

Strategic Management and Digital Literacy: Enhancing Teacher Pedagogical Competence in the Digital Era

Karmin¹, Meilia Rosani¹, Pahlawan¹

¹Universitas PGRI Palembang, South Sumatra, Indonesia

Corresponding author e-mail: karminzakaria35@gmail.com

Article History: Received on 6 June 2025, Revised on 30 July 2025,
Published on 8 August 2025

Abstract: This study examines (1) the strategic management of digital literacy for educators at SMP Negeri 3 Lempuing, (2) the process of teacher digital literacy development in the digital era, and (3) the influence of digital literacy on pedagogical competence enhancement. A qualitative case study approach was employed, with data collected through in-depth interviews, observations, and documentation, supplemented by secondary data. Data analysis followed an interactive model, with validity ensured via triangulation (source, theory, method) and referential adequacy. Findings indicate that digital literacy strategy management adheres to the POAC framework (Planning, Organizing, Actuating, Controlling). Planning involves objective-setting, resource allocation, and success metrics; organizing focuses on HR management and government collaboration; implementation includes digital platform training, online safety education, and positive content creation; and control is maintained through monitoring and evaluation. Pedagogical competence improvement follows the I-P-O model (Input-Process-Output), where inputs (student characteristics, funding) and processes (ed-tech design, strategic management) yield outputs (student achievement, institutional recognition). The study also identifies internal impacts (family influence, school infrastructure) and external impacts (internet access, cyber risks like fraud and bullying). This research is among the first to integrate POAC strategic management and I-P-O frameworks in analyzing digital literacy's role in pedagogical development, offering a structured approach for educational institutions navigating digital transformation. Schools should adopt structured digital literacy programs, foster government partnerships, and implement continuous monitoring to mitigate cyber risks while enhancing teacher competence. The study provides a model for digital literacy strategy management in education, highlighting its critical role in improving teaching quality and institutional readiness for digital-era challenges.

Keywords: Digital Literacy, Teacher Pedagogical Competence, Teacher Strategic Management

A. Introduction

The world of education today is a global one, experiencing the Industrial Revolution 4.0. As a digital revolution, nearly every aspect emphasizes automation and collaboration between technologies, marked by the peak of technology use that has fundamentally changed the way people view life, both in work (education) and in learning. Currently, technology plays a crucial role and has become a very significant part of the world of education. This is changing the way students learn in the digital era. Digital change is very rapid in the development of information and communication technology. Educators play a crucial role in creating an effective learning environment that is responsive to the increasingly diverse needs of students (Markey et al., 2021; Zajda, 2021). Therefore, an effective teacher management strategy is key to improving the quality of existing education. Successful management not only includes human resource management but also facilitates continuous professional development and the integration of technology into the learning process (Alaghbari et al., 2024; Prastyaningtyas et al., 2023). Education is the gateway to a better life by championing the smallest things to the largest things that every human being normally goes through. In every era, there are always updates in the education system. In the 21st century, education is required to be increasingly advanced and accessible to all groups (González-Salamanca et al., 2020).

Education is a conscious and planned effort to create a learning atmosphere and process so that students actively develop their potential to possess spiritual and religious strength, self-control, personality, intelligence, noble morals, and the skills needed by themselves, society, the nation, and the state (Government Regulation Number 57 of 2021, Article 1). Education serves as a platform for developing a competent young generation capable of facing the changing times (Rasskazova et al., 2020). Linguistically, education is defined as a process of changing the attitudes and behavior of individuals or groups of people in an effort to mature them through teaching and training. Education is one of the most vital elements in national development, because through quality education, superior human resources (HR) can be formed (Van Hiep, 2021). One factor that significantly determines the quality of education is the teaching staff. Educators, or teachers, play a central role in transferring knowledge, skills, and values to students. Therefore, effective and efficient management of teaching staff is essential to creating an educational environment that supports quality learning (Nasution et al., 2024; Óskarsdóttir et al., 2020). According to Government Regulation (PP) No. 74 of 2008 concerning teachers, in Chapter I, General Provisions, it is stated that teachers are professional educators with the main task of educating, teaching, guiding, directing, training, assessing, and evaluating students in early childhood education through formal education, basic education, and secondary education.

