

Principal Instructional Leadership for Digital Literacy Culture in Two Siak Junior High Schools

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ABSTRACT

This study examined the role of principal instructional leadership in developing a digital literacy culture at SMP Negeri 2 Siak and SMP Negeri 3 Siak. It focused on strategies used to address barriers and optimize digital literacy implementation. Using a qualitative approach, data were collected through interviews, observation, and documentation. The findings show that principals play strategic roles in defining school missions, managing instructional programs, and creating a climate conducive to digital literacy development. Key strategies include teacher training, the provision of technology facilities, and efforts to secure external support for digital infrastructure. The study also identifies continuing challenges, particularly uneven teacher digital competence, limited funding, and unequal student access to technology. These findings underscore the importance of proactive, technology-oriented instructional leadership in integrating digital literacy into school learning and management. The study offers policy recommendations and practical considerations for building a sustainable digital literacy culture in schools.

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ABSTRACT

Penelitian ini menganalisis peran kepemimpinan instruksional kepala sekolah dalam mengembangkan budaya literasi digital di SMP Negeri Kecamatan Siak, dengan fokus pada strategi yang diterapkan untuk mengatasi tantangan dan memaksimalkan implementasi literasi digital. Transformasi digital dalam pendidikan, yang dipengaruhi oleh kebijakan pemerintah seperti Permendikbudristek Nomor 30 Tahun 2021 dan Peraturan Pemerintah Nomor 57 Tahun 2021, mendorong pengembangan pembelajaran berbasis teknologi di sekolah. Namun, tantangan terkait keterbatasan anggaran, akses teknologi, dan pelatihan guru masih menjadi hambatan signifikan dalam pengembangan literasi digital. Melalui pendekatan kualitatif dengan wawancara, observasi, dan dokumentasi, penelitian ini menemukan bahwa kepala sekolah di SMP Negeri Kecamatan Siak memiliki peran strategis dalam mendefinisikan misi sekolah, mengelola program instruksional, dan menciptakan iklim yang mendukung pengembangan literasi digital. Strategi yang diterapkan mencakup pelatihan intensif bagi guru, penyediaan fasilitas teknologi, serta penggalangan dukungan eksternal untuk memperkuat infrastruktur digital. Meskipun ada kemajuan, hasil penelitian menunjukkan bahwa kompetensi digital guru dan kesenjangan akses teknologi antar siswa masih perlu diperhatikan. Penelitian ini memberikan rekomendasi kebijakan dan praktik terbaik untuk pengembangan literasi digital di sekolah, dengan penekanan pada pentingnya kepemimpinan instruksional yang proaktif dan berorientasi pada teknologi untuk menciptakan budaya literasi yang berkelanjutan.

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1. Introduction

The development of information and communication technology (ICT) in the twenty-first century has brought significant changes to Indonesia's education system. Digital transformation not only changes the ways teachers teach and students learn, but also encourages schools to develop digital learning innovations that are responsive to contemporary needs. Technology offers new opportunities to create more engaging and effective learning experiences. Hadiyastama, [1] state that ICT plays an important role in supporting twenty-first-century learning, particularly in developing the competencies required to succeed in the digital era, such as critical thinking, creativity, collaboration, and communication (4C skills). Through digitalization, learning activities can be conducted more flexibly and interactively, while access to global learning resources can be broadened.

The implementation of educational digitalization in Indonesia is governed by several national policies. Permendikbudristek No. 30 of 2021 concerning the Merdeka Mengajar Platform provides teachers and principals with opportunities to develop digital-based learning, while Ministerial Decree No. 719/P/2020 concerning the Curriculum under Special Conditions accelerated educational digital transformation, particularly during the pandemic, by enabling distance learning. In addition, Government Regulation No. 57 of 2021 emphasizes the importance of using technology to improve educational quality and support twenty-first-century skills. These policies reinforce the commitment to create learning that is more flexible, interactive, and globally connected, while expanding access to digital learning resources.

