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# Digital Transformation in Education A Literature Synthesis on Managerial Roles, Leadership, and Literacy

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**Abstract**

**Digital transformation in the secondary education sector in Indonesia faces major challenges related to competency gaps and managerial readiness. This article aims to systematically analyze the role of management support, digital leadership, and digital literacy in shaping an effective digital learning environment. This study uses the Systematic Literature Review (SLR) method with the PRISMA protocol to review reputable literature from 2018 to 2025. The review results show that digital transformation is a strategic orchestration that depends on three main pillars. Management support functions as the provider of structural foundations and policies; digital leadership acts as a strategic compass in changing organizational culture; while digital literacy is a prerequisite for individuals to operate technology critically and innovatively. The synergy of these three elements confirms that the success of a digital learning environment cannot be achieved solely through the provision of physical infrastructure, but rather through the harmonious integration of system support, leadership exemplarity, and user proficiency. These findings have important implications for the development of education policies that focus more on investing in human capacity rather than just hardware. This conclusion is expected to serve as a strategic foundation for secondary school administrators to build a digital ecosystem that is inclusive, sustainable, and responsive to the challenges of the times in order to realize digital sovereignty in education in Indonesia.**

**Keywords: Digital Transformation, Management Support, Digital Leadership, Digital Literacy, Digital Learning Environment.**

## A. Introduction

The development of Information and Communication Technology (ICT) over the past two decades has brought about a fundamental revolution that has changed the way humans work, interact, and adapt in various aspects of life. In the world of education, this phenomenon has manifested itself in the form of digital transformation, which is not merely a strategic choice, but a real challenge for organizations to remain relevant in an era of global competition. This transformation is seen as a crucial foundation for innovation to drive the

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growth and advancement of the education system[1]. Through this paradigm shift, educational institutions are encouraged to generate new value and improve cost efficiency through digital-based services[2].

Although the urgency of this transformation has been generally agreed upon, educational literature still faces fundamental obstacles related to a strong operational definition. There is a lack of a theoretically robust definition of digitization and digital transformation in previous educational research. This theoretical ambiguity has an impact on implementation in the field, where digitization is often considered merely a technical requirement, when in fact its essence must always be anchored in human development and continuous learning processes[3].

In Indonesia, these theoretical issues are intertwined with the national strategic agenda that establishes digitalization as a pillar of economic and social recovery. The government has emphasized that national digital transformation must be based on the principles of digital sovereignty and independence in order to build an independent technology ecosystem (Secretariat of the Cabinet of the Republic of Indonesia, 2021)[4]. This commitment is reinforced through a 25-year digital transformation roadmap designed by the National Information and Communication Technology Council. The roadmap systematically divides the development phases, starting from laying the regulatory foundation (2020-2025) to developing a mature digital ecosystem in 2045[5].

However, this national ambition faces serious challenges at the technical implementation level in educational institutions, particularly in relation to human resource readiness. The main problem arises because most teachers, education policymakers, and heads of educational institutions do not yet have adequate basic digital competencies to support technology-based learning. This competency gap creates a paradox where digital tools are being formally introduced, but teaching and learning conditions in the classroom are changing very slowly and tend to be overly cautious[6].

The unpreparedness of human resources directly hinders the formation of an ideal Digital Learning Environment (DLE). An effective digital environment should include the integration of six levels, ranging from connectivity to the development of human capital digital skills[7]. Without sufficient human capital, it is difficult to realize a DLE that is capable of creating a friendly, flexible, and interactive learning environment[8]. This emphasizes that

[1] S. Anggoro, *Transformasi Digital Menuju Modernisasi Sekolah* (PT. Media Penerbit Indonesia, 2025), http://repository.mediapenerbitindonesia.com/533/.

[2] K. Tratkowska, "Digital Transformation: Theoretical Backgrounds of Digital Change," *Management Sciences* 24, no. 4 (2020): 32–37, https://doi.org/10.15611/ms.2019.4.05.

