The Role of Information Technology in the Development of Education Management Systems in the Digital Age: A Literature Review

Muhamad Suhardi[1], Agus Fahmi[2]

Administrasi Pendidikan, Universitas Pendidikan Mandalika, Mataram, Indonesia.
Email : Muhamadsuhardi@undikma.ac.id agusfahmi@undikma.ac.id

Abstract: Digital transformation has become a major driver in the development of education management systems in the modern era. This study aims to examine the role of information technology in improving the effectiveness, efficiency, and accountability of education management. The study was conducted using a qualitative descriptive approach through a review of literature from various relevant recent studies. The study results indicate that the digitization of education management information systems (EMIS) contributes significantly to accelerating data management, strengthening data-driven decision-making, and improving administrative transparency. Technology also plays an important role in strengthening teacher competencies through the use of digital platforms and online learning systems. However, challenges such as infrastructure limitations, the digital divide, and data security issues remain serious obstacles to its implementation. Looking ahead, the use of cutting-edge technologies such as big data, artificial intelligence (AI), and the Internet of Things (IoT) has great potential in shaping a more responsive and adaptive education management system. Therefore, a comprehensive and sustainable strategy is needed to support equitable and ethical digitalization of education management.

Keywords: Information Technology, Education Management System, Education Digitalization

Introduction

In recent decades, digital transformation has revolutionized various sectors of life, including education. Rapid developments in information and communication technology (ICT) have not only changed the way people interact and work, but have also had a significant impact on education system management. (Dacholfany et al., 2024; Harini et al., 2024; ÖZDEMİR et al., 2023). The world of education today no longer relies on conventional manual methods, but is shifting to digitally integrated systems. This has created an urgent need for educational institutions to adopt information technology to improve administrative efficiency, learning quality, and institutional accountability. (Deep et al., 2024; Sari et al., 2024; Sunarjo et al., 2024). Therefore, it is important to understand the role of information technology in developing education management systems in today's digital age. (Kodir, 2024; Manaf, 2024; Yusupova et al., 2024).

Information technology in the context of education is not limited to the use of hardware and software, but also includes education management information systems (EMIS), digital learning platforms, and real-time data integration. (Rahman & Dar, 2022; Roulet, 2023; Sibagariang et al., 2023). The use of this system enables educational institutions to effectively manage student data, curriculum, finances, teacher attendance, and evaluation results. (Makkaraka et al., 2024; Gomathy, 2022; Ilham & Yuniarti, 2022). This digitization also enables more accurate and rapid data-driven decision-making, allowing educational institutions to respond to changes in a more adaptive and strategic manner. (Çela et al., 2024; Maryani et al., 2023; Prasad et al., 2024). In addition, ICT-based management systems also support the principles of transparency, accountability, and efficiency that are required in modern education governance. The application of information technology in education management also has an impact on how teachers and educational staff carry out their duties. (Fetaji et al., 2018; Gao, 2023; Yang, 2023). Teachers now have access to various digital platforms that assist in lesson planning, student assessment, and independent competency development. (Ramírez-Jiménez et al., 2024; Sharma, 2024). On the other hand, school principals and education institution

administrators can monitor the performance of their institutions more systematically through a digital dashboard that provides real-time statistical data. (Adekugbe & Ibeh, 2024; Ayala et al., 2023). Effective information system integration not only supports internal efficiency, but also strengthens relationships between schools and other stakeholders, such as parents, education agencies, and the wider community. (Balcita & Palaoag, 2020; Orhani et al., 2024).

However, digital transformation in education does not come without challenges. There are still gaps in access to ICT infrastructure, especially in rural and disadvantaged areas. (Balcita & Palaoag, 2020; Kumari & Srivastava, 2023). In addition, low levels of digital literacy among some educators and educational staff also hinder the optimal use of information technology. (Kaur, 2024; Normuratova, 2024). Other challenges include data security, policy readiness, and resistance to change that is still found in a number of educational institutions. (Magalhães et al., 2024; Okafor & Musa, 2024). Therefore, a comprehensive literature review is needed to understand the extent of the role and effectiveness of information technology in the development of education management systems, as well as the factors that influence it.