Educational digitalization is viewed as a comprehensive transformation of learning systems and education management. According to [2], educational digitalization aims to expand access, improve quality, and strengthen the relevance of education through the use of digital technology. [3] explains that digitalization is not limited to the use of digital devices; it also entails changes in learning culture, teaching strategies, and data-driven school management systems. One important aspect that should be strengthened through digitalization is digital literacy culture, namely the ability to read, write, understand, and critically produce information through digital media. Therefore, developing digital literacy skills among educators is essential to ensure that technology is used effectively and ethically in educational contexts. It also contributes to the strengthening of twenty-first-century competencies, including critical thinking, collaboration, and creativity.

According to [4], digital literacy includes the ability to understand and use information in a range of digital formats.) [5] divides digital literacy into three main dimensions: technical literacy, or the ability to operate digital devices; cognitive literacy, or the ability to evaluate and analyze information; and socio-emotional literacy, or the ability to behave ethically in digital environments. Strong digital literacy develops learners who are technologically capable, critical of information, and able to learn independently. Therefore, strengthening literacy culture through digitalization is an urgent need for improving educational quality in Indonesia.

However, preliminary observations and interviews with the principal of SMP Negeri 3 Siak in Siak District indicate that efforts to build a digital literacy culture still face various challenges. Although some schools have implemented the School Literacy Movement (Gerakan Literasi Sekolah, GLS) and use technologies such as Google Classroom, learning management systems (LMS), and e-libraries, digital literacy practices in the field have not yet been optimized. Many teachers are not accustomed to using technology creatively to

foster students' interest in reading and writing, while some students still tend to use digital media mainly for entertainment. In addition, disparities in ICT facilities remain among schools, including limited computer devices, unstable internet networks, and the absence of integrated digital libraries.

This condition is reinforced by data from [6], which describes the literacy achievement of students at SMP Negeri 3 Siak as follows.

Table 1. 2025 Education Report of SMP Negeri 3 Siak

Indicator	Achievement Category	Percentage / Score	Change from Previous Year	Description / Interpretation
General Literacy Skills	Moderate	63.33%	Decreased by 9.75	63.33% of students achieved minimum competency, indicating the need to strengthen digital literacy.
Above Minimum Competency	High	16.67%	Decreased by 21.79	Only a small proportion of students can analyze, evaluate, and reflect on text content in depth.
Meets Minimum Competency	Moderate	46.67%	Increased by 12.05	Most students can understand and infer implicit information in texts.
Below Minimum Competency	Low	26.67%	Increased by 3.59	Students can only identify simple explicit information.
Far Below Minimum Competency	Very Low	10.00%	Increased by 6.15	Students are not yet able to understand or identify explicit information in texts.

The 2025 Education Report shows that students' literacy performance remains in the moderate category, with 63.33% of students reaching minimum competency, while only 16.67% perform above that level. This condition indicates that the school's literacy culture has not yet fully developed into a culture of critical and reflective thinking. Most students are still limited to understanding basic information in texts, whereas the ability to analyze and evaluate reading content remains low. The increase in the number of students at the minimum level and the decline in the high-achievement level indicate that school literacy activities have not yet fostered deep reading habits. This finding confirms the importance of strengthening a digital literacy culture that encourages students not only to read for comprehension, but also to think critically, creatively, and reflectively through the support of principal instructional leadership.

Principals have a highly strategic role in determining the direction and success of digital literacy culture development at school. According to [7], principals with strong commitment and a clear vision can create innovations in the school environment that support the development of digital literacy. Interviews in this study also indicate that principals who actively support digital literacy initiatives, such as initiating digital libraries and implementing a one-day-one-online-reading program, play a key role in the success of these programs. In contrast, in schools where principals are less active in providing direction and mentoring, literacy activities tend to become merely administrative and unsustainable.

In this context, instructional leadership is a key factor determining the effectiveness of digital literacy development in schools. [8] state that principals with an instructional leadership orientation focus on improving the quality of teaching and learning through academic supervision and professional guidance. This approach ensures that every learning activity aligns with the school's vision and goals. Principals who act as learning leaders do not merely function as managers; they also actively guide teachers in integrating digital literacy into learning, which in turn promotes more relevant and technology-based learning. With effective leadership, principals can foster a digital literacy culture that not only optimizes the use of technology but also strengthens students' twenty-first-century skills.