[3] J. Siljebo, "Digitalization and Digital Transformation in Foreign Countries," *Economy and Entrepreneurship* 27, no. 11 (2020): 204–7, https://doi.org/10.34925/eip.2020.124.11.035.

[4] Sekretariat Kabinet Republik Indonesia, *Peluncuran Program Konektivitas Digital 2021*, 2021, https://www.presidenri.go.id/transkrip/peluncuran-program-konektivitas-digital-2021/.

[5] Wantiknas, *Arah Transformasi Digital Indonesia*, 2023, https://www.rumahmedia.com/insights/arah-transformasi-digital-indonesia.

[6] N. V. Morze and V. O. Kucherovska, "Ways to Design a Digital Educational Environment for K-12 Education," 2879 (2020): 200–211, https://doi.org/10.55056/cte.232.

[7] E. Malkawi and M. Khayrullina, "Digital Learning Environment in Higher Education: New Global Issues," *SHS Web of Conferences* 92 (2021): 05019, https://doi.org/10.1051/shsconf/20219205019.

[8] Nurhayati et al., "Inovasi Pendidikan Di Era Digital," in *Manajemen Pendidikan Islam*, vol. 10 (Google Books, 2024).

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the success of DLE is highly dependent on how technology is managed and integrated by education practitioners in the field.

The existence of DLE in the modern education ecosystem ultimately requires systematic managerial support and digitally-minded leadership. Management Support is responsible for providing policies, resources, and systems that support sustainable access to technology[9]. In addition to management support, Digital Leadership is the main driver that combines technology with strategic vision and human values to create a digital culture in schools. Without collaboration between management support and digital leadership, technology integration will only stop at providing physical facilities without changing the essence of learning[10].

Changes in educational organizations are crucial efforts to improve efficiency and effectiveness through the implementation of new policies or technologies. However, according to (Windon & Stollar, 2022)[11], these changes often cause confusion, insecurity, and uncertainty, so that organizational readiness depends not only on technical capabilities but also on the psychological and social factors of its members to adapt. In facing these dynamics, the presence of Management Support becomes vital as a form of leader involvement in providing direction, assignments, and resource provision[12]. Educational literature portrays this support from two sides that must be balanced: the operational side, which emphasizes managerial assistance from school principals so that teachers can work more efficiently[13], and the institutional side, which views it as a formal mechanism to ensure strategic planning and participation[14]. Without flexible management support, efforts to overcome problems such as access inequality and teacher qualification development in the current situation of educational change will be difficult to achieve[15].

Such robust management support requires leaders who are capable of navigating the technological era, giving rise to the urgency of digital leadership. According to (Ardi et al., 2020), this leadership plays a role in inspiring members of the organization to transfer and apply knowledge for innovative performance. A digital leader or e-leader is required to have the ability to adapt to the e-environment, where they must monitor virtual work, communicate without space and time constraints, and utilize information technology to achieve organizational targets effectively[16]. However, digital leadership should not be limited to tools; Pintauli, (2022) emphasizes that Digital Leadership is the ability to combine

[9] L. Hertati et al., "Top Management Support Functions in Higher Education Management Accounting Information Systems," *Ilomata International Journal of Tax and Accounting* 2, no. 1 (2020): 1–16, https://doi.org/10.52728/ijtc.v2i1.179.

[10] R. F. Pintauli, *Kepemimpinan Digital Di Era Industri 4.0* (Pustaka Aksara, 2022).

[11] S. Windon and M. Stollar, "Support for Organizational Change Among Extension Educators," *Journal of Leadership Education* 21, no. 1 (2022): 68–87, https://doi.org/10.12806/v21/i1/r5.

[12] Hertati et al., "Top Management Support Functions in Higher Education Management Accounting Information Systems."

[13] S. Sariakin et al., "Fostering a Productive Educational Environment: The Roles of Leadership, Management Practices, and Teacher Motivation," *Frontiers in Education* 10 (2025), https://doi.org/10.3389/feduc.2025.1499064.