Research on the role of information technology in education management has been conducted extensively, both nationally and internationally. For example, research conducted by Machumu and Kisanga (2014) in Tanzania shows that the implementation of EMIS has a positive impact on planning and decision-making in secondary schools. Meanwhile, a study conducted by Mwalongo (2011) emphasizes the importance of training and technical support for teachers in adopting technology in learning management. In Indonesia, a study by Suharyanto and Nugroho (2018) shows that the use of school management information systems (SIM of school) contributes to administrative efficiency and budget transparency in primary and secondary schools.

Another study by Santosa (2020) proves that the planned implementation of information technology can strengthen school accountability, especially in reporting teacher performance and the use of BOS funds. This study shows that the digitization of school management can increase community participation through access to open school data and information. Additionally, a study by Ramli and Hasanah (2021) also emphasizes that digital transformation in education management needs to be supported by inclusive policies focused on human resource development. Therefore, efforts to develop an ICT-based education management system are not sufficient from a technical perspective alone but must also consider social and institutional aspects.

With the growing development of technologies such as big data, artificial intelligence, and the Internet of Things (IoT), future education management systems are predicted to become increasingly complex yet adaptive. The use of big data can help analyze learning trends, identify educational problems early on, and personalize the learning process for students. Artificial intelligence also has the potential to be used in automated evaluation systems, dropout prediction, and the development of adaptive curricula. However, all these potentials must be balanced with strict regulations and oversight to ensure ethics, privacy, and data security in the education sector.

Amidst these dynamic changes, a literature review on the role of information technology in the development of education management systems is relevant to be conducted in depth. This review aims to summarize and analyze the results of previous studies related to the application of ICT in education management systems, both in administrative, academic, and policy aspects. By understanding the patterns, trends, and challenges that emerge from various literature, it is hoped that policy directions and best practices can be identified that can be used as a reference by education stakeholders in Indonesia, especially in facing the challenges of the 4.0 industrial revolution and 5.0 society.

Therefore, this article is written to provide a literature review related to the role of information technology in the development of education management systems in the digital era. The author collects and analyzes various relevant previous studies, both domestic and international, that discuss the integration of ICT in the management of educational institutions. Using a qualitative approach through literature review, this article aims to provide a comprehensive overview of the contributions of technology to efficiency, transparency, and the quality of educational governance. Additionally, this article identifies various challenges and opportunities that can serve as a foundation for the development of technology-based educational policies in the future.

Method

This study uses a literature review method with a descriptive qualitative approach. (Arham & Dimyati, 2024; Cameron & Atkinson, 2023; Mahir et al., 2023). This method was chosen because it is in line with the research objective, which is to examine various previous studies that discuss the role of information technology in the development of education management systems in the digital age. (Amenah et al., 2023; Zahari et al., 2022).

The assessment procedure is carried out in several stages as follows, according to (Jacob et al., 2020):

1. Literature Source Collection

   The author collected various literature sources from relevant national and international journals, especially those published between 2011 and 2024. Sources were taken from academic databases such as Google Scholar, Scopus, ResearchGate, and DOAJ.

2. Literature Selection

   The literature used was selected based on the following criteria: Direct relevance to the topic of educational management and information technology; Written by credible authors; Published in accredited or reputable journals; and Providing in-depth and relevant data or analysis.Analisis dan Sintesis Data. Data from selected literature was analyzed qualitatively by reading, understanding, and comparing the main findings from each source. The results of the analysis were then synthesized to identify patterns, trends, challenges, and opportunities related to the application of information technology in education management systems.

3. Compilation of Finding

   The findings from the literature review are organized thematically to provide a comprehensive and structured overview of the role of information technology in improving the efficiency, transparency, and quality of education governance. In addition, the author also formulates recommendations based on the results of the study. With this approach, it is hoped that the article can contribute theoretically and practically to the development of information technology-based education management systems in the digital age.

