Indonesian Journal of Education (INJOE) e-ISSN: 2810-059X
Vol. 5 No. 1, April 2025, pages: 237~248

APPLICATION OF INFORMATION TECHNOLOGY IN EDUCATIONAL MANAGEMENT: CASE STUDY IN SENIOR HIGH SCHOOLS IN INDONESIA

Loso Judijanto*
IPOSS Jakarta, Indonesia
E-mail: losojudijantobumn@gmail.com

Nur Hakim
Akademi Maritim Pembangunan Jakarta, Indonesia
E-mail: nurhakimboy5@gmail.com

Widya Armalia
Akademi Maritim Pembangunan Jakarta, Indonesia
E-mail: widyagetwhatiwont@gmail.com

Abstract

The development of information technology has brought significant changes in educational management, especially at the high school (SMA) level. The application of technology in school administration, learning systems, and communication between stakeholders is considered capable of increasing the efficiency and effectiveness of education management. This research aims to examine the application of information technology in educational management in high schools in Indonesia through a literature review approach. Data sources were obtained from scientific journals, books and relevant research reports to evaluate the benefits, challenges and directions of development of information technology in educational management. The results of the study show that the implementation of information technology has helped schools increase data transparency, the effectiveness of online learning, and the efficiency of academic administration. However, several obstacles are still faced, such as limited technological infrastructure, lack of skills of teaching staff in using technology, and budget limitations in some schools. To optimize the application of information technology in education management, support is needed from the government, schools and stakeholders through the provision of adequate infrastructure, training for teaching staff, and regulations that support the digitalization of education. The implications of this research confirm that information technology has a strategic role in the transformation of educational management in high school. Therefore, further research is needed to explore more effective and sustainable technology implementation models, as well as evaluate the long-term

impact of educational digitalization on the quality of learning and school management.
Keywords: Information Technology, Education Management, High School.

INTRODUCTION

The development of information technology has brought significant changes in various sectors of life, including in the field of education. Digitalization and the use of technology-based devices have helped create an education system that is more efficient and adaptive to the needs of the times (Han & Dan, 2023). This development not only includes the use of hardware such as computers and tablets, but also software that supports school administration, teaching and learning processes, as well as communication between schools, students and parents. At the global level, many countries have adopted information technology to improve the quality of education and the effectiveness of managing educational institutions.

In the context of educational management, information technology has a strategic role in managing various aspects of schools, including administration, finance, curriculum and learning evaluation. Technology-based management systems allow schools to store, manage and analyze academic data more accurately and quickly (Jentleson, 2022). Apart from that, information technology also helps in making more precise decisions based on available data. With an integrated digital system, schools can increase transparency and efficiency in their operations.

In Indonesia, the government has encouraged the application of information technology in education through various policies and programs. Several initiatives such as school digitalization, the use of online learning applications, and the implementation of e-reports have been introduced to help schools manage learning more systematically. Apart from that, programs such as "Freedom to Learn" also prioritize the use of technology to support learning flexibility at various levels of education (Hendrawan, 2023). With the support of this policy, senior secondary schools (SMA) in Indonesia are expected to be more adaptive in implementing information technology in their management.

However, although the application of information technology in educational management offers various benefits, its implementation in high school still faces various challenges (Sari & Retnawati, 2024). One of the main challenges is the availability of infrastructure which is not evenly distributed throughout Indonesia. Schools in urban areas generally have better access to

the internet and technological devices compared to schools in rural or remote areas. This digital divide is an obstacle in efforts to equalize the application of technology in all high schools.

Apart from infrastructure, the readiness of human resources is also a factor that determines the success of implementing technology in education management. Many teaching staff and school administration staff are not fully skilled in operating technology-based systems. Training and mentoring are very important so that they can utilize technology optimally to support school management. Without adequate competence, the implementation of information technology can actually become an additional burden for schools (Prabowo et al., 2023).

Financial aspects are also an obstacle in implementing information technology in schools. Procurement of technological devices, software subscriptions, and maintenance of digital systems require quite a lot of money. Schools with limited funding sources often experience difficulty in allocating budgets for technology investments (Sunata et al., 2023). This is especially felt by state schools that depend on government funding, which sometimes do not prioritize technology investment in education.

Apart from technical and financial obstacles, another challenge faced is resistance to change. Some stakeholders in the world of education still have a conventional mindset and are less open to the digitalization of school management systems. Changing organizational culture is important in adopting technology more effectively. A proactive attitude in adopting innovation, both from schools, teachers and students, will determine how successful the application of information technology is in educational management in high school (Jufrida et al., 2024).

