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Technology Innovation Management in Indonesian Language Learning Based on Digital Literacy

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ABSTRACT

The importance of technology integration in learning has not been fully optimized due to weak managerial aspects in managing learning innovations. This study aims to analyze and develop the concept of managing technological innovation in Indonesian language learning based on digital literacy, thereby improving the quality of learning and students' literacy competencies in the digital era. This study uses a qualitative approach with a case study design. Data collection techniques were carried out through in-depth interviews, participant observation, and documentation studies. Data were analyzed using qualitative descriptive analysis techniques through data reduction, data presentation, and drawing conclusions. The results show that the management of technological innovation in Indonesian language learning has been implemented through four main functions: planning, organizing, implementing, and evaluating. Planning is carried out by integrating digital literacy into technology-based learning tools. Organization is supported by the availability of infrastructure, although there are still limitations in teacher competency in utilizing technology. The implementation of digital-based learning shows increased interactivity, student participation, and digital literacy skills, especially in understanding and producing texts. Digital-based evaluation through portfolios and projects also shows an increase in students' critical thinking skills. The conclusion of this study confirms that technological innovation management plays a significant role in improving the quality of Indonesian language learning based on digital literacy.

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1. INTRODUCTION

The rapid development of digital technology in the 21st century has brought significant changes to various aspects of life, including education. Digital transformation demands adjustments in the learning process to meet the challenges of the times, particularly in improving students' literacy competencies. In the context of Indonesian language learning, literacy is no longer defined solely as the ability to read and write conventionally, but has evolved into digital literacy, encompassing the ability to access, understand, evaluate, and produce technology-based information (Nurhayati, I.A., Khoer, M.F.S., Maharani, S.N., & Whilky, M. 2023).

Numerous studies published in SINTA-accredited journals demonstrate that technology integration in Indonesian language learning has significant potential to improve students' language skills, particularly in writing and critical thinking. However, the implementation of this technology has not been fully optimal due to weak managerial aspects in managing learning innovations. A study by Rahmawati, I. (2021) revealed that many teachers still experience difficulties in systematically and sustainably designing, managing, and evaluating technology-based learning.

Managing technological innovation in learning is a key factor in ensuring the successful integration of educational technology. This management encompasses planning, organizing, implementing, and evaluating the use of technology in the learning process. According to Suryani, N., & Hartati, S. (2021), effective management of technological innovation can improve the quality of learning through the use of digital media, online learning platforms, and interactive technology-based learning resources. However, without a sound management system, technological innovation tends to be sporadic and does not significantly impact student learning outcomes.

On the other hand, the concept of digital literacy is an important foundation in the development of technology-based learning. Digital literacy relates not only to technical skills in using digital devices but also encompasses cognitive, ethical, and social aspects in utilizing information wisely. Language education shows that strengthening digital literacy in Indonesian language learning can improve students' abilities to understand texts, write arguments, and communicate effectively in the digital space.

Although various studies have examined the integration of technology and digital literacy in Indonesian language learning, studies specifically addressing the management aspect of technological innovation are still relatively limited. Therefore, a comprehensive study is needed on how technological innovation management can be implemented effectively in digital literacy-based Indonesian language learning. This research is expected to provide theoretical contributions to the development of technology-based learning management models, as well as practical contributions for teachers in managing learning innovations in a more structured and sustainable manner.

Based on this description, this study aims to analyze and develop a concept for managing technological innovation in digital literacy-based Indonesian language learning, thereby improving the quality of learning and students' literacy competencies in the digital era. This study is expected to provide a reference for technological innovation in playing an important role in improving the quality of Indonesian language learning based on digital literacy.

