

Implementation of a Library Automation System to Improve The Efficiency of Circulation Services at MAN I Jombang

¹ Dhea Roza Fitriyani, ² Nur 'Azah

^{1,2} Universitas Hasyim Asy'ari Tebuireng Jombang.

¹ deap28721@gmail.com, ² azahnur31@gmail.com

ABSTRACT: This study aims to analyse the implementation of a library automation system in improving the efficiency of circulation services at MAN I Jombang. The study employs a qualitative approach using a case study design. Data collection was carried out through observation, in-depth interviews, and documentation involving the head librarian, librarians, and students as service users. Data analysis utilised the Miles, Huberman, and Saldaña model, which encompasses data reduction, data presentation, and drawing conclusions. The results of the study indicate that the implementation of the automation system based on the Senayan Library Management System (SLiMS) has been in place since 2015 and was developed into an online-based system in 2021. The implementation of the automation system has improved the efficiency of circulation services by speeding up the book borrowing and return processes, enhancing the accuracy of data management, and reducing recording errors. The Online Public Access Catalogue (OPAC) feature also provides users with flexible and independent access to information. Furthermore, the automated system assists librarians in managing library administration and reporting in a more systematic manner. The success of the implementation is supported by technological infrastructure, the competence of the librarians, and the support of the madrasah management. However, internet connectivity issues and power supply remain obstacles to the optimisation of technology-based library services.

Key words: Library Automation, SLiMS, Circulation Services, School Libraries, Information Technology

INTRODUCTION

The school library is a key component in supporting the teaching and learning process within the school environment. It serves not only as a repository for book collections, but also as a learning resource centre that provides a wide range of information for pupils, teachers and other members of the school community. Through the use of the library, pupils are expected to develop their literacy skills, broaden their horizons and enhance the quality of their knowledge independently (Jaya, 2024), (Triyuwono et al., 2025). Libraries therefore play a strategic role in fostering a culture of lifelong learning. Consequently, effective and optimal management of school libraries is essential to ensure that their function and role as centres of learning resources can be carried out effectively in support of improving the quality of education.

As they evolve, school libraries are required to adapt to advances in information and communication technology. Digital transformation has changed the way users access information, meaning that libraries need to provide fast, accurate and efficient technology-based services (Simanjuntak et al., 2025). The use of information technology in library management covers various aspects, such as collection development, processing of library materials, circulation services, and the provision of online catalogue access. This is in line with the requirements of Law No. 43 of 2007 on Libraries, which stipulates that libraries must develop information technology-based services (Fahrizandi, 2020), (Fatrizal et al., 2025). Information and communication technology is therefore extremely useful in supporting learners. Information and communication technology currently facilitates teaching and learning activities in educational institutions by utilising the available technological resources ('Azah & Abror, 2023). Consequently, the implementation of information and communication technology in school libraries is not only a necessity but also a strategic move to improve the quality of services, support the learning process, and meet the demands of an increasingly digital age.

In practice many school libraries still face challenges in managing their services, particularly in the circulation department. The manual systems still in use make the processes of borrowing, returning and recording data less efficient and prone to errors (Zulfia, 2023), (Putri & Prasetyawan, 2025). This situation is becoming increasingly complex as the number of library users rises, making it necessary to have a system capable of managing data more quickly, accurately and in an integrated manner (Mannang, 2025). Therefore, innovation is required in the management of circulation services through the implementation of an information technology-based system capable of improving the efficiency, accuracy and overall quality of library services. With an integrated system, data management can be carried out more systematically and in real time, thereby minimising errors and speeding up service processes. Furthermore, the implementation of this technology can also enhance user convenience in accessing library services, whilst supporting the creation of a more modern, effective, and adaptable library management system that keeps pace with the times.

As a solution to the problems identified, the implementation of a library automation system is a relevant and strategic step. Library automation involves the use of computer technology to manage various library activities in an integrated manner, thereby improving the efficiency and effectiveness of services (Agustia & Khairunnisa, 2024), (Ramadani & Rodin, 2025). One of the most widely used software programmes in Indonesia is the Senayan Library Management System (SLiMS), an open-source library management system designed to facilitate the digital management of collections, members and circulation services. The Senayan Library Management System, or SLiMS, is a web-based Free and Open-Source Software (FOSS) solution. SLiMS is built using a combination of several open-source software components, such as Apache as the web

server, HTML (Hypertext Markup Language), PHP (Hypertext Preprocessor) a scripting language embedded within HTML and MySQL, a database management system that serves as a repository for storing all data (Pane, 2024). In addition to facilitating integrated data management, the use of SLiMS can also improve service quality, speed up access to information, and support the creation of a more modern and efficient library system that keeps pace with developments in information technology.