Therefore, a comprehensive strategy is needed to overcome these challenges and ensure that the application of information technology can truly provide benefits for educational management in high schools. Through this literature review, research will examine how information technology is applied in school management, the benefits obtained, and the obstacles faced. With a deeper understanding, it is hoped that there will be recommendations that can help increase the effectiveness and sustainability of the application of technology in education management in Indonesia.

RESEARCH METHOD

This research uses the literature review method as the main approach in collecting and analyzing data. Sources of information used include scientific

journals, academic books, research reports, and official documents relevant to the application of information technology in educational management at the senior secondary school (SMA) level. This study aims to understand fundamental concepts, current trends, and the impact of implementing information technology in school management. By reviewing various previous studies, this research can identify implementation patterns, benefits that have been obtained, and challenges faced by schools in adopting information technology.

Apart from that, this research also applies concept analysis and case studies based on literature to explore the implementation of information technology in various high schools. Case studies taken from literary sources will be analyzed to understand how certain schools have succeeded or experienced obstacles in implementing information technology in their management. This approach allows research to present a more comprehensive picture of the factors that influence the success or failure of technology implementation in the school environment. Thus, it is hoped that the results of this study will provide useful insights for stakeholders in developing optimal strategies to increase the effectiveness of technology-based education management (Earley, M.A. 2014; Snyder, H. 2019).

RESULT AND DISCUSSION

Evaluation of the Success and Failure of Implementing Information Technology in High School

The application of information technology in education management in Senior High Schools (SMA) has shown various successes which have had a positive impact on the efficiency and effectiveness of school management. One indicator of success is increased transparency in school administration, such as digital-based payment systems, e-reports, and online student data management (Frazier & Kallemeyn, 2022). With a digital system, schools can manage academic and administrative information more quickly and accurately, making it easier to make data-based decisions. In addition, the use of technology in communication systems between teachers, students and parents also speeds up the flow of information, increasing parents' involvement in their children's education.

Other successes can be seen in the learning aspect, where information technology allows the application of more flexible learning models, such as blended learning and e-learning. Online learning platforms help students access materials anytime and anywhere, which is very useful especially during

the COVID-19 pandemic (Arymbekov, 2024). With information technology, schools can also implement digital-based evaluation systems, which make it easier for teachers to assess student development more objectively and efficiently. The use of the Learning Management System (LMS) in several high schools has also helped in compiling the curriculum, managing assignments, and providing feedback to students more systematically.

However, on the other hand, the application of information technology in high schools also faces various challenges that cause failure or limitations in its implementation. One of the main obstacles is limited infrastructure, especially in remote areas that have poor internet access or lack of hardware facilities such as computers and projectors in schools. Schools that do not have access to adequate technological resources will experience difficulties in fully adopting digital systems, which ultimately hinders the effectiveness of implementing information technology in education management (Nurrohmawati, 2023).

Other failures occurred due to a lack of preparedness of human resources, both in terms of teaching staff and school administration staff. Many teachers and school staff do not have sufficient digital skills to operate technology-based systems. Without adequate training, information technology actually becomes an additional burden for teachers, which ultimately causes resistance to change. A lack of understanding of the benefits of technology also causes some schools to be reluctant to invest in developing digital systems (Xie, 2023).

Financial aspects are also an inhibiting factor in implementing information technology in high school. Implementing technology requires large investments, starting from procurement of equipment, system development, to maintenance and increasing human resource capacity. Schools that have limited budgets are often unable to allocate sufficient funds to support optimal use of technology (Mellor, 2022). In addition, some schools experience difficulties in adapting to policy changes that require them to use digital-based systems without adequate funding support.

Another challenge is data security and privacy in digital systems. Many schools do not yet have a strong security system to protect student academic and administrative data from cyber threats. If not managed properly, the application of technology can actually pose a risk of data leakage, hacking, or misuse of information by irresponsible parties (Barker, 2023). This requires schools to have clear security policies and increase awareness of the importance of data protection in technology-based management systems.

Overall, the success of implementing information technology in education management in high schools is very dependent on infrastructure readiness, human resource competence, financial support, and sustainable policies. Evaluation of the success and failure of this implementation is important for formulating better strategies for optimizing information technology in the world of education. Therefore, there needs to be synergy between the government, schools and the private sector in supporting digital transformation in high schools so that the benefits of technology can be felt evenly throughout Indonesia.