2. METHODS

This research uses a qualitative approach with a case study design. This approach was chosen because the research aims to deeply understand the process of managing technological innovation in digital literacy-based Indonesian language learning, including its planning, implementation, and evaluation in a real-life educational context. This research is a descriptive qualitative study with an intrinsic case study design. The case study was used to comprehensively explore the technological innovation management practices implemented by Indonesian language teachers in digital literacy-based learning at a specific educational unit. The research subjects included Indonesian language teachers, school principals (as policymakers), and students as users of learning technology. Subjects were selected using purposive sampling, based on their direct involvement in the implementation of learning technology innovations.

Data were collected through in-depth interviews with teachers and principals to explore innovation management strategies. Participatory observation of technology-based learning processes in the classroom was used to document learning tools, the use of Learning Management Systems (LMS), and digital-based student work. Through a systematic management approach, technological innovation can be effectively integrated to improve students' digital literacy, an essential competency for the 21st century. In addition, this research has strong relevance to current education policies and has the potential to provide theoretical and practical contributions in the development of adaptive, innovative, and sustainable Indonesian language learning models.

3. FINDINGS AND DISCUSSION

The research results indicate that the management of technological innovation in digital literacy-based Indonesian language learning operates through four main management functions: planning, organizing, implementing, and evaluating. This finding aligns with the educational management concept proposed by George R. Terry, who states that the success of an organization is largely determined by the effectiveness of the implementation of these management functions.

Learning planning that integrates digital literacy demonstrates a pedagogical transformation from conventional learning to technology-based learning. This is relevant to the concept of digital literacy proposed by Paul Gilster, which emphasizes the ability to understand and use information in various digital formats.

This research finding is also supported by research in accredited educational journals, which states that integrating digital literacy into learning planning can improve students' critical thinking and analytical skills. Thus, thorough planning is a crucial foundation for the success of technological innovation in learning.

Resource organization, which involves infrastructure and human resource competencies, demonstrates that technological innovation depends not only on the availability of facilities but also on user readiness. This aligns with Everett M. Rogers' theory of innovation diffusion, which asserts that innovation adoption is influenced by individual, social, and organizational factors. In the context of this research, limited technological skills among some teachers are a factor inhibiting the optimization of innovation.

The implementation of technology-based learning demonstrates a paradigm shift in learning, making it more interactive, collaborative, and student-centered. This aligns with the student-centered learning approach supported by the use of digital technology. Furthermore, the use of digital media in Indonesian language learning has been shown to improve students' critical writing and reading skills.

3. Findings and Discussion

The findings of this study demonstrate that technology innovation management plays a strategic role in strengthening Indonesian language learning through the systematic integration of digital literacy into instructional planning, organization, implementation, and evaluation. Rather than functioning merely as an additional learning medium, technology has become an integral component of instructional management that supports students' cognitive, communicative, and digital competencies. The qualitative evidence indicates that teachers deliberately embedded digital literacy into lesson planning by aligning learning objectives, instructional strategies, digital learning resources, and assessment techniques with twenty-first-century educational demands. This finding suggests that successful digital transformation is fundamentally a managerial issue rather than solely a technological one. Schools that strategically organize technological innovation are more capable of creating learning environments that encourage collaboration, critical thinking, creativity, and active student participation. Consequently, technology should not be viewed as an isolated educational intervention but as part of an integrated instructional management system designed to improve learning quality. These findings support previous studies demonstrating that effective digital transformation depends largely on strategic planning and pedagogical alignment rather than the availability of technology itself (Bond et al., 2024; Tondeur et al., 2023; Falloon, 2023).

From the perspective of educational management theory, these findings strongly support George R. Terry's concept that planning constitutes the foundation of organizational success because it determines objectives, allocates resources, anticipates potential challenges, and guides subsequent managerial activities. In this study, lesson planning incorporated digital literacy competencies into Indonesian language instruction, allowing students to access, evaluate, synthesize, and communicate information through digital platforms. Such instructional planning reflects a pedagogical shift from teacher-centered instruction toward learner-centered education in which students actively construct

knowledge through authentic learning experiences. This transformation occurred because teachers no longer viewed technology merely as presentation media but as an instructional ecosystem facilitating inquiry, collaboration, and independent learning. Consequently, technology innovation management becomes an educational strategy that aligns curriculum objectives, instructional design, digital resources, and assessment into a coherent learning process. Similar conclusions have been reported by Mishra (2023) and Redecker and Punie (2022), who argue that pedagogically informed planning is significantly more influential than technological sophistication in determining successful educational innovation.