The instructional leadership model developed by [9], which serves as the grand theory in this study, emphasizes three main dimensions: defining the school mission, managing instructional programs, and creating a positive school climate. This model positions the principal as the main driver of improved learning quality through indirect influence on teacher practices and student learning outcomes, and it remains an important theoretical foundation in contemporary educational research. [10] also emphasizes that the purpose of instructional leadership is not

only to achieve short-term learning effectiveness but also to build sustainable school systems. Principals need to instill values of collaboration, responsibility, and commitment to educational quality. In addition, [11] state that instructional leadership aims to create alignment among the school vision, learning strategies, and students' needs in order to achieve meaningful learning.

The issue addressed in this study concerns the urgency of principal instructional leadership in strengthening literacy culture and digital literacy through educational digitalization. Although educational digitalization offers considerable potential to improve students' digital literacy, without strong instructional leadership the process may become a formality that produces no significant impact. One major problem is the low level of teachers' digital competence and the limited technology facilities available in schools, which can hinder the effective implementation of digital literacy. On the other hand, literacy culture, including habits of reading, writing, and critically understanding information, needs to be strengthened so that students do not merely master technology but can also use it wisely and responsibly. Limited principal involvement in mentoring and developing teachers may cause both digital literacy and literacy culture to remain temporary and administrative rather than sustainable. If this occurs, students may use technology more for entertainment than for learning, which can negatively affect the strengthening of literacy culture and digital literacy. This phenomenon is reflected in the 2025 Education Report at SMP Negeri 3 Siak, where literacy achievement and literacy culture remain relatively low. Therefore, it is important for principals to play a strategic role in guiding teachers and creating an environment that supports the sustainable development of both.

[12] show that principals' instructional leadership plays a major role in improving students' literacy and numeracy through focused strategies such as strengthening the school vision, fostering teacher collaboration, and establishing reflective routines. Principals who actively provide instructional guidance can cultivate a sustainable literacy culture among students and teachers. This finding is supported by [13], who emphasize that transformational principal leadership was key to developing literacy culture at SD Negeri 34 Sebelitak through role modelling, continuous training, and learning-resource support that fostered the school community's interest in reading.

Similarly, [14] found that principals act as innovators, motivators, educators, managers, supervisors, and administrators in improving teacher digital literacy at SMP Negeri 3 Palopo. Technology-responsive leadership was shown to foster a digital literacy culture and support the Sekolah Penggerak program. [15] likewise assert that transformational principal leadership significantly improves educators' digital literacy at SD Alkhairaat 1 Palu, especially through training, mentoring, and the cultivation of an innovative school culture. [16] adds that school leadership transformation in the digital era requires principals to master innovative strategies such as digital collaboration, the use of

online learning platforms, and data integration in decision-making in order to improve literacy culture and learning quality.

Meanwhile, [17] highlight that the transformation of school leadership in the era of digital learning management requires a paradigmatic shift toward instructional leadership oriented to technology, teacher reflection, and data-based learning. Taken together, these findings confirm the vital role of principal instructional leadership in integrating digitalization into strategies for developing a school literacy culture through strengthening teacher competence, literacy routines, and educational technology innovation.

This study aims to analyze the role of principal instructional leadership in developing literacy culture through digitalization at public junior high schools in Siak District; to analyze principals' instructional leadership strategies in integrating literacy programs with the use of digital technology; and to analyze the supporting and inhibiting factors of principal instructional leadership in developing digital literacy culture at school.

This study is expected to provide a comprehensive understanding of how principals direct all school components in building a sustainable digital literacy culture, while generating policy recommendations and good practices for digital literacy development in other educational institutions. Accordingly, this study is titled "Principal Instructional Leadership for Digital Literacy Culture in Two Siak Junior High Schools."