Recommendations for Schools, Government and Stakeholders

To increase the effectiveness of the application of information technology in education management in Senior High Schools (SMA), schools as the main institutions need to take strategic steps in optimizing technology. One effort that can be made is to increase the capacity of teaching staff and administrative staff in using technology through ongoing training and workshops (UTAMA & ASYIAH, 2024). This training must include the use of digital-based school management systems, data security, and the use of online learning platforms so that teaching staff can better integrate technology in teaching and learning activities and school administration.

Apart from increasing human resource capacity, schools also need to ensure that the available technological infrastructure is adequate to support the learning process and school management. If budgets are limited, schools can collaborate with the private sector or the educational community to get support in procuring the required hardware and software (Mansfield, 2022). Utilizing cloud-based technology and open-source systems can also be an alternative for schools with limited funds so they can still run efficient and safe digital systems.

The government has a crucial role in supporting the digitalization of education by providing supportive policies and adequate budget allocation. The government must ensure that every school, especially in remote areas, has adequate access to digital infrastructure such as a stable internet network and adequate computer equipment. In addition, clear regulations regarding standards for the application of information technology in educational management need to be developed to ensure uniformity and effectiveness of implementation in all high schools in Indonesia (Hajar et al., 2023).

Apart from infrastructure support, the government also needs to provide incentives to schools that succeed in implementing information

technology effectively in their management. These incentives can take the form of financial assistance, additional training programs, or awards for schools that are innovative in using technology. With this incentive, schools will be more encouraged to develop and optimize digital systems in their operations (Saker, 2023).

Stakeholders, including technology companies and non-governmental organizations, also have an important role in supporting the implementation of information technology in SMA. Collaboration between schools and technology companies can produce innovation in the development of digital-based education management systems that are more suited to school needs. Technology companies can provide more affordable solutions for schools with limited budgets, while non-governmental organizations can help in providing training and mentoring for teaching staff (Schoberl et al., 2022).

In addition, collaboration between schools, universities and educational communities can create a more innovative learning ecosystem. Universities can contribute to research and development of technology-based learning models that can be applied in high schools, while educational communities can become a forum for sharing experiences and best practices in implementing information technology in the school environment (Seamer, 2022). With a supporting ecosystem, schools can continue to develop in adopting information technology that suits their needs.

Overall, the application of information technology in educational management in high schools requires a comprehensive and collaborative approach. Schools, government and stakeholders must work together to provide adequate infrastructure, increase human resource capacity and create policies that support the continued digitalization of education. With the right strategy, information technology can be an effective tool in improving the quality of education and efficiency of school management in Indonesia.

Directions for Future Development of Information Technology in Education Management

Along with increasingly rapid technological developments, educational management in Senior High Schools (SMA) needs to continue to adapt and develop more innovative information technology-based systems. One of the main development directions is the application of Artificial Intelligence (AI) and Big Data in school management. AI can be used to analyze student academic data automatically, provide recommendations for more effective learning strategies, and support data-based evaluation systems (Mayer, 2023).

Meanwhile, Big Data allows schools to manage and analyze large amounts of data, so that decision making can be more evidence-based and accurate.

In addition, the implementation of cloud computing-based school management systems will become a growing trend in the future. Cloud-based systems allow schools to store and access data more flexibly without relying on expensive physical infrastructure (Miller et al., 2023). With this system, education management can become more efficient, especially in terms of document archiving, school administration, and communication between teachers, students and parents. Using the cloud also supports data security because it is equipped with encryption and automatic backup technology that can prevent loss of important data.

The development of the Internet of Things (IoT) in the school environment also has great potential in increasing the efficiency of educational management. With IoT, schools can automate various operational aspects, such as facial or fingerprint scanner-based attendance systems, access control to classrooms and laboratories, as well as real-time monitoring of the condition of school facilities. Implementing IoT in education can increase the security and comfort of the learning environment, as well as reduce the administrative workload of education personnel (MC & Shanmugam, 2023).

In the learning aspect, Virtual Reality (VR) and Augmented Reality (AR) technology is expected to be increasingly integrated into the education system. VR and AR can provide a more interactive and immersive learning experience, allowing students to understand abstract concepts through more realistic simulations. This technology can also be utilized in teacher training, especially in developing teaching methods that are more innovative and in line with the needs of the current digital generation (Dutta, 2024).

In the future, education management systems will also be increasingly integrated through the use of blockchain in academic records and digital certification. Blockchain offers high security and transparency in storing student academic records, reduces the risk of data manipulation, and facilitates accessibility for educational institutions and the world of work. With this system, transcripts, graduation certificates and other academic documents can be verified automatically and are more reliable (Newhouse, 2023).

