



# Exploring The Role of Artificial Intelligence in Library Management at Public Primary School

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## Abstract

The rapid development of technology has brought significant changes in various areas of life, including the world of education. AI is a rapidly developing technology with enormous potential to improve the efficiency and effectiveness of resource management. Library management, which plays a crucial role in supporting teaching and learning activities in schools, employs AI in education. However, the increasing challenges in managing collections, the demand for rapid and accurate services, and the need for effective data management have increased the need for innovation in library management. This study aimed to explore the application of artificial intelligence (AI) in library management at SDN Piyaman 2 Wonosari, emphasizing enhancing operational efficiency, accessibility, and service quality. This study employs a qualitative descriptive approach, collecting data through interviews, observations, and questionnaires from students, teachers, and library staff. The researchers will then process, analyze, and discuss the collected data to conclude. The study results indicate that using artificial intelligence (AI) can improve library operational efficiency by reducing borrowing time, returning each book, and searching from five minutes to one minute. In addition, AI also increases user satisfaction, with an average increase from 60% to 85%. Despite the technical challenges and user adjustments, the results of this study indicate that AI has enormous potential to improve the effectiveness and efficiency of school libraries. Other schools can use this study as a model to implement AI technology in library management, making it more modern and responsive to user needs.

**Keywords:** Artificial Intelligence, Library, Efficient, Management, Public.

## 1. Introduction

The rapid development of technology has brought significant changes in various areas of life, including the world of education [1]. One of the technologies that is developing rapidly and has enormous potential to increase efficiency and effectiveness is artificial intelligence (AI). One significant application of AI in education is library management [2]. As a center for information resources, libraries support teaching and learning activities in schools, providing more accessible and faster access for students and teachers to various references and teaching materials [3]. However, libraries face increasing challenges in managing collections, demands for rapid and accurate services, and effective data management. These challenges trigger the need for innovation in library management to adapt to the times and meet user expectations [4]. At SDN Piyaman 2 Wonosari, using AI in library management is one of the strategic efforts to overcome these challenges. By utilizing AI, libraries can increase efficiency in managing collections, speed up the information search process, and provide more responsive services to users. We expect this innovation to enhance student's learning experience and foster the development of 21st-century skills necessary to navigate the challenges of an increasingly digital world. By utilizing AI technology, SDN Piyaman 2 Wonosari can create a more modern, interactive library that can better meet information needs.

Traditional library management, which often relies on manual processes, is becoming less efficient in dealing with the increasing volume of information [5]. Managing libraries effectively requires significant changes. The presence of artificial intelligence (AI) offers solutions through the automation of various processes, such as book indexing, information retrieval, and recommendation systems. This automation not only increases the efficiency of library management but also allows library staff to focus on more valuable services to users. In addition, AI can provide more personalized services to students [6]. By analyzing preferences and reading history, AI can recommend books that suit each student's interests, enhancing their learning experience. With the application of this technology, students not only find relevant information but also feel more involved in the learning process. Therefore, the urgency of this research lies in the



need to adopt AI technology as a strategy to improve the performance of school libraries. The application of AI in library management is expected to speed up the service process and make it more responsive to student needs [7]. With the right technology, libraries can transform into more modern and attractive information centers, helping students access learning resources more effectively and efficiently [8]. This study aims to investigate the implementation of artificial intelligence (AI) in library management at SDN Piyaman 2 Wonosari. Specifically, this study focuses on three main aspects: service effectiveness, user accessibility, and service quality and user experience.

AI can enhance the efficiency of library collection management [9]. For example, AI technology can assist in organizing and managing books, making it easier for librarians to maintain the availability and order of collections [10]. In addition, AI-based services, such as chatbots, can quickly assist students in finding the information they need. Implementing AI technology in libraries focuses on collection management and can potentially improve the overall user experience [11]. With the analysis of AI-generated usage data, libraries can conduct more targeted service evaluations and improvements. This includes understanding student usage patterns and preferences, which can help design more responsive and relevant services [12]. Therefore, we anticipate that the application of AI will enhance the library's appeal and utility as a source of information for students. Focusing on service effectiveness, accessibility, and quality, this study provides a comprehensive overview of the benefits and challenges of implementing AI in school libraries. The researchers expect the results of this study to serve as a reference for other libraries looking to adopt AI technology to enhance service quality and user experience in educational environments.