2. Method

This study employed a qualitative approach. The qualitative approach was selected because it enables the researcher to understand in detail the subjective experiences of principals, teachers, and students in implementing digital literacy. A phenomenological design provides space for researchers to explore the meanings embedded in participants' experiences, thus generating deeper insight into the dynamics involved in implementing digital literacy policies at school. Through this approach, the researcher can investigate participants' perceptions and personal reflections on the principal's instructional leadership role and its effects on the literacy culture within the school environment.

The study focused on two schools in Siak Regency, namely SMP Negeri 2 Siak and SMP Negeri 3 Siak, which were selected purposively because both had implemented digital-based literacy programs, although with differing levels of success. The two schools are committed to developing literacy culture and have begun to use digital technology in learning, making them relevant sites for examining how principals encourage the transformation of literacy culture. Participants included principals, teachers actively involved in literacy programs, and students participating in digital literacy activities. Research ethics were maintained by ensuring that all participants, including principals, teachers, and students, provided informed consent before taking part in interviews and observations. Participants received clear explanations of the study purpose, data collection procedures, and their rights, including the right to withdraw at any time without consequences. To maintain data confidentiality and privacy, all information obtained was anonymized and used only for academic research purposes. All data were stored securely and could only be accessed by the researcher; they were not shared with other parties without participants' permission.

Data collection is an important stage in research for obtaining accurate and relevant information. According to [18], data can be collected through observation, interviews, and documentation. In-depth interviews were conducted to explore the experiences, perceptions, and strategies used by principals in designing and directing digital literacy programs.

Interviews with teachers and students were also conducted to obtain their views on the effectiveness of principal leadership and the impact of the digital literacy program. Participant observation was used to directly observe how principals and teachers implemented digital literacy policies in the field, as well as to record interactions among principals, teachers, and students in technology-based learning activities. Documentation was used to examine relevant documents, including school work programs, digital literacy activity plans, activity implementation reports, school policies related to educational digitalization, and Education Report data as supporting material for analysis.

The data analysis procedure followed the interactive model of [19]. First, data reduction was conducted by selecting, focusing, and organizing data relevant to the study focus. This stage enabled the researcher to identify important information concerning instructional leadership strategies, principal support for teachers and students, barriers encountered in digital literacy implementation, and changes in learning culture at school. Second, the data were presented in descriptive narrative form to describe the relationships among the principal's role, digitalization strategies, and the strengthening of literacy culture. This presentation helped the researcher provide a clear picture of instructional leadership dynamics and the implementation of digital literacy in the field. Finally, conclusions were drawn gradually, with provisional conclusions reviewed to ensure the consistency and validity of the data. The process also involved data verification through triangulation to ensure the trustworthiness of the findings.

3. Results

This study examined the role of principal instructional leadership in developing digital literacy culture at public junior high schools in Siak District, as well as the supporting and inhibiting factors encountered in implementing digital literacy programs. In addition, the study identified strategies applied by principals to overcome barriers to digital literacy development. Based on data analysis from interviews, observation, and documentation, the following findings were obtained.

3.1. The Role of Principal Instructional Leadership in Developing Digital Literacy Culture

The findings show that principal instructional leadership at public junior high schools in Siak District plays a very important role in developing digital literacy culture. Principals have defined school missions that focus not only on improving reading and writing literacy but also on developing students' ability to use digital technology wisely. In implementation, principals prioritize the integration of digital literacy into the curriculum and learning across all subjects. Principals also give particular attention to providing technology facilities accessible to all students and teachers, so that technology becomes not merely a supporting tool but an integral part of daily learning.

Vice principals support the principal's mission by coordinating teacher training and ensuring that infrastructure supporting digital literacy is available, including the hardware and software required for technology-based learning. They also work with principals to create a school climate conducive to digital literacy development through both facility support and policies that encourage the use of technology in learning.

From the teachers' perspective, they felt supported by principals who actively integrated technology into learning. Teachers received regular training on the use of technology in teaching, as well as adequate access to digital devices for classroom use. This support made it easier for teachers to integrate technology into learning and ensured that students could learn more interactively and effectively.