Teaching staff management is a crucial aspect of education, influencing the quality of learning and the achievement of educational goals. Qualified and motivated teaching

staff play a crucial role in creating an effective and productive learning environment (Chakraborty & Biswas, 2019). Therefore, appropriate strategic teaching staff management is essential to enhance the professionalism, well-being, and motivation of educators in carrying out their duties. Management is a series of educational processes encompassing planning, organizing, implementing, monitoring, and evaluating to achieve predetermined organizational goals (Asad et al., 2022). However, in practice, challenges often arise in implementing teaching staff strategic management. These challenges range from learning planning and career development to suboptimal teacher performance assessments. Some frequently encountered problems include a lack of persuasive approaches, low work motivation, and a lack of competency development that aligns with current needs. Through appropriate management strategies, such as effective educational planning, continuous professional development, and objective performance evaluation, educational management can play a role in improving the quality of learning by enhancing teacher performance.

Good strategic management, which involves planning, organizing, directing, and supervising educators, can be a solution to address these problems. Therefore, it is important to examine and formulate strategies that can improve the quality of educator management, with the aim of increasing the effectiveness and efficiency of the learning process. Effective educational management can also provide the necessary support, training, and supervision for teachers to continuously develop themselves and improve the quality of their teaching (Amelia et al., 2022). On the other hand, technological developments and social changes also influence the work methods and expectations of educators. The development of education in Indonesia is no stranger to the use of technology. Technology-based learning in the current era is not a new thing. Therefore, the strategic management of teaching staff must be able to answer this challenge, both in terms of the use of educational technology and in terms of improving soft skills such as communication skills, classroom management, and the ability to adapt to changes in the ever-evolving educational environment.

Therefore, this study aims to examine the extent to which strategic management of teaching staff and understanding of digital literacy improve the pedagogical competence of teachers at SMP Negeri 3 Lempuing. This research is important to provide an overview of digital literacy's understanding of teacher pedagogical competence in order to produce professional, qualified educators who are able to adapt to the challenges of globalization and advances in information technology. In the era of globalization and rapid development of information technology, digital literacy has become a crucial skill that every individual, especially educators, must possess (Gündüzalp, 2021). Digital literacy encompasses not only the ability to use technological devices such as computers and the internet but also involves understanding, skills, and critical thinking in accessing, evaluating, and using information effectively and ethically in an educational context (Falloon, 2020). In the digital era, educators are required to utilize information technology as a tool in the

learning process and in educational administration. Digital literacy is an individual's interest, attitude, and skills in optimizing the use of digital and communication technologies to access, organize, integrate, analyze, and evaluate information, construct new knowledge, and communicate with others, enabling them to actively participate in society (Isabella et al., 2023).

In Indonesia, digital transformation in education has become an integral part of efforts to improve the quality of education. The introduction of educational technology encourages the use of technology to improve access and the quality of learning. However, the transition to technology-based education faces significant challenges, particularly in the understanding and skills of digital literacy among educators. This is crucial because educators who lack a sufficient understanding of digital literacy will struggle to optimally integrate technology into the teaching and learning process. Educational technology is the application of scientific knowledge in learning so that learning objectives can be achieved effectively and efficiently (Yeung et al., 2021). This encompasses not only tools and materials or hardware but also software and brainware. This is evident from field results, which indicate that many educators still have limitations in using technology devices and digital platforms in their learning. The lack of structured training and a lack of awareness of the importance of digital literacy mean that most educators are not fully prepared to face the challenges of digitalizing education. Furthermore, there are also issues related to low levels of understanding of digital security, ethics in technology use, and the ability to evaluate the quality of information found online.

Therefore, it is important to conduct research to determine the extent of digital literacy among educators at SMP Negeri 3 Lempuing and to identify factors influencing their digital literacy levels. This research is expected to provide an overview of the extent to which educators understand and utilize digital literacy in their educational practices, as well as provide recommendations for training and professional development that can improve their digital literacy skills. Educators can utilize technology as a learning medium or mediator in conveying knowledge to students through various applications, such as Zoom, Google Classroom, Google Meeting, or WhatsApp groups (Singh et al., 2020).