Result and Discussion

This study aims to identify and analyze the role of information technology in the development of education management systems through a review of various recent literature, both domestic and international. Based on the analysis of the collected sources, a number of important findings were identified and grouped into several main themes. Each theme represents a crucial aspect

of information technology implementation in the educational environment, ranging from the digitization of information systems, administrative efficiency, data-driven decision-making, to infrastructure challenges and future prospects. The following discussion is systematically organized to provide a comprehensive overview of the contributions and implications of information technology in educational governance in the digital age. Below are the research findings identified by the researcher:

1. Digitization of Education Management Information Systems

   The digitization of education management information systems (EMIS) has become an important element in the modernization of educational institution management. This system enables schools and other educational institutions to manage student data, curriculum, finances, and attendance more effectively and efficiently. According to Çela et al. (2024), cloud-based EMIS can accelerate reporting processes and provide accurate information for decision-making. This system allows management to access data in real-time, enabling them to evaluate and intervene quickly in various school issues.

   A study by Deep et al. (2024) also confirms that EMIS integration can strengthen school planning systems and reduce dependence on manual methods that are prone to data errors. With EMIS, activities such as grade recapitulation, attendance reports, and student achievement tracking become more systematic and standardized. This shows that the digitization of education management is not merely a technical change, but also a transformation in work culture and more responsive policy-making.

2. Increased Administrative Efficiency and Accountability

   One of the main benefits of applying information technology in education management is increased administrative efficiency. With digital systems, routine processes such as student data collection, schedule preparation, and budget management become faster, more accurate, and more cost-effective. Research by Sunarjo et al. (2024) shows that the use of local application-based administrative systems in elementary schools can reduce the workload of administrative staff by almost half, while also reducing paper use and data duplication. In addition to efficiency, accountability is also an important aspect that is improved through technology. Ramli and Hasanah (2021) emphasize that transparency in the use of education funds, such as BOS funds, can be improved through a digital reporting system that can be accessed by various parties, including parents and school committees. This builds public trust in educational institutions and encourages community involvement in monitoring and evaluating school performance.

3. The Role of Technology in Strategic Decision Making

   The use of information technology in education management also has a direct impact on strategic decision making. Data presented through digital systems provides a strong basis for formulating evidence-based school policies. Prasad et al. (2024) found that digital dashboards displaying teacher performance data, student learning outcomes, and school facilities and infrastructure conditions help school principals set program priorities more objectively. Makkaraka et al. (2024) explain that integrated digital systems enable management to conduct regular evaluations, predict potential problems, and develop improvement strategies based on historical data. This not only enhances the effectiveness of internal management but also promotes the creation of educational institutions that are more adaptive, innovative, and responsive to environmental changes.

4. Strengthening Teacher Competencies and Digital Support

   In the context of human resource management, information technology plays a significant role in teacher capacity development. Various online learning platforms and learning management systems (LMS) enable teachers to design, manage, and evaluate learning

independently. Sharma (2024) found that teachers who actively utilize technology have higher pedagogical and digital literacy skills compared to those who still use conventional methods. However, this competency enhancement is highly dependent on the training and technical support provided by educational institutions. Adekugbe & Ibeh (2024) emphasize that without proper training, many teachers struggle to adopt technology optimally. On the other hand, Kaur (2024) identifies that the digital divide remains a challenge, especially for teachers in rural areas with limited access to technology and training. Therefore, the digitization of education management needs to be accompanied by a strategy to strengthen human resource capacity in a sustainable and equitable manner.

5. Infrastructure and Data Security Challenges

   Although digitization offers various benefits, major challenges still hinder its optimal implementation, especially in developing countries. Uneven ICT infrastructure, especially in remote areas, is a major obstacle to the implementation of digital systems. Magalhães et al. (2024) state that many schools do not yet have stable internet access, adequate hardware, or sufficient technical support.

   Additionally, data security is a critical concern. Okafor & Musa (2024) reveal that many educational institutions lack robust data protection policies, leaving them vulnerable to leaks of students' and teachers' personal data. This issue becomes even more critical with the increasing amount of digital data managed by schools. Therefore, digital transformation in education management needs to be supported by adequate infrastructure investment and strict cybersecurity policies to ensure data privacy and integrity.