Meanwhile, students felt that the school mission supporting

the use of technology in learning greatly facilitated their learning process. Existing facilities, such as computer rooms and internet networks, enabled students to access a wide range of information supporting their learning. Students also felt that technology made learning more engaging and relevant to their daily lives.

3.2. Supporting and Inhibiting Factors of Principal Instructional Leadership in Digital Literacy Development

The study also found that supporting factors for digital literacy development at public junior high schools in Siak District include internal and external aspects. The strongest internal factor is the enthusiasm of teachers who strive to innovate in the use of technology in the classroom. Teachers who are enthusiastic and willing to develop their digital literacy skills are one of the main strengths supporting digital literacy development. In addition, the principal's commitment to providing adequate technology facilities, such as hardware and software, is another important factor supporting successful digital literacy implementation.

From an external perspective, government policies that encourage the use of technology in education are highly helpful in ensuring that digital literacy becomes an integral part of learning. Such policies provide guidance and funding needed to support the procurement of required technological devices. In addition, assistance from external educational institutions in the form of grants and partnerships for device provision further strengthens the school's digital literacy development efforts.

However, several barriers were identified in this study. The most significant internal barrier is limited funding, which restricts schools' ability to provide more digital devices and expand equitable training for all teachers. Resistance among some teachers who are not yet accustomed to technology also poses a challenge to implementing digital literacy in the classroom. On the other hand, the external barrier involves limited access to technology at home for some students, causing inequities in the optimal use of technology for learning.

3.3. Principal Strategies for Overcoming Barriers to Integrating Digital Literacy Programs at School

To address the existing barriers, principals have implemented various strategies to ensure that digital literacy programs continue to operate. One key strategy is to provide more intensive teacher training on the use of technology in learning. Principals also actively submit grant proposals to obtain external support, thereby strengthening technology infrastructure and providing devices needed by students and teachers. In addition, principals develop assistance programs for students who need technological devices in order to ensure equitable access for all students.

Vice principals contribute by managing budgets more efficiently and strengthening collaboration with external parties, such as educational institutions and technology companies, to obtain additional support. They also invite parents to participate in supporting the use of technology at home so that students can continue digital learning beyond school hours.

Teachers address barriers by improving their skills through additional training provided by principals and maximizing the use of available devices. Some teachers also seek alternative solutions, such as sharing devices among students or using web-based applications that can be accessed by more students at the same time.

Students felt greatly helped by the steps taken by principals and teachers. They were given additional access to devices and opportunities to use online learning platforms to support their learning. This enabled them to continue participating effectively in learning despite barriers to device access or

internet connectivity.

4. Discussion

This study explored the role of principal instructional leadership in developing digital literacy culture at public junior high schools in Siak District. Based on interviews, observation, and documentation, the findings indicate that principals play a crucial role in defining the school mission, managing instructional programs, and creating a climate that supports digital literacy development. However, despite several supporting factors, both internal and external barriers continue to affect the implementation of digital literacy. The strategies applied by principals demonstrate meaningful efforts to address these barriers, although challenges related to technology access and teacher training still require greater attention.

4.1. The Role of Principal Instructional Leadership

The findings show that principal instructional leadership at public junior high schools in Siak District is highly important for developing digital literacy culture. This is consistent with the theory of Hallinger and Murphy (1985), which emphasizes three major dimensions of principal instructional leadership: defining the school mission, managing instructional programs, and creating a positive school climate. In this study, principals successfully defined school missions by incorporating digital literacy as an integral part of the curriculum and learning in all subjects. This reflects principals' broad understanding of the importance of technology in education, enabling students to access information more quickly and supporting more interactive learning.

[20] also emphasizes that principal instructional leadership influences not only the direct quality of learning but also the creation of a climate that supports the development of student and teacher competencies. At public junior high schools in Siak District, principals not only directed the digital literacy mission but also managed instructional programs by providing teacher training and ensuring that adequate technology facilities were available to support digital-based learning.