Thus, a sound understanding of digital literacy will open up opportunities for educators to be more adaptive to changing times, thus facilitating more engaging, effective, and relevant learning in line with existing technological developments. This will also strengthen the overall quality of Indonesian education in facing global challenges in the digital era. According to Susanto et al. (2020), pedagogical competence is the ability of educators to provide understanding to students in the learning or educational process. Fundamentally, this competence requires educators to understand the characteristics of students and all their potential. Educators understand learning planning, implementation, and evaluation. Pedagogical competence, which refers to teachers' ability to design, implement, and evaluate

effective learning processes, must align with ever-changing technological developments. Teachers are not only expected to have a strong understanding of educational theory and practice but also must be able to utilize digital technology to improve the quality of learning. This includes the use of various learning platforms, digital media, and technology-based communication tools to increase student engagement, facilitate collaborative learning, and provide broader access to information.

However, despite strong government and community support for integrating technology into education, many teachers still face significant challenges in developing their pedagogical competencies in the digital age. One major challenge is the lack of adequate training and education related to the use of technology in learning. Many teachers struggle to master the ever-evolving digital tools and platforms, resulting in a lack of optimal use of technology in teaching and learning activities. The rapid development of information technology in the current era of globalization has an unavoidable impact on education. Global demands require the education sector to continually adapt to technological developments to improve the quality of education, particularly in adapting the use of information and communication technology for education, particularly in the learning process.

On the other hand, technology also demands a paradigm shift in teaching methods. Teachers in the digital age must be able to create a more flexible, interactive learning environment that is based on the needs of students who are increasingly accustomed to using technology. This requires a broader knowledge of digital learning strategies, optimal classroom management, and the ability to evaluate and manage relevant digital resources. According to Geletu (2022), pedagogical competence is the ability to deeply understand students and implement educational learning, including the ability to design lessons, implement them, assess the learning process and outcomes, and make continuous improvements. Therefore, it is important to conduct research on teacher pedagogical competence in the digital era. This research aims to determine the extent to which teachers at SMP Negeri 3 Lempuing possess the competencies needed to integrate technology into the learning process. This research aims to identify challenges faced by teachers in developing their pedagogical competence in the digital era and to find solutions to strengthen these competencies through training, professional development, and more supportive policies.

By improving teacher pedagogical competence in the digital era, it is hoped that the learning process will be more effective and relevant to current developments. Teachers with strong pedagogical competence in technology will be better able to utilize technology to support enjoyable, interactive learning that is based on students' needs and interests. This, in turn, will have a positive impact on improving the overall quality of education in Indonesia. Pedagogical competence is the ability to deeply understand students and implement educational learning. A teacher's pedagogical competence is characterized by the ability to organize a quality learning process, as

well as attitudes and actions that can be exemplary (Zhang & Tian, 2025). In today's rapidly developing digital era, information and communication technology (ICT) has transformed the way we work and learn, including in education. The use of technology in learning is not only a necessity but also a challenge for educators, particularly in terms of mastering digital literacy and related pedagogical competencies. Digital literacy, which encompasses the ability to access, evaluate, and use information effectively using digital technology, is an integral skill for teachers' pedagogical competencies in the digital era at SMP Negeri 3 Lempuing.

Integrating technology into learning is a necessity to meet the demands of modern developments and improve the quality of education. The management strategy in question includes a systematic approach to designing and implementing training or briefing programs for teachers to optimally master digital literacy. Furthermore, this strategy also encompasses efforts to increase teachers' understanding of the importance of digital literacy in supporting their pedagogical competencies in the digital era. With a good understanding of digital literacy, it is hoped that teachers at SMP Negeri 3 Lempuing can improve their abilities in designing, implementing, and evaluating learning that utilizes technology effectively. This study attempts to examine and explore strategic management that can be implemented to improve the digital literacy understanding of educators at SMP Negeri 3 Lempuing, as well as identify its impact on improving teachers' pedagogical competence in facing the challenges of education in the digital era. The results of this study are expected to provide an overview and become material that can help improve the quality of education at this school by strengthening digital literacy and teachers' pedagogical competence.