Apart from technological innovation, the direction of development must also include developing policies and regulations that support digital transformation in the education sector. The government needs to design

policies that not only focus on providing infrastructure, but also ensure that every school has equal access to technology (Acosta, 2023). In addition, regulations related to data security and ethics in the use of information technology must be strengthened so that the use of technology in education remains in a safe and responsible corridor.

Overall, the future of information technology-based education management will be increasingly oriented towards automation, system integration and more sophisticated data analysis. However, the success of this development still depends on infrastructure readiness, human resource competency, and collaboration between the government, schools and the private sector in creating a sustainable digital education ecosystem. With the right direction of development, information technology can be an effective tool in improving the quality of education and creating a more modern, efficient and inclusive learning environment in Indonesia.

CONCLUSION

Based on the literature review that has been carried out, the application of information technology in education management in Senior High Schools (SMA) has a positive impact in increasing administrative efficiency, data transparency and learning flexibility. However, its implementation still faces challenges in the form of limited infrastructure, human resource readiness, and financial constraints. Evaluation of the success and failure of implementing technology in high schools shows that support from the government, schools and stakeholders is very necessary so that digital transformation can run optimally and evenly throughout Indonesia. By adopting the latest technology trends such as AI, cloud computing, and IoT, future education management systems can become more effective and responsive to the needs of the times.

The implications of this research indicate that the digitalization of educational management needs to continue to be developed with a comprehensive and sustainable approach. The government needs to strengthen regulations and invest in technological infrastructure, while schools must increase the competence of teaching staff in using technology. For further research, a more in-depth empirical study is needed regarding the effectiveness of various models of implementing information technology in schools, as well as an analysis of the specific factors that influence the success of educational digitalization in various regions. In this way, the strategy for

implementing technology in education management can be more focused and in line with school needs in the future.

REFERENCES

Acosta, O. A. L. (2023). Implementing a Didactic Strategy for Teaching Recyclable Plastic Polymers in High School Education. *International Journal of Science and Research (IJSR)*, *12*(8), 742–751. https://doi.org/10.21275/sr23728055936

Arymbekov, B. (2024). The Effect of Augmented Reality (AR) Supported Teaching Activities on Academic Success and Motivation to Learn Nuclear Physics among High School Pupils. *International Journal of Information and Education Technology*, *14*(5), 743–760. https://doi.org/10.18178/ijiet.2024.14.5.2099

Barker, K. S. (2023). Student Success in a High-Minority High School. *Student Success Modeling*, *Query date: 2025-03-05 18:35:19*, 96–133. https://doi.org/10.4324/9781003447191-4

Dutta, S. K. (2024). Implementing the Salesforce Enablement Playbook: A Guide to Best Practices and Organizational Success. *The American Journal of Engineering and Technology*, 6(7), 13–23. https://doi.org/10.37547/tajet/volume06issue07-03

Earley, M. A. (2014). A synthesis of the literature on research methods education. Teaching in Higher Education, 19(3), 242-253.

Frazier, E., & Kallemeyn, L. (2022). The TCS School Program Evaluation. *Designing and Implementing Effective Evaluations*, *Query date: 2025-03-05 18:35:19*, 57–63. https://doi.org/10.4324/9780429277788-5

Hajar, M. N. F. A., Sugiarti, Y., & Maharani, S. (2023). Self-Evaluation of Agro-Industry Prospective Teacher's Skill at Vocational High School in Information and Communication Technology Literacy. *EDUTEC : Journal of Education And Technology*, 6(4). https://doi.org/10.29062/edu.v6i4.680

Han, Y., & Dan, H. (2023). Exploring the Characteristics of Attribution and Countermeasures for Senior High School Students' Success or Failure in Physics Examinations. *Education Study*, *5*(4), 612–618. https://doi.org/10.35534/es.0504088

Hendrawan, R. F. (2023). Evaluation Of The Readiness Of Vocational High School Teachers In Implementing E-Learning Learning During The Pandemic Period. *Journal of Namibian Studies : History Politics Culture*, *33*(Query date: 2025-03-05 18:35:19), 694–706. https://doi.org/10.59670/jns.v33i.1887

Jentleson, B. W. (2022). Explaining Sanctions Success/Failure. *Sanctions*, *Query date: 2025-03-05 18:35:19*. https://doi.org/10.1093/wentk/9780197530313.003.0004

Jufrida, J., Kurniawan, W., & Basuki, F. R. (2024). Ethnoscience learning: How do teacher implementing to increase scientific literacy in junior high school. *International Journal of Evaluation and Research in Education (IJERE)*, *13*(3), 1719–1719. https://doi.org/10.11591/ijere.v13i3.26180