This study is also critical because, so far, the adoption of artificial intelligence (AI) in library management in schools in Indonesia is still minimal. Although several studies have explored the use of AI in the context of university libraries, very few studies still focus on secondary school libraries. Given the significant role school libraries play in supporting student education, it is imperative to bridge this research gap. This gap presents a chance for additional investigation into the effective implementation of AI in school libraries [13]. With the increasing volume of information and the need for rapid and accurate services, implementing AI in school libraries can be an innovative solution to improve library resource management and the quality of service to students. This study aims to fill this gap by providing an in-depth analysis of the application of AI technology in the context of school libraries and its impact on student learning experiences [14]. Thus, this study's results are expected to contribute significantly to the development of best practices in school library management and encourage wider adoption of AI technology in Indonesian educational environments. This will help prepare school libraries to face challenges in the digital era and ensure students have better access to relevant and valuable information sources [15]. This study proposes implementing an artificial intelligence (AI) system, which includes automatic classification, intelligent indexing, and an AI-based book recommendation system. We anticipate this technology will enhance library management efficiency, alleviate staff workload, and boost the accuracy of collection management. In addition, the AI-based recommendation system can provide a more personalized experience for users by offering relevant book recommendations based on their preferences and reading history [16]. We expect this study to significantly contribute to developing an AI-based library management model at the secondary school level, particularly in Indonesia. The results of this study will not only offer practical insights for library managers but can also be a reference for other schools that want to adopt similar technology. The researchers expect school libraries to transform into information centers that are more responsive and relevant to students' needs, thereby improving the quality of their overall learning experience by implementing this solution.

This study is crucial because it fills a gap in the existing literature regarding the application of artificial intelligence (AI) in elementary school libraries. By focusing on library management at SDN Piyaman 2 Wonosari, this study has the potential to be a relevant model for other schools in Indonesia that are trying to improve the quality of their library services. The researchers expect advanced technologies like AI to enhance collection management efficiency and user experience in the ever-evolving education context. The results of this study will not only benefit SDN Piyaman 2 Wonosari but also provide insights and strategies for other schools facing similar challenges in library management. The researchers hope these schools can optimize their library resources, enhance their responsiveness to student needs, and more effectively support the teaching and learning process with a data- and technology-based approach.

## 2. Research Method

This study explores using artificial intelligence (AI) in library management at SDN Piyaman 2 Wonosari. We adjust the research method to provide a comprehensive picture of AI implementation, its impact on library efficiency and effectiveness, and the challenges encountered. This study employed a qualitative descriptive approach, engaging stakeholders such as students, teachers, and library staff to provide detailed feedback on the implementation of AI in school libraries. We will gather data on the use of AI, the challenges encountered, and the advantages experienced. We conducted this study at SDN Piyaman 2 Wonosari, Gunungkidul Regency, for two months, from August to September 2024. The location selection was based on the school's readiness and initiative to adopt AI technology to improve library management. This period enables researchers to observe the implementation of AI at various stages and the associated problems and overall impacts. The research subjects include the library management system and related parties who often use the library, such as students, teachers, and library staff. Purposive sampling was conducted for the subject selection, focusing on the most relevant parties, such as library staff and users who understand AI technology. The instruments used in this study included a semi-structured interview guide to collect data from students, teachers, and library staff. We also used observation notes to document changes and activities in the library and a questionnaire to gather their impressions and satisfaction with the new services. Data collection techniques consisted of interviews, observations, questionnaires, and documentation. Following the successful collection of data, Miles and Huberman introduced the interactive analysis model for data analysis. This model comprises four interrelated components: data collection, data reduction, data presentation, and drawing conclusions and verification.