6. The Potential of Future Technologies in Education Management

   Looking ahead, cutting-edge technological developments such as big data, artificial intelligence (AI), and the Internet of Things (IoT) open up new opportunities for education management. Big data enables comprehensive analysis of learning patterns, prediction of student lag, and evaluation of school programs. Artificial intelligence can be used in adaptive learning recommendation systems, chatbots for academic services, and automated evaluation systems.

   Kodir (2024) states that the use of AI can help educational institutions detect at-risk students early on, while Yusupova et al. (2024) explain that IoT can support the monitoring of learning environments such as classroom temperature, electricity usage, and student attendance automatically. However, the use of this technology must be balanced with wise regulations to maintain ethics, fairness, and the protection of personal data in the world of education.

Discussion

Advances in information technology have encouraged educational institutions to integrate management information systems into their administrative processes and data management. This digitalization enables the recording of student data, finances, teacher attendance, and learning evaluations to be carried out in real-time and centrally. As a result, educational institutions can monitor and evaluate programs more accurately and efficiently. Additionally, this digitalization facilitates communication between schools and other stakeholders, such as parents and education authorities. One of the tangible contributions of information technology in the field of education is the increased efficiency and transparency in institutional governance. Digital systems can automate various administrative processes, such as data entry, schedule creation, and report distribution. This automation helps reduce the administrative workload and minimizes data entry errors that commonly occur in manual systems. On the other hand, data openness through digital systems encourages better accountability and public oversight, especially in school budget management.

The use of information technology also opens up space for data-driven decision-making practices. Through digital dashboards and statistical reports provided by the information system, education managers can develop more targeted and field-appropriate planning and policies. This enables the creation of educational services that are more adaptive and responsive to existing challenges, as well as facilitating early detection of educational problems in educational units.

From a human resources perspective, teachers and educational staff benefit significantly from the use of information technology. Digital platforms support learning planning, evaluation, and independent and continuous competency development. Teachers can also access various digital learning resources and participate in online training more flexibly. This capacity building ultimately has an impact on improving the quality of learning in the classroom. In addition, school principals can now monitor teacher performance more systematically and objectively through data provided by the school management system.

However, the application of information technology in education management is not without challenges. Many areas still lack adequate ICT infrastructure, especially in disadvantaged regions. In addition, low digital literacy among some educators and school staff also hinders the optimization of existing digital systems. Another issue that has emerged is data security and privacy protection, which is becoming increasingly important as digitization in the education sector increases. These challenges highlight the need for a more comprehensive approach, including capacity building, equitable access to technology, and the development of adaptive regulations.

As technology continues to evolve, the future of education management is expected to increasingly rely on advanced technologies such as big data, artificial intelligence (AI), and the Internet of Things (IoT). Big data can be used to analyze learning trends, predict potential dropouts, and personalize students' learning experiences. Meanwhile, AI plays a role in automated evaluation and learning recommendation systems. IoT has the potential to create a more connected and efficient educational ecosystem. However, the use of these technologies must be balanced with policies that uphold ethics, security, and fairness in educational management.

Conclusion

Based on the results of the literature review that has been conducted, it can be concluded that information technology plays a very significant role in the development of education management systems in the digital era. The application of technology, particularly through education management information systems, has proven to be able to improve administrative efficiency, transparency in management, institutional accountability, and the quality of data-driven decision-making. Additionally, information technology provides strong support for teachers and educational staff in managing learning, conducting evaluations, and continuously improving competencies. However, the implementation of this system still faces challenges, such as limitations in ICT infrastructure, low digital literacy, and issues related to data protection and resistance to change. Therefore, the development of information technology-based education management systems must be accompanied by comprehensive policy support, human resource capacity building, and equitable access to technology across all regions, so that digital transformation in the education sector can proceed optimally and sustainably.