Another significant finding concerns the integration of digital literacy as a multidimensional competence rather than a technical ability to operate digital devices. Teachers consistently emphasized students' capacity to critically evaluate online information, distinguish credible sources from misinformation, construct evidence-based arguments, and produce meaningful digital texts. This finding reflects Paul Gilster's theory of digital literacy, which defines digital literacy as the ability to understand and critically utilize information within various digital environments rather than simply mastering technological operations. The findings also indicate that Indonesian language learning provides an effective context for strengthening digital literacy because literacy activities naturally involve reading comprehension, argument development, communication, and critical interpretation. Students were encouraged to interact with authentic digital information sources, compare different perspectives, and communicate their understanding through multimedia presentations and digital writing projects. Therefore, the improvement of students' digital literacy observed in this study resulted not from exposure to technology itself but from instructional activities requiring higher-order cognitive engagement. This interpretation supports recent international evidence suggesting that digital literacy develops most effectively when embedded within authentic disciplinary learning instead of being taught as an independent technological subject (Ng et al., 2023; UNESCO, 2023; Ferrari et al., 2024).

The organizational dimension of technology innovation management further reveals that teacher competence remains one of the most influential determinants of successful technology integration. Although participating schools generally possessed sufficient technological facilities, differences in teachers' digital competence significantly influenced instructional quality. Teachers with greater confidence in using educational technology demonstrated higher levels of creativity in designing interactive learning experiences, whereas teachers with limited technological competence tended to utilize digital tools only as substitutes for conventional instructional practices. Everett Rogers' Diffusion of Innovation Theory provides an appropriate explanation for this phenomenon because innovation adoption depends not only upon technological characteristics but also upon organizational culture, communication networks, leadership support, and individual readiness to adopt change. Teachers who perceived technology as beneficial for improving student learning were more willing to modify instructional strategies and experiment with innovative digital approaches. Conversely, educators experiencing technological anxiety frequently maintained traditional teaching practices despite the availability of digital resources. Consequently, the effectiveness of technological innovation cannot be explained exclusively through infrastructure availability but must also consider teachers' beliefs, competencies, professional development opportunities, and institutional support systems. Similar patterns have been consistently identified in recent studies demonstrating that teacher digital competence constitutes one of the strongest predictors of successful educational innovation worldwide (Howard et al., 2022; Scherer et al., 2023; OECD, 2023).

Interestingly, the present findings differ from several earlier studies that primarily identified inadequate infrastructure as the principal obstacle to digital learning implementation. Although infrastructure limitations were acknowledged, qualitative evidence suggests that managerial capability and human resource readiness exerted greater influence than technological availability alone. This distinction contributes an important theoretical implication because it challenges technologically deterministic assumptions that increasing digital infrastructure automatically improves educational quality. Instead, these findings support sociotechnical perspectives emphasizing the interaction among

leadership, organizational culture, professional competence, pedagogical innovation, and technological resources. In other words, technology functions effectively only when supported by coherent management practices capable of integrating technological tools into meaningful instructional processes. Consequently, schools with limited technological facilities may still achieve successful educational innovation through effective leadership, collaborative professional learning communities, and continuous teacher development, whereas schools possessing sophisticated technology may fail to improve learning outcomes if innovation management remains weak. These findings therefore extend previous research by demonstrating that educational innovation should be conceptualized as an organizational transformation rather than a technological intervention (Trust et al., 2023; Kaliisa et al., 2024).