Mansfield, K. C. (2022). Setting and Implementing School Level Policy. *Setting and Implementing School Level Policy*, *Query date: 2025-03-05 18:35:19*. https://doi.org/10.4324/9781138609877-ree96-1

Mayer, B. (2023). *Interscholastic Sports in Education: The Influence of High School Athletics on Academic Success*. *Query date: 2025-03-05 18:35:19*. https://doi.org/10.2139/ssrn.4340918

MC, A., & Shanmugam, K. (2023). Implementing unique identification technology: The journey and success story of Aadhaar in India. *Journal of Information Technology Teaching Cases*, *Query date: 2025-03-05 18:35:19*. https://doi.org/10.1177/20438869231200286

Mellor, L. (2022). Successes and Challenges Implementing Equitable High School Pathways for College and Career Readiness. *AERA 2022*, *Query date: 2025-03-05 18:35:19*. https://doi.org/10.3102/ip.22.1893301

Miller, J., Connolly, R., Uzoka, F. M., Keavey, K., & Dolan, N. K. (2023). Information technology project management: Success, failure and risk factors. *International Journal of Business Information Systems*, *44*(4), 485–507. https://doi.org/10.1504/ijbis.2023.135348

Newhouse, B. (2023). *Implementing Data Classification Practices*. *Query date: 2025-03-05 18:35:19*. https://doi.org/10.6028/nist.sp.1800-39.ipd

Nurrohmawati, L. (2023). The Delphi-Goal Oriented Evaluation Model to Implementing Teaching Factory in Vocational High School at Bogor Regency. *International Journal of Business, Law, and Education*, *4*(2), 498–511. https://doi.org/10.56442/ijble.v4i2.206

Prabowo, Y. D., Fernando, E., & Gate, J. (2023). Evaluation of IT Governance with BAI Domain at Senior High School Using Cobit 5. *2023 International Conference on Information Management and Technology (ICIMTech)*, *Query date: 2025-03-05 18:35:19*, 1–6. https://doi.org/10.1109/icimtech59029.2023.10277731

Saker, V. S. N. (2023). Navigating Agile Transformation in Information Technology Projects: Overcoming Challenges and Implementing Effective Strategies for Organizational Success. *International Journal of Science and Research (IJSR)*, *12*(12), 752–756. https://doi.org/10.21275/sr231126034709

Sari, L. P. M., & Retnawati, H. (2024). Evaluation of learning success by implementing curriculum 2013 in high school. *AIP Conference Proceedings*, *3081*(Query date: 2025-03-05 18:35:19), 40005–40005. https://doi.org/10.1063/5.0133629

Schoberl, M., Tuyisabe, S., Hollauer, C., & Fottner, J. (2022). Managing Projects More Successful: Evaluation of a Concept for Implementing Critical

Success Factors in Practice. *2022 IEEE 28th International Conference on Engineering, Technology and Innovation (ICE/ITMC) & 31st International Association For Management of Technology (IAMOT) Joint Conference*, *Query date: 2025-03-05 18:35:19*, 1–6. https://doi.org/10.1109/ice/itmc-iamot55089.2022.10033150

Seamer, J. (2022). High Impact Teaching. *Reading Success in the Early Primary Years*, *Query date: 2025-03-05 18:35:19*, 81–92. https://doi.org/10.4324/9781003244189-11

Snyder, H. (2019¬). Literature review as a research methodology: An overview and guidelines. Journal of business research, 104, 333-339.

Sunata, D., Sumarno, S., & Hendripides, H. (2023). Evaluation of Factors Influencing the Successful Implementation of the Independent Learning Curriculum at State Vocational High School 3 Pekanbaru. *JETISH: Journal of Education Technology Information Social Sciences and Health*, *2*(2), 1704–1709. https://doi.org/10.57235/jetish.v2i2.786

UTAMA, Z. M., & ASYIAH, S. (2024). STRATEGIES FOR ORGANIZATIONAL CHANGE AT RAGUNAN ZOO PARK TO ACHIEVE SUCCESS IN IMPLEMENTING INFORMATION TECHNOLOGY. *ICCD*, *6*(1), 522–527. https://doi.org/10.33068/iccd.v6i1.718

Xie, Y. (2023). Teachers' and Students' Attribution of EFL Success and Failure in a Chinese High School. *Proceedings of the 2023 AERA Annual Meeting*, *Query date: 2025-03-05 18:35:19*. https://doi.org/10.3102/2010438