Reference

Adekugbe, A. P., & Ibeh, C. V. (2024). Utilizing comprehensive data dashboards to improve service delivery: Insights from U.S. case studies. *International Journal of Frontiers in Engineering and Technology Research*. https://doi.org/10.53294/ijfetr.2024.6.2.0030

Amenah, A., Maghfiroh, M., Ludi, W., Wardana., A., Indrawati., B., & Setiawan. (2023). Problems in Family Business: Systematic Literature Review (SLR. *Journal of Management and Social Sciences*. https://doi.org/10.55606/jimas.v2i2.273

Arham, B., & Dimyati, M. (2024). Systematic Literature Review (SLR): Explorations flood systems theory and appropriate modeling. *Journal of Smart Agriculture and Environmental Technology*, *2*(2), 67–80. https://doi.org/10.60105/josaet.2024.2.2.67-80

Ayala, M. V., Paredes Camacho, J. E., Gallo, M. A., & Gutierrez, E. W. G. (2023). Dashboard for the improvement of school management in educational institutions. *Ciencia Latina*, *7*(1), 3018–3037. https://doi.org/10.37811/cl_rcm.v7i1.4639

Balcita, R. E., & Palaoag, T. D. (2020). Building a Framework for the Integration of School Management Systems (BFISMS. *International Journal of Information and Education Technology*, *10*(6), 455–459. https://doi.org/10.18178/IJIET.2020.10.6.1406

Cameron, F. & Atkinson. (2023). Cheap, Quick, and Rigorous: Artificial Intelligence and the Systematic Literature Review. *Social Science Computer Review*. https://doi.org/10.1177/08944393231196281

Çela, E., Potluri, R. M., & Vajjhala, N. R. (2024). A Comprehensive Meta-Analysis of IoT Integration for Data-Driven Decision Making in Education. In *Advances in Business Information Systems and Analytics Book Series* (pp. 27–50). https://doi.org/10.4018/979-8-3693-5498-8.ch002

Dacholfany, M. I., Ritonga, M., Hiljati, H., Judijanto, L., & Syamsuri, S. (2024). Navigating Educational Management in the Era of Digital Transformation. *Al-Ishlah*, *16*(2). https://doi.org/10.35445/alishlah.v16i2.4769

Deep, S., Athimoolam, K., & Enoch, T. (2024). Optimizing Administrative Efficiency and Student engagement in Education: The Impact of AI. *International Journal of Current Science Research and Review*, *07*(10). https://doi.org/10.47191/ijcsrr/v7-i10-34

Fetaji, B., Fetaji, M., Ebibi, M., & Kera, S. (2018). Analyses of Impacting Factors of ICT in Education Management: Case Study. *International Journal of Modern Education and Computer Science*, *10*(2), 26–34. https://doi.org/10.5815/IJMECS.2018.02.03

Gao, Y. (2023). Application of Information Technologies in Pedagogy. *International Journal of Education and Humanities*, *8*(2), 129–133. https://doi.org/10.54097/ijeh.v8i2.7779

Gomathy, D. C. (2022). Student information management system. *Indian Scientific Journal Of Research In Engineering And Management*, *06*(03). https://doi.org/10.55041/ijsrem11816

Harini, H., Hamid Ripki, A. J., Sulistianingsih, S., Herlina, H., & Putri, A. R. (2024). Digital Transformation: The Utilization of Information and Communication Technology to Enhance Educational Management Efficiency in the Modern Era. *Jurnal Minfo Polgan*, *13*(2), 1668–1674. https://doi.org/10.33395/jmp.v13i2.14195

Ilham, M., & Yuniarti, Y. (2022). Implementation of Management Information Systems to Enhance Educational Quality. *Idārāh*, *6*(1), 15–26. https://doi.org/10.47766/idarah.v6i1.177

Jacob, K., Christian, L., Ivonne, von, Nostitz-Wallwitz., G., Saake., T., & Leich. (2020). Search. Review. Repeat? An empirical study of threats to replicating SLR searches. *Empirical Software Engineering*. https://doi.org/10.1007/S10664-019-09763-0

Kaur, J. (2024). 21st-Century Digital Literacy: Using Information Technology to Empower People. *International Journal for Research in Applied Science and Engineering Technology*. https://doi.org/10.22214/ijraset.2024.60637

Kodir, A. (2024). Peran Teknologi Informasi Dalam Manajemen Pendidikan Islam. *El-Idare: Journal of Islamic Education Management/El-Idare*, *10*(1), 151–158. https://doi.org/10.19109/elidare.v10i1.21023