B. Methods

The research was conducted at SMP Negeri 3 Lempuing from November 2024 to April 2025. This study describes the strategic management and understanding of digital literacy towards the pedagogical competence of teachers at SMP Negeri 3 Lempuing. Therefore, the main data sources of researchers are people who are considered important to obtain clear and accurate information. This study uses a descriptive qualitative method, namely describing situations or events that are arranged systematically, factually, actually, and accurately regarding the facts and phenomena being investigated or observed. The objects in this study are the principal, vice principal (curriculum, infrastructure), and educators or teachers. Data collection techniques through observation, interviews, and case studies of documentation. Data analysis is carried out with steps of data reduction, data presentation, and conclusions or data verification. While the validity of the data includes credibility tests (internal validation), transferability (external validation), dependability (reliability), and confirmability (objectivity).

C. Results and Discussion

Strategic management in an educational institution can be considered successful if each function within the strategic management is executed optimally and in accordance with sound principles (Kamara et al., 2024; Moreno-Carmona et al., 2020). Weaknesses in any of these functions can impact the entire process and potentially lead to the failure of effective and efficient strategic management. In the context of improving teacher pedagogical competence at SMP Negeri 3 Lempuing, the implementation of strategic management functions can be analyzed by researchers as follows:

Planning Digital Literacy Strategic Management to Improve the Pedagogical Competence of Educators

Planning is the process of selecting and linking various facts and formulating predictions or assumptions for the future, with the aim of designing and formulating the steps needed to achieve desired results. The existence of planning in the strategic management of educators and the understanding of digital literacy in improving the pedagogical competence of teachers at an institution reflect that leader, including the principal, have considered and planned in advance the direction and objectives of each activity. Based on the results of the researchers' research at SMP Negeri 3 Lempuing, it appears that planning in digital literacy strategic management is structured based on a specific approach, method, or logic. This plan outlines the organization's goals and determines the most effective way to achieve them. Furthermore, planning also enables this educational institution to acquire and manage the necessary resources. The planning reflects realistic goals and strategies for achieving them. Goal setting is a crucial element of any plan, and the objectives of digital literacy strategy management at SMP Negeri 3 Lempuing must be achieved through a deep understanding of the educational institution's surrounding environment.

Setting targets for digital literacy strategy management at school is a crucial step that reflects the school's vision and mission as an indicator of the success of that strategy (Radovanović et al., 2020). The school then chooses a work strategy management strategy through various activities that not only support the learning process but also serve as a medium for learning and reflect the quality of education at the school. Furthermore, it is crucial for the principal, educators, and education staff to understand how students utilize digital media, the internet, and digital educational platforms. With clear, targeted targets, the implementation of digital literacy strategy management at SMP Negeri 3 Lempuing can be carried out optimally and in line with established expectations.

Organizing Digital Literacy Strategy Management to Improve Teacher Pedagogical Competence at SMP Negeri 3 Lempuing

Organizing is a process related to how strategies and tactics previously formulated in the planning stage are structured and implemented into an organizational structure that aligns with the needs of the institution (Falqueto et al., 2020). This process includes structuring the roles, tasks, responsibilities, and authority of each individual and work unit within the institution so that all organizational elements can operate in a harmonious and directed manner. Furthermore, organizing also requires a structured work system and a conducive work environment, both physically and psychologically, to support the performance of all components within the organization. The goal is to ensure that all parties involved, from leaders to implementers, can carry out their functions effectively, efficiently, and oriented towards achieving the institution's overall vision and goals. Thus, organizing is a crucial element in bridging strategic planning with actual implementation on the ground.