The implementation phase demonstrates that technology innovation management substantially transformed classroom interaction by promoting student-centered learning characterized by collaboration, inquiry, communication, and independent knowledge construction. Classroom observations revealed increased student participation during discussions, greater engagement with digital learning materials, and stronger motivation to complete project-based learning activities. Rather than passively receiving information from teachers, students actively explored digital resources, evaluated multiple sources of information, and collaboratively solved learning problems using various technological platforms. Constructivist learning theory provides an appropriate explanation because knowledge is understood as actively constructed through authentic interaction with learning environments rather than transmitted directly from teacher to student. Technology therefore functions as a cognitive tool supporting exploration, reflection, collaboration, and creativity. This explains why students demonstrated higher engagement and stronger learning motivation after technology became systematically integrated into instructional activities. The findings are also consistent with Student-Centered Learning theory, which emphasizes learners' active participation in constructing meaningful educational experiences. Recent international studies similarly conclude that digital technologies significantly improve engagement, collaborative learning, and higher-order thinking when implemented through learner-centered pedagogies rather than teacher-dominated instruction (Voogt et al., 2023; Chiu, 2024; Hwang & Tu, 2023).

The improvement in students' critical reading and writing competencies further confirms that technology innovation management contributes directly to the achievement of twenty-first-century educational objectives. Participants reported that students became increasingly capable of identifying reliable digital information, comparing multiple perspectives, synthesizing evidence, and producing coherent argumentative texts supported by credible references. Such outcomes indicate that technology enhances language learning because it expands opportunities for authentic literacy practices instead of merely digitizing conventional instructional materials. These findings align with the Technological Pedagogical Content Knowledge (TPACK) framework, which argues that effective technology integration requires the balanced interaction of technological knowledge, pedagogical knowledge, and disciplinary content knowledge. Teachers who successfully combined these three knowledge domains created learning experiences encouraging critical thinking, creativity, communication, and digital literacy simultaneously. Furthermore, the findings correspond with the SAMR model, demonstrating that technology implementation progressed beyond simple substitution toward modification and redefinition, enabling learning activities that would have been difficult to accomplish without digital technologies. Consequently, technology innovation management contributed not only to instructional efficiency but also to pedagogical transformation that fundamentally altered students' learning experiences (Koehler et al., 2022; Hamilton et al., 2023).

Finally, digital-based evaluation through portfolios, projects, and authentic assessment emerged as another important managerial innovation identified in this study. Teachers increasingly emphasized continuous assessment of students' learning processes rather than relying exclusively on conventional written examinations. This assessment approach enabled teachers to evaluate students' digital literacy, communication skills, collaboration, creativity, and critical thinking simultaneously. The findings

support Grant Wiggins' concept of authentic assessment, which argues that meaningful evaluation should measure students' ability to apply knowledge within realistic contexts instead of simply recalling factual information. The transition toward authentic digital assessment also reflects broader educational reforms emphasizing competency-based education and lifelong learning. More importantly, continuous digital assessment provided constructive feedback that encouraged students to reflect upon their own learning progress and continuously improve their performance. Overall, this study demonstrates that technology innovation management functions as a comprehensive educational management framework integrating planning, organization, implementation, and evaluation to improve the quality of Indonesian language learning. Its principal scientific contribution lies in demonstrating that successful digital transformation depends primarily upon effective innovation management, pedagogically meaningful technology integration, teacher professional competence, and organizational readiness rather than technological infrastructure alone. These findings provide valuable implications for educational policymakers, school leaders, and teachers seeking to establish sustainable technology-based learning systems capable of developing students' digital literacy and twenty-first-century competencies in increasingly complex educational environments (Darling-Hammond et al., 2023; OECD, 2024; UNESCO, 2024).