The implementation of SLiMS not only streamlines the work of librarians, but also makes it easier for users to access information via the Online Public Access Catalogue (OPAC) (Fania & Rukmana, 2022). SLiMS is designed with a comprehensive range of features, such as an online catalogue, collection management, lending and returns, and member management, and is constantly evolving to help libraries manage their collections efficiently from book cataloguing and member management to circulation processes and reporting. SLiMS is widely used because it is free, open-source, flexible and user-friendly (Cahyaningtyas & Marintan, 2024). With this system, users can browse the collection, check the status of their loans and access library services independently, without being restricted by time or place (Nugroho & Setiawan, 2021). This indicates that library automation makes a significant contribution to improving service quality and user satisfaction.

MAN I Jombang is one of the educational institutions that has been using the SLiMS-based library automation system since 2015. When it was first introduced, the system was still offline and limited to use within the library. In line with technological developments and the need for more flexible services, the system was subsequently upgraded to an online platform in 2021 (Pramudita et al., 2022). This transformation enables users to access library services from various locations, thereby improving the effectiveness and efficiency of services, particularly circulation services. However, several challenges have been encountered during implementation, such as the limited stability of the internet connection, which affects system performance (Wahyusesa et al., 2023), (Pataropura et al., 2024). Network disruptions can slow down data processing, information synchronisation and data backup, thereby affecting the quality of library services (Gustian et al., 2024). Therefore, it is important to evaluate the implementation of the library automation system in order to determine the extent to which it can improve service efficiency.

Based on the above, this study aims to examine the implementation of a library automation system in improving the efficiency of circulation services at MAN I Jombang. It is hoped that this study will contribute to the development of information technology-based school library services and serve as a reference for other educational institutions in optimising library management in the digital age.

METHOD

This study employs a qualitative approach using a case study design to gain an in-depth understanding of the implementation of a library automation system in improving the efficiency of circulation services at MAN I Jombang. The qualitative approach was chosen because it is capable of describing phenomena holistically based on natural conditions, with an emphasis on the meanings, processes and experiences of the research subjects (Creswell, 2007). Qualitative research is a systematic approach that places greater emphasis on gaining an in-depth understanding of the meanings, perspectives and experiences of subjects within a specific social context (Wulan et al., 2025). The research was conducted at MAN I Jombang, East Java, which was selected on a purposive basis as it had already implemented a library automation system based on the Senayan Library Management System (SLiMS). Data collection took place in September 2025 through observation, in-depth interviews and documentation.

The data sources for this study consist of primary and secondary data. Primary data was obtained directly from informants involved in the implementation of the automation system, namely the head librarian, two librarians, and three students as service users. Informants were selected using purposive sampling based on their involvement with and understanding of the system under study (Sugiyono, 2013). Meanwhile, secondary data was obtained from supporting documents such as library archives, transaction records and activity documentation. Data collection techniques included participant observation, semi-structured interviews to gather in-depth information, and a review of documentation to corroborate the research findings.

Data analysis was carried out interactively using the Miles, Huberman and Saldaña model, which comprises three main stages: data reduction, data presentation, and drawing conclusions/verification (Miles & Huberman, 1994). The analysis was conducted on an ongoing basis from the data collection stage until sufficient and credible data had been obtained. To ensure the validity of the data, this study employed source, methodological and temporal triangulation, supported by member checking and the researcher's diligence (Creswell, 2015). In addition, data validity testing also takes into account the criteria of credibility, transferability, dependability and confirmability to ensure the validity and objectivity of the research findings (Husnullail et al., 2024).