[14] Nomin et al., *Strategic Planning in Achieving Optimal Quality of Education With School Based Management*, 13, no. 1 (2025): 435–44.

[15] B. Retnawati, "Transforming Educational Management: Trends, Challenges, and Opportunities," *Journal of Educational Management* 27, no. 1 (2023): 23–45.

[16] Pantja Djati Ardi S. et al., "The Relationship Between Digital Transformational Leadership Styles and Knowledge-Based Empowering Interaction for Increasing Organisational Innovativeness," *International Journal of Innovation, Creativity and Change* 11, no. 3 (2020), www.ijicc.net.

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technology with strategic vision and corporate culture without neglecting humanity, empathy, and social responsibility[17].

The synergy between management and leadership ultimately boils down to individual readiness in terms of literacy. Digital literacy is defined by Spires et al., (2018) as the ability to understand and use information in various formats from various sources presented through computers[18]. Furthermore, Yelubay et al., (2022) emphasize that this concept encompasses cognitive and socio-emotional competencies to assimilate, evaluate, and integrate information, not just the simple ability to use software[19].

In addition to managerial factors, individual abilities in understanding and using technology, or digital literacy, are crucial determinants in the success of this transformation. Digital literacy is not merely a technical skill, but also includes the ability to think critically in evaluating digital content and interacting ethically in cyberspace[20]. This digital literacy is a key requirement for creating an inclusive and effective learning environment for today's students[21]. Therefore, synergy between management support, digital leadership, and digital literacy is an absolute prerequisite for the success of digital transformation in schools.

This Systematic Literature Review (SLR) article was compiled to comprehensively map how previous literature discusses the relationship between Management Support, Digital Leadership, and Digital Literacy in shaping DLE. The focus on this systematic review is important because research on digital transformation in Indonesia has so far been dominated by higher education, while studies at the senior high school level are still relatively limited[22]. Through this SLR, it is hoped that literature gaps and a strong theoretical synthesis will be identified to support the development of an applicable digital transformation model at the secondary school level.

## B. Research Method

This study applies the Systematic Literature Review (SLR) method with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol to identify, evaluate, and synthesize literature related to digital transformation in education. Referring to Snyder (2019), this approach is used to map the development of complex topics and find research gaps in order to build a solid theoretical foundation[23]. The data collection process was carried out by screening reputable journal articles published between 2018 and 2025. The selected literature was then analyzed descriptively to provide a comprehensive

[17] Pintauli, *Kepemimpinan Digital Di Era Industri 4.0*.

[18] H. A. Spires et al., "Encyclopedia of Information Science and Technology," *Issues in Science and Technology Librarianship* 42 (2018), https://doi.org/10.29173/istl2003.

[19] Y. Yelubay et al., *Developing Future Teachers' Digital Competence via Massive Open Online Courses (MOOCs)*, 13, no. 2 (2022): 170–95.

[20] Nurhayati et al., "Inovasi Pendidikan Di Era Digital."

[21] T. T. Akbari and R. R. Pratomo, "Higher Education Digital Transformation Implementation in Indonesia during the COVID-19 Pandemic," *Jurnal Kajian Komunikasi* 10, no. 1 (2022): 52, https://doi.org/10.24198/jkk.v10i1.38052; M. Ali et al., "Transformasi Digital: Upaya Peningkatan Kualitas Pendidikan Di Universitas Negeri Yogyakarta," 2024, 199–207.

[22] Akbari and Pratomo, "Higher Education Digital Transformation Implementation in Indonesia during the COVID-19 Pandemic"; Ali et al., "Transformasi Digital: Upaya Peningkatan Kualitas Pendidikan Di Universitas Negeri Yogyakarta."

[23] H. Snyder, "Literature Review as a Research Methodology: An Overview and Guidelines," *Journal of Business Research* 104 (2019): 333–39.