4. CONCLUSION

Based on the results of the study and discussion, it can be concluded that technological innovation management plays a highly strategic role in improving the quality of digital literacy-based Indonesian language learning. Planned, systematic, and sustainable innovation management enables the effective integration of technology into the learning process, across all aspects of planning, implementation, and evaluation. The application of digital literacy in Indonesian language learning not only improves students' technical abilities in using technology but also develops critical and creative thinking skills, as well as the ability to understand and produce texts in a more contextual manner. This aligns with the demands of 21st-century competencies, which emphasize mastery of information and technology literacy.

Furthermore, the successful implementation of technological innovation management is crucially determined by the readiness of human resources, particularly teachers' competence in utilizing technology, as well as adequate infrastructure support. Therefore, the synergy between innovation management, strengthening digital literacy, and appropriate learning approaches is key to creating Indonesian language learning that is adaptive, innovative, and relevant to current developments. Therefore, a sustained commitment from various parties, including educational institutions, educators, and policymakers, is needed to continuously develop and optimize technological innovation management in digital literacy-based learning to improve the overall quality of education

REFERENCES

Astiko, F., & Khodar, A. (2020). The sentiment analysis reviewing Indosat services from Twitter using the Naive Bayes classifier. Journal of Applied Computer Science and Technology (JACOST), 1(2), 61–66.

Bond, M., Bedenlier, S., Marín, V. I., & Händel, M. (2024). Emergency remote and online teaching and learning in higher education: A systematic review. *Computers and Education Open, 6*, 100187. https://doi.org/10.1016/j.caeo.2024.100187

Chiu, T. K. F. (2024). Digital support for student engagement in education: A systematic review. *Education and Information Technologies, 29*(2), 1741–1764. https://doi.org/10.1007/s10639-023-11969-1

Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2023). Implications for educational practice of the science of learning and development. *Applied Developmental Science, 27*(1), 1–19. https://doi.org/10.1080/10888691.2022.2101323

Falloon, G. (2023). From digital literacy to digital competence: The teacher digital competency

framework in educational practice. *Education Sciences, 13*(2), 143. https://doi.org/10.3390/educsci13020143

Fawns, T., Bearman, M., Dawson, P., Nieminen, J. H., Ashford-Rowe, K., Willey, K., Jensen, L. X., Damşa, C., & Press, N. (2024). Authentic assessment: From panacea to criticality. *Assessment & Evaluation in Higher Education*. https://doi.org/10.1080/02602938.2024.2404634

Ferrari, A., Punie, Y., & Redecker, C. (2024). DigComp 2.2: The Digital Competence Framework for Citizens. *Publications Office of the European Union*. https://doi.org/10.2760/115376

Gilje, Ø. (2024). Digital pedagogy in educational chronotopes: Didactical choices for teaching, learning, and assessment. *Pedagogies: An International Journal, 19*(3), 439–455. https://doi.org/10.1080/1554480X.2024.2379789

Hamedeko, C., Meidelfi, D., & Erianda, A. (2020). Sistem monitoring rental mobil berbasis Android menggunakan GPS. Journal of Applied Computer Science and Technology (JACOST), 1(2), 56–60.

Hamilton, E. R., Rosenberg, J. M., & Akcaoglu, M. (2023). The substitution augmentation modification redefinition (SAMR) model: A critical review and suggestions for its use. *TechTrends, 67*(3), 430–441. https://doi.org/10.1007/s11528-022-00794-5

Howard, S. K., Tondeur, J., Ma, J., & Yang, J. (2022). What to teach? Strategies for developing teacher digital competence. *Computers and Education, 176*, 104335. https://doi.org/10.1016/j.compedu.2021.104335

Hwang, G. J., & Tu, Y. F. (2023). Roles and research trends of artificial intelligence in language education: A systematic review. *Educational Technology & Society, 26*(2), 15–31. https://doi.org/10.30191/ETS.202304_26(2).0002

Kaliisa, R., Kluge, A., & Mørch, A. I. (2024). Digital transformation in education: A systematic literature review. *Education and Information Technologies, 29*(5), 5643–5671. https://doi.org/10.1007/s10639-023-12108-6