RESULTS AND DISCUSSION

1. Implementation of the Library Automation System at MAN I Jombang

The research findings indicate that the implementation of the library automation system at MAN I Jombang has been underway in stages since 2015 through the use of the Senayan Library Management System (SLiMS) and was developed into an online-based system in 2021. This transformation demonstrates the institution's efforts to improve the quality of library services through the use of information technology. This

finding is consistent with the view that library automation involves the use of computer technology to streamline library operations, making them more effective and efficient (Potoboda et al., 2016), (Sutisna, 2019). The implementation of automation at MAN I Jombang is also in line with the provisions of Law No. 43 of 2007 on Libraries, Article 23(5), which stipulates that school libraries must develop services based on information and communication technology.

The implementation of the automation system at MAN I Jombang is supported by several key components, namely software, hardware, and human resources. From a software perspective, the use of the Senayan Library Management System—an open-source automation system facilitates the integrated management of acquisition, cataloguing, and circulation services. This finding supports the view that the implementation of information technology in libraries aims to improve service integration and data management efficiency (Sefa et al., 2025), (Saptaria et al., 2026). Furthermore, the use of open-source systems also offers advantages in terms of flexibility and operational cost efficiency. Open-source technology enables wider access to technology, particularly for educational institutions with limited budgets. With no licence fees, educational institutions can provide high-quality software without having to bear a significant financial burden (Firdausy et al., 2024). Another advantage of open-source distribution is that it offers an alternative with no licence fees and a high degree of flexibility (Firdaus et al., 2025). With the support of open-source software such as SLiMS, MAN 1 Jombang is able to optimise library management more effectively and efficiently. The use of this system not only helps to streamline administrative processes and library services, but also supports the creation of a more structured and easily accessible information management system that is capable of adapting to the evolving technological needs of the educational environment.

In terms of hardware, the research findings indicate that the MAN I Jombang library has provided computers and barcode scanners as the main operational support for the automation system. The availability of this infrastructure demonstrates the institution's readiness to support the digitisation of library services. Meanwhile, from a human resources perspective, librarians have undergone technical training on the use of SLiMS, enabling them to operate the system effectively. These findings indicate that the success of automation implementation is determined not only by technology but also by the librarians' competence in managing the library information system (Pramesti & Haq, 2024), (Assyiffatulhayat & Hildansyah, 2025). This is in line with the view that librarians' skills are a key factor in the successful implementation of library automation systems (Sari & Ibadati, 2023), (Sobana & Purwanda, 2025). Thus, the successful implementation of the library automation system at MAN 1 Jombang is inseparable from the synergy between software, hardware and human resources, all of which support one another. The availability of adequate technological infrastructure and the librarians' competence in operating the system are key factors in creating more

effective, efficient, and high-quality library services. Furthermore, this readiness also demonstrates the library's commitment to keeping pace with developments in information technology in order to improve services and optimally meet users' information needs.

2. Transforming Circulation Services through Automation Systems

The implementation of an automation system at MAN I Jombang has had a significant impact on improving the efficiency of circulation services. Prior to automation, the entire borrowing and return process was carried out manually by recording details on membership cards and book cards. This system was deemed ineffective as it was relatively time-consuming and prone to recording errors. Following the implementation of the barcode-based automation system and SLiMS, circulation transactions have become faster and more accurate. These findings indicate that the implementation of the barcode-based automation system and SLiMS in the library has had a positive impact on improving the efficiency and quality of circulation services (Ramadhani, 2023), (Budyman & Rahmah, 2025). The transition from a manual system to a digital one not only speeds up the process of borrowing and returning books, but also minimises the recording errors that previously occurred frequently with manual record-keeping (Ariani et al., 2024). This indicates that the use of information technology in library management plays a strategic role in creating more effective, efficient and accountable services. Furthermore, the use of SLiMS enables the integrated management of member data, collections and transactions, thereby making it easier for librarians to monitor and manage library service data more effectively.

The research findings show that the process of borrowing and returning books can be completed in under a minute per transaction. This efficiency is achieved because librarians only need to scan the member's barcode and the collection's barcode to process the transaction. This demonstrates that the implementation of an automated system can speed up circulation services and reduce the administrative workload of librarians (Haq & Rodiah, 2025). As well as speeding up the transaction process, the online automation system also makes it easier for library users to access information (Rabani et al., 2022). Students can check the status of their book loans, return deadlines and the amount of any fines independently via their mobile phones. This feature demonstrates the optimisation of the Online Public Access Catalogue (OPAC), which allows users to access library information without being restricted by time or place (Safitri et al., 2024). These findings support the research by Rahmawati and Prasetyo (2021), which states that the digital transformation of libraries can improve the quality of services and users' independence in accessing information.