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overview of the synergy between management support, digital leadership, and digital literacy in shaping an effective digital learning ecosystem.

## C. Results and Discussion

### a. Management Support

The success of digital transformation in educational institutions depends heavily on the extent of organizational support provided to implementers in the field. Management support is a crucial function that ensures accounting and management information systems in higher and secondary education can run optimally[24].Without strong support from top management, technology integration will lose its operational foundation. This support is not limited to the provision of facilities, but also includes a commitment to overseeing changes in the work culture within the school environment.

This management support is operationally manifested in the form of providing adequate policies and resources to support student engagement and academic outcomes through digital platforms[25]. Managerial commitment to providing strong infrastructure has proven to be a key determinant in increasing learning effectiveness [26].When management actively facilitates technological needs, technical barriers that often hinder teachers can be minimized, making the transition to a digital ecosystem more focused.

Furthermore, the effectiveness of this management support is clearly evident in the successful implementation of learning platforms such as Learning Management Systems (LMS). Management is fully responsible for validating learning media and evaluating learning outcomes to improve the satisfaction of all stakeholders[27]. This responsibility ensures that the technology used is not merely a formality, but a tool that has been proven effective in supporting the instructional process in both virtual and physical classrooms.

The availability of this infrastructure and platform must ultimately be accompanied by a change strategy that is consistently implemented by school management. Change strategies that are well managed by management are the main determinants of the successful integration of the Virtual Learning Environment (VLE) and the formation of a digital-based school culture[28]. This shows that the role of management does not stop at the procurement of tools, but continues with efforts to instill new values in the school ecosystem so that technology can be accepted and used sustainably.

In addition to influencing technical aspects, the organizational support felt by

[24] Hertati et al., "Top Management Support Functions in Higher Education Management Accounting Information Systems."
[25] P. Brugliera, "The Effectiveness of Digital Learning Platforms in Enhancing Student Engagement and Academic Performance," *Journal of Education, Humanities, and Social Research* 1, no. 1 (2024): 26–36, https://doi.org/10.70088/xq3gy756.
[26] V. Dhameria et al., "The Impact of Digital Transformation in Higher Education Management: Integrating Online Learning and Educational Applications for Efficiency and Accessibility," *International Journal of Educational Qualitative Quantitative Research* 4, no. 1 (2025): 15–24, https://doi.org/10.58418/ijeqqr.v4i1.135.
[27] R. Fadhli et al., "Developing a Digital Learning Environment Team-Based Project to Support Online Learning in Indonesia," *International Journal of Evaluation and Research in Education* 12, no. 3 (2023): 1599–608, https://doi.org/10.11591/ijere.v12i3.24040.
[28] E. N. Purnomo et al., "Transformation of Digital-Based School Culture: Implications of Change Management on Virtual Learning Environment Integration," *Cogent Education* 11, no. 1 (2024), https://doi.org/10.1080/2331186X.2024.2303562.

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individuals also has an impact on innovative behavior in the work environment. There is a significant relationship between perceived organizational support and career success and institutional goal achievement[29]. When teaching staff feel supported by management through clear assignments and relevant content assistance, they tend to be more motivated to innovate in their teaching methods [30].

It is this motivation and innovation of teachers that then strengthens the institution's readiness to face technological disruption in the digital age. Education management that is responsive to the times can improve the effectiveness of digital learning and strengthen the institution's capacity for structural change[31]. Through inclusive and sustainable policies, school management can ensure that every teacher has equal access to the necessary digital competency training and development.

Ultimately, this entire range of managerial support forms the basis for creating a flexible and personalized digital learning environment. Management support in providing the right digital platform has been proven to increase the flexibility and accessibility of learning for students[32]. With good integration between management policies and technological needs in the field, the vision of digital transformation in schools can be realized in practice, rather than remaining merely a strategic plan on paper.