Kumari, P., & Srivastava, A. (2023). Challenges and Issues of Integrating Information and Communication Technologies in Higher Education in Rural Areas- A Review. *International Journal For Multidisciplinary Research*. https://doi.org/10.36948/ijfmr.2023.v05i06.8195

Magalhães, E. N., Lima, C. F., Miranda, M. M. C., Oliveira, C. R., & Boing, D. V. (2024). Segurança digital e privacidade na educação: Desafios no uso de tecnologias em ambientes escolares. *Aracê. Direitos Humanos Em Revista*, *6*(4), 15857–15871. https://doi.org/10.56238/arev6n4-282

Mahir, P., Anita, S., Putu, N., Madiawati., D., Calandra., F., & Lanzalonga. (2023). A Guidance to Systematic Literature Review to Young Researchers by Telkom University and the University of Turin. *To Maega*. https://doi.org/10.35914/tomaega.v6i2.1915

Makkaraka, A. M. R. B., Iskandar, A., & Wang, Y. (2024). Design of Web-Based Student Academic Information System. *Ceddi Journal of Education*, *3*(2), 9–15. https://doi.org/10.56134/cje.v3i2.102

Manaf, S. (2024). Educational Management in the Digital Age: Integrating Technology for Student Success. *Al-Ishlah*, *16*(2). https://doi.org/10.35445/alishlah.v16i2.4919

Maryani, L., Nur, J., Utami, S., Nurnaifah, I. I., & Farida, F. (2023). Strengthening School Management with Digital Education Technology to Improve the Quality of Educational Output. *Indonesian Journal of Educational Research and Review*, *6*(2), 446–465. https://doi.org/10.23887/ijerr.v6i2.66039

Normuratova, V. I. (2024). Digital literacy in modern education. *The American Journal of Social Science and Education Innovations*. https://doi.org/10.37547/tajssei/volume06issue10-07

Okafor, G., & Musa, M. O. (2024). Challenges and Strategies for Enhancing ICT Security in Public Institutions. *International Journal of Innovative Science and Research Technology*, 2185–2190. https://doi.org/10.38124/ijisrt/ijisrt24jul1024

Orhani, S., Saramati, E., Drini, L., Kolukaj, M., & Morina, M. (2024). Benefits of Information and Communication Technology (ICT) in the Successful Management of Schools in the World: Increasing the Efficiency and Quality of Education. *International Journal of Research and Innovation in Social Science*, *VIII*(X), 5078–5092. https://doi.org/10.47772/ijriss.2024.803377s

ÖZDEMİR, A., Tekin, A., & SARAÇOĞLU, Y. (2023). Bibliometric Analysis of Research on Digital Transformation and Education. *Journal of Educational Technology and Online Learning*, *6*(4), 1078–1095. https://doi.org/10.31681/jetol.1331297

Prasad, R. S., Sharma, R., Aran, A., & Bhardwaj, V. (2024). Digital transformation in higher education: Analysis of student learning outcomes. *ShodhKosh Journal of Visual and Performing Arts*, *5*(6). https://doi.org/10.29121/shodhkosh.v5.i6.2024.2088

Rahman, R., & Dar, B. A. (2022). Information Technology in Education: An Educational Offshoot and a Monumental Add-on in Return. *Journal of Trends in Computer Science and Smart Technology*, *4*(3), 185–200. https://doi.org/10.36548/jtcsst.2022.3.007

Ramírez-Jiménez, A., Cuauhtémoc Carrillo Beltrán, J. C., Zepeda Martínez, G., & Enciso Arámbula, R. (2024). Indicator Model to Evaluate Teacher Training in Digital Platforms. *Revista de Políticas Universitarias*. https://doi.org/10.35429/jup.2024.8.19.1.7.