The implementation of features within SLiMS has also had a positive impact on the efficiency of library administration. The bibliographic feature helps librarians to input collection data more quickly than with manual methods (Rahardja et al., 2015). In

addition, the scanner-based membership feature speeds up the process of identifying members during transactions (Valenty & Anan, 2025). The automated reporting system in SLiMS also makes it easier for librarians to compile daily and monthly reports accurately and systematically. Consequently, the implementation of this automated system not only improves the quality of service provided to users, but also supports the efficiency of librarians' work in managing library administration.

3. Factors Supporting and Hindering the Implementation of Automation Systems

The successful implementation of the library automation system at MAN I Jombang was influenced by several contributing factors, one of which was the support of the madrasah's management. The head of the madrasah provided support by allocating the necessary budget and facilities for the development of the library automation system. This managerial support was a strategic factor in the successful implementation of information technology within the educational environment (Caswanda et al., 2024). This finding is consistent with the view that the commitment of institutional leadership has a significant impact on the sustainability of library automation systems (Kumalasari & Khamidi, 2024). Thus, the support of madrasah management not only serves as a facilitator in the provision of facilities and funding, but also constitutes a fundamental element that determines the effectiveness, sustainability and optimisation of the implementation of the library automation system in improving the quality of information services within the educational environment.

However, this study also identified several challenges in the implementation of the automation system, particularly regarding the stability of the internet connection and reliance on the electricity supply. Internet connection disruptions cause data synchronisation, data import and export, and data backup processes to run more slowly (Bataona & Meilani, 2025). This situation has the potential to disrupt circulation services, particularly when a large number of transactions occur simultaneously (Nasir, 2024). These findings indicate that the success of library automation is heavily influenced by the availability of adequate information technology infrastructure. Consequently, the readiness of information technology infrastructure—particularly the stability of the internet connection and the reliability of the electricity supply—is a key prerequisite for ensuring the effective implementation of library automation systems. Without adequate infrastructure support, the optimisation of automation-based services risks encountering technical obstacles that could affect the quality, speed, and continuity of library services as a whole.

Librarians are required to be more adaptable in managing data, including carrying out regular data backups to prepare for system failures. This situation highlights that the implementation of library automation requires a combination of technological readiness and human resource capabilities to address various technical challenges (Yuningsih & Atur, 2022). Consequently, the optimisation of the library automation

system at MAN I Jombang still requires the strengthening of network infrastructure and the enhancement of librarians' technical skills so that library services can operate more effectively and sustainably. Therefore, strengthening librarians' technical skills and developing information technology infrastructure are strategic measures that need to be implemented on an ongoing basis to support the effective implementation of the library automation system (Istikomah et al., 2021). It is hoped that the synergy between the readiness of human resources and the quality of infrastructure will result in library services that are more responsive, efficient and focused on improving the quality of information services within the educational sector.

CONCLUSION

Based on the research findings, the implementation of a library automation system at MAN I Jombang through the use of the open-source Senayan Library Management System (SLiMS) has been successful and has enabled the management of library services in a more effective, efficient and integrated manner. The transition from a manual system to a digital system demonstrates the library's commitment to keeping pace with developments in information technology in order to improve the quality of service for library users. The implementation of the automation system has had a positive impact on circulation services, particularly in speeding up the process of borrowing and returning books, minimising recording errors, improving the accuracy of data management, and facilitating access to information through the OPAC feature and online services that can be accessed flexibly by users. In addition to improving the quality of service for library users, the automation system also assists librarians in administrative management, data monitoring, and the preparation of reports in a more systematic manner.

The successful implementation of this automation system was underpinned by synergy between software, hardware, human resources, and the support of madrasah management in providing facilities and funding. However, this study also identified challenges in the form of internet connectivity issues and reliance on the electricity supply, which have the potential to hinder the optimisation of technology-based library services. Therefore, there is a need to strengthen information technology infrastructure and continuously enhance librarians' technical competencies so that the implementation of the library automation system can operate more optimally, responsively, and sustainably in supporting the improvement of information service quality within the educational environment.

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