As the author's statement, this literature review confirms that management support is not an independent variable, but rather the main catalyst that brings other variables in the digital education ecosystem to life. Based on the synthesis of the above references, the author argues that without managerial intervention that includes policy, funding, and emotional support for educators, even the most advanced technology will fail to have a transformative impact. Therefore, school leaders must view management support as a long-term strategic investment to ensure the sustainability of education quality in an era of disruption.

**b. Digital Leadership**

Leadership in the era of digital disruption requires a new paradigm that goes beyond traditional leadership methods. Digital leadership is defined as the ability to integrate technology with strategic vision, organizational culture, and human values in order to face the challenges of the 4.0 industrial revolution (Pintauli, 2022). This leadership characteristic is crucial in educational institutions, where leaders not only manage administration but also become agents of change capable of creating a digital culture in

[29] L. Jinbei et al., "Examining the Relationship between Perceived Organizational Support and Career Success: A Comprehensive Review," *International Journal of Academic Research in Business and Social Sciences* 15, no. 2 (2025): 195–209, https://doi.org/10.6007/ijarbss/v15-i2/24535.

[30] M. Novita et al., "Digital-Based Learning Management Support Through Service Learning Method in Accelerating the Achievement of Sustainable Development Goal (SDG 4) in Indonesia," *Global Sustainability and Community Engagement* 1, no. 01 (2025): 34–44, https://doi.org/10.62568/gsce.v1i01.218.

[31] S. Manaf, "Educational Management in the Digital Age: Integrating Technology for Student Success," *AL-ISHLAH: Jurnal Pendidikan* 16, no. 2 (2024): 1451–61, https://doi.org/10.35445/alishlah.v16i2.4919.

[32] I. U. Berezi, "Virtual Learning Environment: Redefining Higher Educational Delivery for Efficiency and Accessibility," *Journal of Innovative Education* 1, no. 1 (2025): 1–13.

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schools and universities [33].

The crucial role of digital leaders is evident in their ability to motivate and guide all members of the organization in adopting new technologies. Digital leadership serves as the main driver, motivator, and role model in building a sustainable digital learning environment [34].Through transformational leadership, the challenges of digitalization can be overcome by inspiring teachers and staff to continue innovating in the daily teaching and learning process.

The power of digital leadership also has a significant impact on the intellectual and emotional capacity of educators. Research shows that digital leadership can strengthen a culture of knowledge sharing and increase the emotional intelligence of lecturers in the digital age [35]. By creating an environment that supports technology-based idea exchange, educational institutions can achieve more optimal performance compared to conventional leadership approaches[36].

The correlation between leadership style and organizational innovation levels is also supported by leaders' ability to empower knowledge-based interactions. Digital transformational leadership style encourages interactions that empower staff, which ultimately enhances the overall innovative capabilities of the organization [37]. This indicates that successful digital leaders are those who are able to build a collaborative ecosystem where each individual feels they have a role in the technological transformation.

In addition to collaboration, digital leaders in higher education are now faced with the demand to have both technical and strategic understanding. Digital academic leadership requires perceptions and practices that are in line with the technological developments of the digital society in order to remain competitive[38]. Institutional leaders must possess adaptive core skills to navigate the rapid and massive transformational changes occurring in the education sector[39].

This adaptability is key in dealing with the uncertainty brought about by technological disruption in schools. Adaptive leadership is needed to face the challenges of educational disruption by identifying opportunities for innovation amid infrastructure

[33] A. W. Khurniawan et al., "The Impact of Digital Leadership on Digital Transformation in University Organizations: An Analysis of Students' Views," *Perspektivy Nauki i Obrazovania* 67, no. 1 (2024): 677–90, https://doi.org/10.32744/pse.2024.1.38.

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[35] S. Anwar and U. N. Saraih, "Digital Leadership in the Digital Era of Education: Enhancing Knowledge Sharing and Emotional Intelligence," *International Journal of Educational Management* 38, no. 6 (2024): 1581–611, https://doi.org/10.1108/IJEM-11-2023-0540.