## 3. Result and Discussions

This study aims to understand how SDN Piyaman 2 Wonosari uses artificial intelligence (AI) in library management. This section presents the research results from the data collection process and a detailed discussion of AI implementation and the challenges encountered in school library management. The collected data is presented in tabular form, providing a clear picture of the results obtained and facilitating analysis. Several significant results were obtained after collecting data related to the utilization of AI in library

management at SDN Piyaman 2 Wonosari. The utilization of AI in library management brings striking changes in library operations and management, increasing the effectiveness and efficiency of services. Among the positive impacts observed are service efficiency, increased access speed, and improved service quality and user experience. This shows that AI technology can make a real contribution to improving the library management system at the school level. However, this study also notes the challenges faced during library management using AI. These obstacles can range from a lack of skilled human resources in technology, technical issues during the implementation of AI systems, and resistance from various stakeholders to the changes brought about by new technologies. The analysis will delve deeper into these constraints to paint a more comprehensive picture of AI's use in school libraries.

### 3.1. Improved Service Efficiency

**Table 1.** Library Service Time Data Before and After Using AI

| No | Indicators                          | Before Using AI           | After Using AI           |
|----|-------------------------------------|---------------------------|--------------------------|
| 1  | Average time to borrow books        | 5 minutes per transaction | 1 minute per transaction |
| 2  | Average time to search for books    | 15 minutes                | 3 minutes                |
| 3  | Waiting time in the borrowing queue | 10 minutes                | 2 minutes                |

Based on the data in Table 1, it is clear that AI significantly accelerates the library service process, especially in terms of searching, borrowing, and returning books. The implemented AI system can automate tasks that previously required manual intervention from librarians and users, thereby minimizing the time needed to complete each transaction. With this automation, library services become faster and more effective, providing a better experience for users. Users can easily find the information they need, borrow, and return books without waiting long. The AI system boosts user satisfaction and frees librarians to concentrate on strategic tasks and provide higher-quality services. Overall, the implementation of AI in library management at SDN Piyaman 2 Wonosari shows that this technology improves operational efficiency and improves the overall quality of library services. These results provide a positive picture of the potential use of AI in school libraries and open up opportunities for further development in technology-based library management systems.

### 3.2. Increased Accessibility

**Table 2.** Library Visitor Access Data Before and After Using AI

| No | Indicators                               | Before Using AI      | After Using AI        |
|----|--|----------------------|-----------------------|
| 1  | Number of library visitors per day       | 60 visitors per week | 120 visitors per week |
| 2  | Frequency of access to digital resources | 20 per week          | 80 per week           |
| 3  | The success rate of book searches        | 60 %                 | 95%                   |

Table 2 demonstrates how the presence of AI has significantly facilitated users' browsing of library collections. Thanks to the intelligent search feature, users can find books based on more specific keywords and receive book recommendations that align with their interests and preferences. Before the introduction of AI technology, users had to manually search for books, a time-consuming and often inconvenient process. AI presents a transformation that simplifies and enhances the practicality of this process. Users no longer need to look for books on library shelves or wait for help from librarians. AI-optimized systems enable quick and efficient access to all necessary information. Thus, the user experience of visiting the library becomes more enjoyable. The positive impact of the offered convenience has led to an increase in users' enthusiasm to visit the library daily. Users feel more motivated to explore the existing collections, leading to a rise in the number of visits to the library. This shows that implementing AI not only optimizes the library's function but also contributes to increasing community interest and involvement in utilizing available resources.

### 3.3. Service Quality and User Experience

**Table 3.** Data on Service Quality and User Experience of the Library Before and After Using AI

| No | Indicators  | Before Using AI | After Using AI |
|----|---|-----------------|----------------|
| 1  | User satisfaction with library services (scale 1-5) | 60%             | 85%            |
| 2  | Service response (response time)                    | 24 hours        | 2 minutes      |

Implementing AI significantly increased satisfaction with library services, according to a survey of students and teachers. Most respondents stated that access to the library is now more accessible and systematic. This shows that AI technology has succeeded in facilitating user interaction with library services. Respondents also felt that the library is now more responsive to their needs. With the AI system, users get the information they need quickly and experience a more personalized experience. For instance, the AI-presented recommendation feature enables users to find books or materials that align with their interests more effectively. This increase in satisfaction shows that the implementation of AI not only improves the operational efficiency of the library but also directly contributes to the user experience. Thus, the presence of AI is the right solution to improve the quality of library services, making them more attractive and relevant to students and teachers.