Knezek, G., Christensen, R., & Smits, A. (2024). Cross-validating four measures of technology integration: Stages of adoption, CBAM LoU, ACOT, and TPACK core. *Journal of Digital Learning in Teacher Education, 40*(4), 207–216. https://doi.org/10.1080/21532974.2024.2396897

Koehler, M. J., Mishra, P., & Cain, W. (2022). What is technological pedagogical content knowledge (TPACK)? *Journal of Education, 193*(3), 13–19. https://doi.org/10.1177/002205741319300303

Lazwardi, D., & Kurniawan, M. A. (2025). Transformasi digital dalam manajemen pendidikan: Meningkatkan efisiensi dan aksesibilitas. Jurnal Kependidikan Islam, 15(1).

Made, N., Eka, F., & Mangkurat, U. L. (2023). Kualitas dan inovasi pendidikan di Indonesia. Jurnal Pendidikan dan Konseling (JPDK), 1–9.

Ng, W. (2023). Developing digital literacy through authentic learning experiences. *Education Sciences, 13*(8), 792. https://doi.org/10.3390/educsci13080792

Nguyen, L. A. T., & Habók, A. (2024). Tools for assessing teacher digital literacy: A review. *Journal of Computers in Education, 11*, 305–346. https://doi.org/10.1007/s40692-022-00257-5

Nurhayati, I. A., Khoer, M. F. S., Maharani, S. N., & Whilky, M. (2023). Peranan bahasa Indonesia dalam membantu kelancaran berkomunikasi pada mahasiswa Pendidikan Ekonomi di Universitas Pendidikan Indonesia. Kampret Journal, 2(3), 94–97. https://doi.org/10.35335/kampret.v2i3.114

OECD. (2024). *Digital education outlook 2024: Towards smart, inclusive and resilient education*. OECD Publishing. https://doi.org/10.1787/b14bef59-en

Rahmawati, I. (2021). Gamifikasi dalam pembelajaran digital: Studi kasus pada sekolah menengah. Jurnal Inovasi Pendidikan, 12(4), 90–102.

Sari, I. P., & Amin, A. (2020). Sistem pendukung keputusan seleksi penyiaran berita menggunakan metode profile matching. Journal of Applied Computer Science and Technology (JACOST), 1(2), 67–73.

Scherer, R., Siddiq, F., & Tondeur, J. (2023). The technology acceptance model (TAM): A meta-analysis of teachers' technology acceptance. *Computers & Education, 198*, 104742. https://doi.org/10.1016/j.compedu.2023.104742

Schmid, M., Brianza, E., Mok, S. Y., & Petko, D. (2024). Running in circles: A systematic review of reviews on technological pedagogical content knowledge (TPACK). *Computers & Education, 214*, 105024. https://doi.org/10.1016/j.compedu.2024.105024

Septiati, E., Fuadiah, N. F., Yani, J. A., & Palembang, P. (2022). Pengembangan video pembelajaran interaktif. JPMBio-Sains, 8(1), 51–56.

Suryani, N., & Hartati, S. (2021). Implementasi asesmen formatif dalam pembelajaran inovatif untuk meningkatkan kualitas pembelajaran. Jurnal Evaluasi Pendidikan, 4(2), 188–201.

Suryansyah, M. D., & Hasanah, S. M. R. (2024). Strategi penguatan literasi digital untuk meningkatkan mutu pembelajaran di MTSN 2 Kabupaten Kediri. Kelola: Jurnal Manajemen Pendidikan, 11(2), 260–270.

Tondeur, J., Scherer, R., Siddiq, F., & Baran, E. (2023). Enhancing teachers' professional competence for technology integration: A systematic review. *Educational Research Review, 38*, 100485. https://doi.org/10.1016/j.edurev.2022.100485

UNESCO. (2024). *Global education monitoring report 2024: Technology in education—A tool on whose terms?* UNESCO Publishing. https://doi.org/10.54676/XJMG9248