[36] A. Quddus et al., "Effect of Ecological, Servant Dan Digital Leadership Style Influence University Performance? Evidence from Indonesian Universities," *Systematic Reviews in Pharmacy* 11, no. 10 (2020): 408–17, https://doi.org/10.31838/srp.2020.10.64.

[37] Ardi et al., "The Relationship Between Digital Transformational Leadership Styles and Knowledge-Based Empowering Interaction for Increasing Organisational Innovativeness."

[38] M. Jing et al., "Higher Education Digital Academic Leadership: Perceptions and Practices from Chinese University Leaders," *Education Sciences* 15, no. 5 (2025): 1–27, https://doi.org/10.3390/educsci15050606.

[39] D. Kadarsah et al., "Understanding Leadership Core Skills for Education in an Era of Digital Disruption and Transformational Change," *Jurnal Administrasi Pendidikan* 22, no. 1 (2025).

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and human resource constraints[40]. With a clear vision, digital leaders are able to guide organizations to not only survive but also thrive through the inclusive utilization of digital opportunities[41].

Globally, the trend of research publications on digital leadership continues to experience significant growth, indicating that this framework is increasingly considered a determinant of the effectiveness of future learning environments[42]. A systematic review reaffirms that strengthening the digital learning environment is highly dependent on the strength of leadership in designing policies and evaluating the implementation of technology on an ongoing basis[43]. Without visionary leaders, technological investments will only become an administrative burden without any substantial changes to the quality of learning.

As the author's statement, this literature review concludes that digital leadership is the "compass" that determines the direction of successful digital transformation in schools and universities. Based on the synthesis of the above references, the author argues that digital leadership does not only focus on hardware sophistication, but more on the mental and strategic readiness of leaders in managing the human transition into the digital ecosystem. Therefore, the development of leadership capacity based on technological literacy and emotional intelligence must be a top priority for every school principal and educational institution leader in Indonesia to ensure the success of DLE.

**c. Digital Literacy**

In an increasingly digitized education ecosystem, technical skills alone are no longer sufficient without a deep understanding of what is known as digital literacy. Digital literacy is defined as an individual's ability to use technology effectively, covering technical, cognitive, and ethical aspects of interacting with digital information[44]. This literacy is not merely a complementary variable, but rather a core competency that determines the extent to which digital transformation can be internalized by educators and students in the daily learning process.

The need for digital literacy is increasingly urgent given the significant increase in the demands of the digital society on the world of education. Educators are required to have digital competencies that are in line with the times in order to be able to facilitate the needs of students in the 21st century[45].Without adequate mastery of digital literacy, efforts to integrate technology into the curriculum will face major obstacles, especially in

[40] A. Anengsih et al., *Adaptive Leadership Transformation in Facing Educational Disruption in The Digital Era*, 10, no. 2 (2025): 1350–64.

[41] A. Uzorka et al., "Educational Leadership in the Digital Age: Navigating Challenges and Embracing Opportunities," *International Journal of Technology in Education and Science* 9, no. 1 (2025): 128–41, https://doi.org/10.46328/ijtes.605.

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[43] Yelubay et al., *Developing Future Teachers' Digital Competence via Massive Open Online Courses (MOOCs)*.

[44] Nurhayati et al., "Inovasi Pendidikan Di Era Digital."

[45] I. I. Golovanova et al., "VII International Forum on Teacher Education A Study into the Requirements of Digital Society and Educators' Digital Literacy," 2021, 555–68, https://doi.org/10.3897/ap.

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navigating reading and writing skills in the digital space[46].

Therefore, developing teachers' digital competencies is one of the main pillars in ensuring the quality of the digital learning environment. Digital literacy plays a crucial role in supporting flexible and interactive learning processes, thereby increasing instructional effectiveness[47]. Through a good understanding of technology, teachers can create a more dynamic online learning atmosphere that has a direct impact on improving overall student learning outcomes[48].