### 3.4. Challenge

Based on the information obtained, library management through the application of AI is not free from obstacles, mainly technical obstacles and user adaptation problems. In the early stages of implementation, several technical issues emerged, such as errors in voice recognition used in the search system and adjustments to the search algorithm that were not yet entirely accurate. These obstacles require special attention and continuous improvement so the system can function optimally. These technical problems not only affect the service's effectiveness but also impact user trust in the new system. Additionally, the challenge of user adaptation extends to students and library staff. Some users have difficulty understanding how to use the latest features provided by the AI system. This suggests that users require training and guidance to utilize technology [17] effectively. By understanding these obstacles, schools can design better strategies

to support the implementation of AI in library management. All stakeholders in the library must overcome technical barriers and support users during the adaptation process to fully reap the benefits of AI technology.

User adaptation remains a challenging obstacle in the library's implementation of the AI system. Based on statements from the head of the library and librarians, not all users feel comfortable with the newly implemented AI system. Switching to more sophisticated technology often challenges users accustomed to manual methods [18]. This shows that, although AI technology offers various conveniences, the transition process from the old to the new system requires significant time and effort. Some users, especially those less familiar with technology, take longer to adapt to the new system [19]. Various factors, including a lack of understanding of the available features, can cause this discomfort. To overcome this problem, library staff are trying to provide more support, including training and guidance, to help users better understand how the AI system works [20][21]. However, despite the challenges in this adaptation, library staff remain optimistic. They believe that with enough time and guidance, users will feel more comfortable and accustomed to using the new system [22]. In the not-too-distant future, it is hoped that all library users, including students and teachers, will be able to make maximum use of the AI system and enjoy its benefits. The study results showed that the benefits obtained from the application of AI in library management far outweigh the obstacles faced at the beginning of implementation [23]. Although there were some challenges, such as technical errors and user adaptation, the positive impact of this system was visible. With the presence of AI, the service process becomes faster and more efficient, improving the library user experience [24]. To ensure the success of this AI implementation, intensive adjustment, and socialization are significant. Librarians and library staff need to actively train users to understand and utilize the AI system optimally [25].

Additionally, we must consider user feedback to tailor system development to their needs and expectations [26]. With ongoing efforts to overcome existing obstacles, the AI system can continue to be developed. It is hoped that implementing this technology will improve library services and be a model for other schools to adopt similar technology. Thus, school libraries can function as information centers that are more modern and responsive to user needs [27].

Overall, this study confirms that the use of AI in library management at SDN Piyaman 2 Wonosari has tremendous potential to improve efficiency and quality of service. With the implementation of this technology, various aspects of library operations have undergone significant improvements, ranging from the speed of service processes to ease of access for users. This shows that AI can contribute positively to library management in school environments. Future research can concentrate on enhancing user adaptation to AI systems. Since not all users are immediately comfortable with this new technology, developing more effective training and socialization programs is essential. In addition, user involvement in the system development and evaluation process can help create solutions more suited to their needs. In addition to user adaptation, developing more sophisticated AI features is also an essential focus for meeting the increasingly complex needs of libraries. Research can delve deeper into integrating various technological innovations into the library system, including analyzing user data to provide more personalized recommendations and interactive features that improve the user experience. With these steps, it is hoped that the SDN Piyaman 2 Wonosari Library can continue to develop and function as a relevant and innovative information center.

#### 4. Conclusion

This study successfully shows that using artificial intelligence (AI) in library management at SDN Piyaman 2 Wonosari can significantly improve operational efficiency, especially regarding search time, borrowing, and returning books. Implementing AI has reduced the average time for borrowing books to much faster than the manual method. The survey results on service quality and user experience showed increased satisfaction from teachers and students with library services after the implementation of AI, with the average level of user satisfaction increasing from 60% to 85%. The library manager of SDN Piyaman 2 Wonosari must overcome several technical challenges and user adaptations. Still, implementing AI in the library has proven to significantly improve service quality, leading to more effective and efficient library management. This study presents opportunities for future development, including implementing more sophisticated AI features and service automation to cater to specific user needs, enhancing the library's sophistication, and attracting users to frequent and utilize its facilities. Future studies should concentrate on assessing the long-term effects of AI in library management and investigate other AI technologies that could enhance user experience and boost overall operational efficiency.

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