SMP Negeri 3 Lempuing collaborates with the local government in managing the digitalization strategy for education. The understanding of digital literacy at SMP Negeri 3 Lempuing refers to three main stages in the transformation towards digitalization in education: the digitalization innovation process, the organizer, and the digitalization ecosystem for education. Digital transformation plays a key role in the creation of digital innovation (Bresciani et al., 2021). One of the greatest contributions to the advancement of information technology is the emergence of digital technology, which has driven widespread digitalization across various sectors of life. Innovation itself can be defined as an idea, event, or method considered new by individuals or groups, whether originating from discovery or invention, that is used to achieve specific goals or solve problems. In the context of education, information technology can be a significant opportunity if optimally utilized by educational institutions through the creation of innovations that can increase competitiveness. Conversely, if it fails to keep pace with technological developments, it can pose a challenge or even a threat to the sustainability and quality of educational institutions.

Innovation in the field of information technology (IT) is progressing very rapidly. IT professionals continue to explore and develop innovative applications that provide new services. Information technology has also brought about extraordinary breakthroughs that have significantly transformed communication and interaction. At SMP Negeri 3 Lempuing, innovation in IT is growing so rapidly that it's difficult to contain. IT professionals are increasingly demonstrating their creativity in designing digital solutions that address the various challenges faced by the school community and the surrounding community. In fact, new applications emerge almost constantly, offering easier learning, public services within the school environment, and more efficient and affordable digital library services.

The digital era has opened up significant opportunities for technological innovation that are fundamentally changing the face of education. Cutting-edge technologies such as artificial intelligence (AI), the Internet of Things (IoT), blockchain, and cloud computing have brought significant changes to the way educational institutions operate, interact with stakeholders, and manage their various support systems. Surprisingly, the school community, particularly the students and young generation at SMP Negeri 3 Lempuing, have been able to quickly adapt and transform towards digital. They appear to be shifting from conventional services to the use of various information technology-based applications. However, some educators still choose to stick with traditional methods or services due to various considerations, such as limited knowledge, old habits, or discomfort with new technologies. This situation creates differences in perspectives and approaches, ultimately triggering clashes between those who are already proficient in digital technology and those who still adhere to conventional methods.

Digital literacy refers to the practical knowledge and skills possessed by educators and students in the school environment in utilizing technology for various purposes. This includes the ability to access, manage, evaluate, produce, and convey information through various technology platforms and digital media. Several factors that influence a person's level of digital literacy include age, educational level, and socioeconomic status. A person can be said to be digitally literate if they possess core competencies such as the ability to search for information on the internet, navigate hypertext systems, assess the accuracy and relevance of information content, and systematically organize knowledge based on the information obtained. In responding to information needs and the demands of modern developments, educational institutions are required to adapt their management systems to align with the ever-evolving digital ecosystem or environment. The rapid growth of data, particularly unstructured data on the internet, has posed significant challenges in terms of efficiency and accuracy in information retrieval. To address this, a healthy innovation ecosystem is needed, fostering mutually beneficial collaboration between various parties. Such an ecosystem can foster innovation through the sharing of knowledge and experience and the collaborative use of resources.

In the era of globalization, libraries play a crucial role and offer significant opportunities in managing and disseminating information. Therefore, libraries are required to meet users' needs for accurate, relevant, and timely information. To address this, efforts are needed to optimize the use of existing services, both in terms of quality and quantity. Service quality is strongly influenced by the professionalism of librarians, ease of procedures, and a comfortable atmosphere. Meanwhile, service quantity relates to the variety and number of services available to users. If these three main components – librarians, facilities, and services – function optimally, libraries will be able to improve the quality of their services. Management is also required to support this improvement through the development of education, training, and the provision of facilities, which ultimately enhance the quality of human resources. All

of these aspects significantly impact the library's existence. Therefore, the primary focus is user satisfaction in meeting their information needs. In the context of digital technology development, the library at SMP Negeri 3 Lempuing has various advantages that significantly support the professional performance of librarians. These advantages include the ability to present the information users need, systematically compile and organize data, securely store information, effectively manage information resources, distribute or disseminate information to those who need it, and maintain and preserve information so that it remains available for future generations. However, rapid technological advances and changing needs should not disrupt or reduce the quality of library management. Instead, these developments must be anticipated through adaptive management so that the library remains relevant and optimal in carrying out its functions.