In addition to impacting teachers' teaching methods, digital literacy is also a determining factor in students' academic achievement at various levels of education. There is a significant positive influence between students' digital literacy levels and their learning outcomes, especially in the context of e-learning [49].When students have high confidence in using digital devices, they tend to be more actively involved in academic activities and achieve better performance[50].

Interestingly, digital literacy is now also beginning to expand into more complex areas, such as the use of artificial intelligence in education. AI literacy has become an important factor in determining the readiness of students and learners to face the increasingly intelligent digital learning environment of the future[51]. Mastery of this cutting-edge technology-based literacy, when combined with proper risk management, has been proven to improve learning innovation performance at the higher education level[52].

The interaction between digital literacy and the learning environment atmosphere creates a lasting effect on individual learning motivation. Digital literacy has a direct impact on learning outcomes through the mediation of the digital atmosphere and confidence in using technology[53]. In addition to formal channels, this literacy also encourages independent learning through informal channels (digital informal learning), which ultimately strengthens digital competence holistically[54].

More broadly, strengthening digital literacy is considered a key requirement for

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[46] W. D. Septiari et al., "Digital Literacies in Education: Navigating Reading and Writing Skills Among Students in the 21st Century," *Educational Process: International Journal* 16 (2025), https://doi.org/10.22521/edupij.2025.16.197.

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[52] A. Setyadi et al., "Risk Management, Digital Technology Literacy, and Modern Learning Environments in Enhancing Learning Innovation Performance: A Framework for Higher Education," *Education and Information Technologies* 30, no. 11 (2025): 15095–123, https://doi.org/10.1007/s10639-025-13380-4.

[53] N. Yuan et al., "The Impact of Digital Literacy on Learning Outcomes among College Students: The Mediating Effect of Digital Atmosphere, Self-Efficacy for Digital Technology and Digital Learning," *Frontiers in Education* 10 (2025): 1–11, https://doi.org/10.3389/feduc.2025.1641687.

[54] S. Zakir et al., "Digital Literacy and Academic Performance: The Mediating Roles of Digital Informal Learning, Self-Efficacy, and Students' Digital Competence," *Frontiers in Education* 10 (2025): 1–13, https://doi.org/10.3389/feduc.2025.1590274.

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realizing an inclusive and sustainable education system in regional areas such as ASEAN. Educational policy reforms that emphasize transformation and digital literacy are an urgent call to narrow the gap in education quality between regions [55].With equitable digital literacy, complex challenges in technology integration can be transformed into opportunities for innovation that benefit all levels of society [56].

As a statement from the author, this literature review concludes that digital literacy is the "key to access" for every individual to fully participate in the digital transformation of education. Based on the synthesis of the above references, the author argues that digital literacy should no longer be viewed as a separate technical skill, but rather as a basic right to education in the modern era. Therefore, the strengthening of digital literacy, which includes cyber ethics and data literacy, must be integrated into teacher competency standards and school curricula to ensure a digital learning environment that is not only sophisticated, but also safe and educational.

## D. Conclusion and Recommendations

This study concludes that digital transformation in secondary schools is a strategic orchestration involving three main pillars: management support as the provider of structural foundations, digital leadership as a compass for changing organizational mindsets, and digital literacy as a basic individual competency. The synergy of these three elements confirms that the success of a digital learning environment cannot be achieved solely through the procurement of physical technology, but must be achieved through the harmonious integration of system support, leadership role models, and user proficiency. Without the strength of these three pillars, the digital transformation process will only become an administrative burden that fails to touch the essence of improving the quality of learning in depth.

This systematic integration ultimately becomes an absolute requirement for the digital sovereignty of education in Indonesia, where institutions must be able to transform themselves from mere technology users into smart digital ecosystem managers. Through this comprehensive framework, schools will not only be able to adapt to disruption, but also have the capacity to create inclusive and sustainable innovation.

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