4.2. Supporting and Inhibiting Factors

This study identified various supporting and inhibiting factors affecting digital literacy development in schools. Supporting internal factors include teachers' enthusiasm to initiate innovations in the use of technology and principals' commitment to providing adequate technology facilities. This is consistent with the findings of [21], which show that teacher motivation and the commitment of school leaders are highly important for the successful integration of technology in education.

However, the study also found internal barriers, particularly limited budgets and the lack of equitable training for all teachers. Resistance among some teachers who are not accustomed to using technology in teaching is a challenge that principals must address. This aligns with [22], who states that limited digital skills and resistance to change among teachers often hinder the implementation of technology in classrooms.

From an external perspective, government policies that encourage technology use in education are a strong supporting factor, as shown by [23], whose study found that education policies supporting digital literacy can accelerate technology adoption in schools. However, the external barrier identified in this study is limited technology access at home for some students, which causes inequality in the optimal use of technology in learning.

4.3. Principal Strategies for Overcoming Barriers

To overcome the existing barriers, principals have applied several effective strategies. One major step is providing intensive training to teachers to improve their technology competencies. This is consistent with [24], who emphasize that continuing teacher training is key to developing digital literacy

in schools. Such training enables teachers to integrate technology more efficiently into their teaching.

In addition, principals actively seek external support, both in the form of grant funding and collaboration with external institutions, to ensure that the required digital devices and infrastructure are available. This step supports the findings of [25], which show that external collaboration between schools and outside parties can strengthen technology integration in education, particularly by addressing limited resources.

On the other hand, teachers attempt to overcome barriers by maximizing available devices and seeking alternative ways to use technology in the classroom, such as sharing devices among students. Students also felt greatly supported by the steps taken by principals and teachers, particularly through additional access to devices and online learning platforms that supported their learning.

5. Conclusion and Recommendations

For principals, it is important to strengthen visions and missions that support the use of technology in learning and to expand access to technology devices through external partnerships and fundraising. Principals should also ensure continuous training for teachers to improve their technology competencies. Teachers need to update their technology skills through training and peer learning, while designing learning that integrates technology to develop students' twenty-first-century skills. Future researchers may explore the long-term impact of principal instructional leadership on digital literacy culture, examine how government policies influence digital literacy development in schools, and assess the effectiveness of different technology training programs for teachers. This study provides useful insights for education policy and technology-based learning practices in schools.