Implementing Digital Literacy Strategy Management to Improve Teachers' Pedagogical Competence

Implementing strategy management is the implementation stage aimed at ensuring all elements within the institution can carry it out effectively. Furthermore, this process also includes efforts to foster motivation so that each individual involved is able to carry out their duties, authorities, and responsibilities with full awareness and optimal productivity. Implementation is the implementation stage of the prepared plan, which is carried out in real-life situations and involves all human resources at SMP Negeri 3 Lempuing to achieve predetermined goals. Involvement here means encouraging and mobilizing all teaching staff to work voluntarily, consciously, and collectively to achieve the desired goals effectively. Therefore, a leader with the strength to encourage and mobilize all these elements is needed. The role of the principal is crucial in this process.

Digital Literacy Strategy Management Oversight to Improve Teachers' Pedagogical Competence

Supervision or controlling is a process aimed at ensuring that all planned, organized, and implemented activities are running according to established targets. In this regard, evaluation plays a crucial role in every human activity, as evaluation results can determine the effectiveness and sustainability of an activity, thereby minimizing the potential for deviations or unwanted obstacles. Evaluation is also a key indicator for measuring the extent to which goals have been achieved. Furthermore, evaluation serves as a tool in the planning, development, implementation, improvement, and continuation of digital literacy programs within the school environment. In carrying out its supervisory function at SMP Negeri 3 Lempuing, the principal needs to consider three main aspects: 1) establishing standards or performance indicators that serve as a benchmark for work performance, 2) comparing achieved work results with these standards, and 3) taking corrective action if work results do not meet established standards. This supervisory role is highly strategic in efforts to improve the

pedagogical competence of educators, given that the principal has full authority to manage the digital literacy strategy within the school.

Digital literacy is a crucial skill encompassing the understanding, utilization, and active involvement in the digital environment effectively. In the context of literacy management in schools, an understanding of digital literacy for educators is crucial to supporting the improvement of pedagogical competence. This encompasses knowledge of how the internet works, the ability to manage and evaluate online information, and the ability to distinguish between valid and misleading information. Furthermore, digital literacy also encompasses an understanding of digital media ethics, including positive online behavior and the importance of maintaining online privacy. With a strong grasp of digital literacy, teachers can integrate technology into the learning process more wisely and professionally. Strengthening digital literacy through the utilization of digital platforms is a strategic step in supporting teacher and student readiness to face the challenges of the digital era. For educators, a deep understanding of digital literacy is crucial for improving pedagogical competence, as it enables them to optimally utilize technology in the learning process while also being able to anticipate various risks that may arise in the online world. Through targeted and integrated literacy management within the education system, schools can ensure that digital literacy becomes an integral part of the teaching process, thereby supporting the creation of a generation that is adaptive, technologically savvy, and ready to compete in an ever-evolving digital environment.

D. Conclusion

This study concludes that strategic management based on the POAC framework (Planning, Organizing, Implementing, and Supervision) plays a pivotal role in enhancing digital literacy and pedagogical competence among teachers at SMP Negeri 3 Lempuing. The planning phase involved structured goal-setting and collaborative strategy formulation among school leaders and teachers, while organizing established dedicated teams to execute digital literacy initiatives. Implementation focused on practical upskilling through training in learning applications and interactive media development, and supervision ensured continuous improvement through periodic evaluations. Additionally, the Input-Process-Output (I-P-O) model clarified the progression from educator characteristics and financial resources (inputs) to educational technology integration and strategic management (processes), ultimately yielding measurable outcomes such as improved student performance and teacher recognition. The study also identified internal influences (e.g., school infrastructure like hotspot availability) and external factors (e.g., internet access and data quotas) as critical to sustaining digital literacy efforts. Practically, these findings suggest that schools should institutionalize POAC-based digital literacy programs, secure stable funding for technological resources, and foster partnerships to address infrastructure gaps. Furthermore, proactive measures such as cybersecurity workshops are needed to mitigate external challenges like unreliable internet connectivity. For future

research, longitudinal studies could assess the long-term impact of digital literacy on pedagogical outcomes, while comparative analyses across diverse school contexts would help identify scalable best practices. Additionally, exploring the role of government policies in supporting school-level digital transformation could provide actionable insights for systemic improvement.