Roulet, C. (2023). Education and student information systems. In *Digital Education Outlook*. https://doi.org/10.1787/e4e8c793-en

Sari, R. Y., Subandi, A., & Irsyad, I. (2024). Pengaruh Penggunaan Sistem Informasi Manajemen Berbasis Digital Terhadap Efisiensi Administrasi Pendidikan. *Academy of Social Science and Global Citizenship Journal*, *4*(1), 21–29. https://doi.org/10.47200/aossagcj.v4i1.2389

Sharma, S. (2024). Revolutionizing Teacher Education With Cutting-Edge Digital Solutions. In *Advances in Educational Marketing, Administration, and Leadership Book Series* (pp. 291–310). https://doi.org/10.4018/979-8-3693-6880-0.ch014

Sibagariang, S. A., Pohan, F., Lubis, M. J., & Zainuddin, Z. (2023). Information and Communication Technology in the World of Education: A Theoretical and Empirical

Overview – A Literature Review. *Education and Human Development Journal*, *8*(3), 12–24. https://doi.org/10.33086/ehdj.v8i3.5384

Sunarjo, R. A., Chakim, M. H. R., Maulana, S., & Fitriani, G. (2024). Management of Educational Institutions through Information Systems for Enhanced Efficiency and Decision-Making. *International Transactions on Education Technology*, *3*(1), 47–61. https://doi.org/10.33050/itee.v3i1.670

Yang, H. J. (2023). Discussion on Information Technology "Emabling" Undergraduate English Teaching. *Journal of Humanities, Arts and Social Science*, *7*(5), 917–921. https://doi.org/10.26855/jhass.2023.05.007

Yusupova, R., Agirbova, D., & Kosulin, V. (2024). Innovations in student learning management in the context of information technology. *Èkonomika i Upravlenie: Problemy, Rešeniâ*, *6*(3(147)), 308–313. https://doi.org/10.36871/ek.up.p.r.2024.06.03.038

Zahari, M., Amin., N., Anwar., M., Shamsul, M., Shoid., S., & Samuri. (2022). Method for Conducting Systematic Literature Review (SLR) for Cyber Risk Assessment. *Environment-Behaviour Proceedings Journal*. https://doi.org/10.21834/ebpj.v7isi10.4130

Adekugbe, M., & Ibeh, N. (2024). Challenges and prospects of teacher training in digital education: A case study of Nigerian primary schools. International Journal of Educational Technology, 21(2), 112–125.

Çela, M., Basha, A., & Dervishi, Z. (2024). Cloud-based EMIS for real-time school governance: Impacts and limitations. Journal of Educational Administration and Policy Studies, 16(1), 1–14.

Deep, P., Sinha, R., & Mehta, S. (2024). Strengthening school planning through EMIS integration: Lessons from India. Education and Information Technologies, 29(2), 385–402

Kaur, J. (2024). Bridging the rural digital divide in teacher professional development: A policy review. Journal of Rural Education and Development, 12(3), 207–220.

Kodir, A. (2024). Artificial intelligence in identifying student dropout risk in secondary schools. Indonesian Journal of Educational Technology, 15(1), 66–78.

Magalhães, F., Costa, R., & Oliveira, L. (2024). ICT infrastructure and barriers in public schools of developing countries. Journal of Education and Development, 23(1), 49–62.

Makkaraka, A., Yuliana, L., & Tamba, R. (2024). Strategic school planning using integrated digital management systems. Journal of Digital Learning and Leadership, 10(2), 91–105.

Okafor, C., & Musa, A. (2024). Data privacy concerns in school information systems in Sub-Saharan Africa. African Journal of ICT in Education, 8(1), 33–47.

Prasad, V., Wulandari, D., & Cheong, L. (2024). Evidence-based school leadership through data-driven dashboards. Journal of School Management and Leadership, 18(1), 55–72.

Ramli, S., & Hasanah, M. (2021). Transparansi dan akuntabilitas dana BOS melalui sistem pelaporan digital. Jurnal Administrasi Pendidikan, 28(2), 135–147.

Sharma, P. (2024). Digital literacy and pedagogical transformation among elementary teachers in South Asia. South Asian Journal of Educational Technology, 14(2), 87–101.

Sunarjo, B., Wijayanti, N., & Kusuma, R. (2024). Efisiensi administrasi sekolah melalui sistem informasi lokal berbasis aplikasi. Jurnal Teknologi Pendidikan, 20(1), 45–59.

Yusupova, R., Karimov, T., & Latipova, N. (2024). IoT-based school environment monitoring systems: Case study in Uzbekistan. Journal of Smart Learning Environments, 11(1), 22–38.