References

- [1] R. Hadiyastama, Nurwahidin, and Yulianti, "Peran TIK dalam pembelajaran abad ke-21," *J. Pendidik. Teknol. Inf.*, 2022.
- [2] UNESCO, "Reimagining Our Futures Together: A New Social Contract for Education," UNESCO, Paris, 2021.
- [3] C. Heinrich, "Data-driven education and digital transformation in schools," *Educ. Technol. Rev.*, 2019.
- [4] P. Gilster, *Digital literacy*. New York: Wiley Computer Publishing, 1997.
- [5] W. Ng, "Can we teach digital natives digital literacy?," *Comput. Educ.*, vol. 59, no. 3, pp. 1065–1078, 2012, doi: 10.1016/j.compedu.2012.04.016.
- [6] R. Handayani, B. K. Apriani, and M. Mustari, "Pemanfaatan Rapor Pendidikan dalam Perencanaan Berbasis Data untuk Meningkatkan Mutu Sekolah di SDN 44 Ampenan," *J. Ilm. Profesi Pendidik.*, vol. 10, no. 1, pp. 336–342, 2025, doi: 10.29303/jipp.v10i1.2935.
- [7] K. Leithwood and J. Sun, "The nature and effects of transformational school leadership," *Educ. Adm. Q.*, 2012.
- [8] V. M. J. Robinson, C. A. Lloyd, and K. J. Rowe, "The impact of leadership on student outcomes: An analysis of the differential effects of leadership types," *Educ. Adm. Q.*, vol. 44, no. 5, pp. 635–674, 2008.
- [9] P. Hallinger and J. F. Murphy, "Assessing the instructional leadership behavior of principals," *Elem. Sch. J.*, vol. 86, no. 2, pp. 217–247, 1985, [Online]. Available: <https://www.jstor.org/stable/1001742>
- [10] U. Suharsaputra, *Kepemimpinan pendidikan*. Bandung: Refika Aditama, 2016.
- [11] W. K. Hoy and A. W. Hoy, *Instructional leadership: A research-based guide to learning in schools*. Pearson, 2015.
- [12] Q. Nisak, "Peran kepemimpinan pembelajaran kepala sekolah dalam mewujudkan literasi dan numerasi siswa," *Pendas J. Ilm. Pendidik. Dasar*, vol. 10, no. 1, pp. 213–224, 2025.
- [13] M. A. Sunardiyah, S. Surahman, P. A. Cakranegara, and H. B. Hina, "Manajemen kepemimpinan transformatif dalam mengembangkan budaya literasi di sekolah dasar negeri 34 Sebelitak," *EDUKASIA J. Pendidik. dan Pembelajaran*, vol. 3, no. 3, pp. 857–864, 2022.
- [14] R. B. Pamungkas and T. Tahrir, "Peran kepala sekolah dalam pengembangan literasi digital guru untuk mewujudkan sekolah penggerak di SMP Negeri 3 Palopo," *Hikamatzu J. Multidiscip.*, vol. 1, no. 1, pp. 238–250, 2024.
- [15] M. Rifad, F. Alhabsyi, and S. Nadirah, "Kepemimpinan transformatif kepala sekolah dalam meningkatkan kemampuan literasi digital tenaga pendidik di SD Alkhairaat 1 Palu," *J. Integr. Manaj. Pendidik.*, vol. 2, no. 1, pp. 49–58, 2023.
- [16] I. Mukaddamah, "Transformasi kepemimpinan kepala sekolah di era digital: Tinjauan literatur tentang tantangan dan strategi inovatif," *Hikamatzu J. Multidiscip.*, vol. 2, no. 2, 2025.
- [17] R. Wijaya and S. Nuraini, "Transformasi kepemimpinan sekolah dalam era manajemen pembelajaran digital," *J. Din. Pendidik. Islam*, vol. 1, no. 2, pp. 1–12, 2025.
- [18] Sugiyono, *Metode penelitian pendidikan (kuantitatif, kualitatif, dan R&D)*. Bandung: Alfabeta, 2019.
- [19] M. B. Miles, A. M. Huberman, and J. Saldaña, *Qualitative data analysis: A methods sourcebook*, 4th ed. SAGE Publications, 2020.
- [20] P. Hallinger, "Leading educational change: A review of the theory and research," *J. Educ. Adm.*, vol. 41, no. 2, pp. 125–141, 2003, doi: 10.1108/09578230310471280.
- [21] S. R. Lynch, L. McDowell, and C. A. Granger, "Factors influencing teachers' use of technology in the classroom: A comprehensive review of research," *Educ. Technol. Res. Dev.*, vol. 63, no. 2, pp. 355–380, 2015, doi: 10.1007/s11423-015-9399-3.
- [22] A. Harris, "Distributed leadership: A critical review of the evidence," *Educ. Manag. Adm. Leadersh.*, vol. 41, no. 2, pp. 211–228, 2013, doi: 10.1177/1741143212462584.
- [23] G. Hanna, B. Cleary, and P. West, "Digital literacy in the classroom: Using technology to support literacy and learning," *Int. J. Educ. Dev.*, vol. 39, pp. 98–105, 2016, doi: 10.1016/j.ijedudev.2014.09.004.
- [24] D. Bebell and L. M. O'Dwyer, "The impact of digital technology on student achievement in the United States: A review of research," *J. Educ. Comput. Res.*, vol. 43, no. 2, pp. 97–114, 2010, doi: 10.2190/EC.43.2.a.
- [25] J. Tondeur, J. Van Braak, P. A. Ertmer, and A. T. Ottenbreit-Leftwich, "Preparing pre-service teachers to integrate technology in education: A synthesis of qualitative research," *Comput. Educ.*, vol. 62, pp. 1–10, 2017, doi: 10.1016/j.compedu.2012.10.009.