E. Acknowledgement

We would like to express our acknowledgment to our respondents who helped us in this article.

References

- Alaghbari, M. A., Ateeq, A., Alzoraiki, M., Milhem, M., & Beshr, B. A. H. (2024). Integrating Technology in Human Resource Management: Innovations and Advancements for the Modern Workplace. *2024 ASU International Conference in Emerging Technologies for Sustainability and Intelligent Systems (ICETSIS)*, 307–311. <https://doi.org/10.1109/ICETSIS61505.2024.10459498>
- Amelia, C., Aprilianto, A., Supriatna, D., Rusydi, I., & Zahari, N. E. (2022). The Principal's Role as Education Supervisor in Improving Teacher Professionalism. *Nidhomul Haq: Jurnal Manajemen Pendidikan Islam*, 7(1), 144–155. <https://doi.org/10.31538/ndh.v7i1.2075>
- Asad, M. M., Rind, A. A., & Abdulmuhsin, A. A. (2022). The Effect of Knowledge Management in Educational Settings: A Study of Education Management Organizations (EMOS) Schools of Pakistan. *International Journal of Organizational Analysis*, 30(5), 1156–1171. <https://doi.org/10.1108/IJOA-12-2020-2521>
- Bresciani, S., Huarng, K.-H., Malhotra, A., & Ferraris, A. (2021). Digital Transformation as a Springboard for Product, Process and Business Model Innovation. *Journal of Business Research*, 128, 204–210. <https://doi.org/10.1016/j.jbusres.2021.02.003>
- Chakraborty, D., & Biswas, W. (2019). Motivating Factors in a Teacher's Research and Developmental Activities and Their Impact on Effective Quality Teaching in Higher Education Institutions. *Journal of Applied Research in Higher Education*, 12(4), 609–632. <https://doi.org/10.1108/Jarhe-07-2018-0161>
- Falloon, G. (2020). From Digital Literacy to Digital Competence: The Teacher Digital Competency (TDC) Framework. *Educational Technology Research and Development*, 68(5), 2449–2472. <https://doi.org/10.1007/s11423-020-09767-4>
- Falqueto, J. M. Z., Hoffmann, V. E., Gomes, R. C., & Onoyama Mori, S. S. (2020). Strategic Planning in Higher Education Institutions: What are the Stakeholders' Roles in the Process? *Higher Education*, 79(6), 1039–1056. <https://doi.org/10.1007/s10734-019-00455-8>
- Geletu, G. M. (2022). The Effects of Teachers' Professional and Pedagogical Competencies on Implementing Cooperative Learning and Enhancing Students' Learning Engagement and Outcomes in Science: Practices and Changes. *Cogent*

