideas that support the shift from traditional to technology-based learning. Integrating various technologies into the learning process allows for personalized learning that caters to the unique needs of students. This includes developing internet-based learning media, utilizing social media for learning activities, developing online learning strategies, and/or combining online and offline learning. Principals should understand that social and digital technologies can be leveraged to improve communication, collaboration, school management, and innovation in education (Supriyanto et al., 2020).

The principal is a pivotal figure in facilitating learning independence in the digital era. As managers and learning leaders, principals must adapt to changing circumstances, using challenges and opportunities to enhance the quality of education. Principals can also implement remote leadership, utilizing digital technologies to provide guidance and supervise teacher performance (Maisyaroh et al., 2020). Furthermore, principals need to collaborate with parents to support students' learning through the use of digital technologies. They play a crucial role in fostering student achievement through effective personnel management, resource allocation, and engagement with educational stakeholders (Sanfo, 2020).

IV. CONCLUSION

Principal learning leadership refers to the principal's ability to lead through symbolic and cultural aspects, grounded in values, beliefs, personality, and experience. This leadership should focus on integrating the use of digital-based information technology into the school's culture. To accustom students and staff to using information technology, schools can leverage digital media for educational activities, administration, and governance. Through their leadership, principals play a pivotal role in fostering development by building partnerships with the school community and engaging with parents and other stakeholders. The process of habituating the use of digital technology takes place across academic activities, school management, classroom and home learning media, and communication channels for sharing school information with stakeholders. Therefore, the principal's leadership in promoting the use of information technology in elementary schools is an effort to establish a culture of digital technology that is engaging, safe, comfortable, and conducive to overall school health, social interaction within the school community, as well as both academic and non-academic achievements, and personal growth of students and staff.

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