- Education*, 9(1). <https://doi.org/10.1080/2331186X.2022.2153434>
- González-Salamanca, J. C., Agudelo, O. L., & Salinas, J. (2020). Key Competences, Education for Sustainable Development and Strategies for the Development of 21st Century Skills. A Systematic Literature Review. *Sustainability*, 12(24), 10366. <https://doi.org/10.3390/su122410366>
- Gündüzalp, S. (2021). 21st Century Skills for Sustainable Education: Prediction Level of Teachers' Information Literacy Skills on Their Digital Literacy Skills. *Discourse and Communication for Sustainable Education*, 12(1), 85–101. <https://doi.org/10.2478/dcse-2021-0007>
- Isabella, I., Iriyani, A., & Puji Lestari, D. (2023). Digital Literacy as an Effort to Build the Character of a Digital Society. *Jurnal Pemerintahan dan Politik*, 8(3), 167–172. <https://doi.org/10.36982/jpg.v8i3.3236>
- Kamara, Y., Rahida, F. G., Kargbo, W., & Koroma, C. (2024). Application of Strategic Management in Educational Organizations. *Global Scientific and Academic Research Journal of Education and Literature*, 2(7), 1–11.
- Markey, D. K., O' Brien, D. B., Kouta, D. C., Okantey, C., & O' Donnell, D. C. (2021). Embracing Classroom Cultural Diversity: Innovations for Nurturing Inclusive Intercultural Learning and Culturally Responsive Teaching. *Teaching and Learning in Nursing*, 16(3), 258–262. <https://doi.org/10.1016/j.teln.2021.01.008>
- Moreno-Carmona, C., Ferial-Domínguez, J. M., & Troncoso, A. (2020). Applying the Open Government Principles to the University's Strategic Planning: A Sound Practice. *Sustainability*, 12(5), 1826. <https://doi.org/10.3390/su12051826>
- Nasution, R., Mutia Asmara, D. S., & Luyao Xu. (2024). Management of Teachers and Educational Staff: Their Roles and Importance in Enhancing the Quality of Learning. *PEBSAS: Jurnal Pendidikan Bahasa Dan Sastra*, 2(2), 19–31. <https://doi.org/10.61721/pebsas.v2i2.348>
- Óskarsdóttir, E., Donnelly, V., Turner-Cmuchal, M., & Florian, L. (2020). Inclusive School Leaders – Their Role in Raising the Achievement of All Learners. *Journal of Educational Administration*, 58(5), 521–537. <https://doi.org/10.1108/JEA-10-2019-0190>
- Prastyaningtyas, E. W., Almaududi Ausat, A. M., Muhamad, L. F., Wanof, M. I., & Suherlan, S. (2023). The Role of Information Technology in Improving Human Resources Career Development. *Jurnal Teknologi dan Sistem Informasi Bisnis*, 5(3), 266–275. <https://doi.org/10.47233/jteksis.v5i3.870>
- Radovanović, D., Holst, C., Belur, S. B., Srivastava, R., Hounghonon, G. V., Le Quentrec, E., Miliza, J., Winkler, A. S., & Noll, J. (2020). Digital Literacy Key Performance Indicators for Sustainable Development. *Social Inclusion*, 8(2), 151–167. <https://doi.org/10.17645/si.v8i2.2587>
- Rasskazova, O., Alexandrov, I., Burmistrov, A., Siniavina, M., & Cornelis, E. (2020). Key Competencies in the Digital Age and Transformation of Education. *IOP Conference Series: Materials Science and Engineering*, 940(1), 012093. <https://doi.org/10.1088/1757-899X/940/1/012093>
- Singh, C. K. S., Singh, T. S. M., Abdullah, N. Y., Moneyam, S., Ismail, M. R., Tek, E., & Singh, J. K. S. (2020). Rethinking English Language Teaching through Telegram,

- Whatsapp, Google Classroom and Zoom. *Systematic Reviews in Pharmacy*, 11(11), 45–54.
- Susanto, R., Rozali, Y. A., & Agustina, N. (2020). Pedagogic Competence Development Model: Pedagogic Knowledge and Reflective Ability. *Proceedings of the International Conference on Progressive Education (ICOPE 2019)*. <https://doi.org/10.2991/assehr.k.200323.082>
- Van Hiep, D. N. (2021). High Quality Human Resources Development. *Journal of University of Shanghai for Science and Technology*, 23(1). <https://doi.org/10.51201/jusst12546>
- Yeung, K. L., Carpenter, S. K., & Corral, D. (2021). A Comprehensive Review of Educational Technology on Objective Learning Outcomes in Academic Contexts. *Educational Psychology Review*, 33(4), 1583–1630. <https://doi.org/10.1007/s10648-020-09592-4>
- Zajda, J. (2021). *Constructivist Learning Theory and Creating Effective Learning Environments* (pp. 35–50). https://doi.org/10.1007/978-3-030-71575-5_3
- Zhang, H., & Tian, M. (2025). Unpacking the Multi-Dimensional Nature of Teacher Competencies: A Systematic Review. *Scandinavian Journal of Educational Research*, 69(5), 1004–1025. <https://doi.org/10.1080/00313831.2024.2369867>