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Development of Web-Based Library System at SMP Negeri 3 Sungai Kakap

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ABSTRACT
This research aims to develop a web-based library information system at SMP Negeri 3 Sungai Kakap to improve the efficiency of library management and support students' access to learning resources. The research method used was Research and Development (R&D) with the Richey and Klein model, including planning, production, and evaluation stages. The development of the system involved 2 media experts, 3 librarians, and 30 students as respondents. The validation results showed that this system was very feasible, with an average score of 89% from media experts and 88% from expert librarians. The student response was also positive, with a score of 86.13%, indicating satisfaction with the ease of use and benefits of the system. Thus, this web-based library information system was effective in improving library services and supporting the learning process in schools.

INTRODUCTION

Information technology has become an inseparable part of various aspects of life, including in the world of education. Technological advances in the modern era have brought major changes that have a significant impact on human life (Abrar & Siswono, 2024). Its rapid development allows for the dissemination of information quickly, efficiently, and beyond geographical restrictions. In the realm of education, information technology plays a crucial role in supporting various academic and administrative activities, including library management (Sulistiani et al., 2022) As the main center of learning resources, libraries have undergone a significant transformation with the presence of the concept of digital libraries, which allows for more flexible storage, management, and distribution of collections (Nugraha et al., 2024; Subekti & Pratama, 2024). With the implementation of digital systems, access to learning resources becomes easier and is no longer limited by space or time (Arms et al., 2000). This transformation is increasingly relevant in the digital era, where the use of technology is a fundamental need in improving the efficiency of education services (Andita, 2023).

However, in Indonesia, there are still many school libraries, especially at the junior high school level, that are managed manually. A similar thing was found at SMP Negeri 3 Sungai Kakap, where library data recording is still done conventionally using ledgers and paper forms, while computers are only used for making simple reports. This manual system poses various obstacles, such as inefficiencies in

recording and searching data, the risk of loss or damage to archives, and limitations in the management of information collection and access (Junaedi et al., 2021). This condition shows the need for technology-based management innovation so that library services are more effective and adaptive to school needs.

Based on the results of direct observation and interviews with school principals, librarians, teachers, and student representatives of SMP Negeri 3 Sungai Kakap, a number of main problems were identified. First, the process of recording loans and returns is still manual, so it takes a long time and makes it difficult to find data. Second, physical documents are at risk of being lost, damaged, or out of sync with the latest data because there is no adequate backup system. Third, access to information is very limited, as students and teachers can only find out the availability of books when visiting the library directly. Fourth, the monthly reporting process must be done manually, which often has the potential to cause delays and miscalculations. Finally, the lack of service integration makes libraries lack member management features, cataloguing collections according to classification, and flexible borrowing schedule arrangements.

From these problems, the school conveyed the main needs as the basis for system development. Some of the needs that are considered crucial include: (1) automation of the entire library administration process starting from member registration, cataloging collections, to reporting; (2) the quick search feature of books by title, author, or book code; (3) web-based access so that students and teachers can check the availability of collections anytime and anywhere; (4) a data security system with a centralized database and automatic backup mechanism; (5) flexibility in manual setting of borrowing and return dates; and (6) a simple interface that is easy to use by users with varying levels of digital literacy. This needs analysis is an important foundation in designing the system, so that the features developed really answer problems in the field and support the improvement of the quality of library services.

Thus, the development of a web-based library information system is seen as a relevant and strategic solution. This system not only automates various important processes, such as cataloguing collections (Sahfitri, 2019), member management (Masturi et al., 2021), loan-return circulation (Pratama et al., 2019), and structured reporting (Manurung et al., 2024), but also improves the accessibility of learning resources more broadly for students and teachers (Hartanti et al., 2022).

Although previous research has extensively discussed the application of technology in libraries, most of the focus is still limited to large institutions or colleges (Devi, 2021). Research related to the development and implementation of web-based systems at the junior high school level is still rarely done (Baroroh et al., 2023). In addition, studies on the impact of digital systems on ease of access to information for students and teachers are also still limited (Putri et al., 2022).

Therefore, this research is here to fill this gap by developing a web-based library information system at SMP Negeri 3 Sungai Kakap. The goal is not only to improve administrative efficiency and data accuracy, but also to expand access to information for all school residents. With this approach, the research is expected to make a real contribution to digital transformation in the education sector, especially in supporting more effective, efficient, and inclusive school library services.

METHOD

This research used the research and development (R&D) method, which is a systematic approach to produce a specific product and test its effectiveness. According to Sugiyono (2018), this method aims to identify needs, design, develop, and evaluate products until they are ready to use. In this study, the development of a web-based library information system was carried out using the Richey and Klein model, which consisted of three main stages: planning, production, and evaluation (Richey & Klein, 2014). This research was carried out in the library of SMP Negeri 3 Sungai Kakap, involving 2 media

experts, 3 expert librarians, and 30 students as research respondents.

The first stage, namely planning, involved analysing needs through observation and interviews with potential users, such as students and librarians of SMP Negeri 3 Sungai Kakap. This analysis aims to identify the main features of the system to be developed, such as collection management, circulation, and library reports. The results of this needs analysis were the basis for designing a system to meet user needs optimally.

Furthermore, the production stage was carried out by designing the initial design of the system based on the identified needs. This process included the development of a prototype of a web-based library system using PHP and MySQL technologies, with a user interface designed to be simple yet still functional. The resulting prototype was then tested internally to ensure the design's conformity with the planned specifications before entering the evaluation stage. Meanwhile, the last stage was the evaluation, which was carried out by involving 2 media experts and 3 librarians to assess the feasibility aspects of the system, such as functionality, ease of use, and attractiveness. In addition, 30 students as end-users participated in the trial to provide responses to the developed system. This evaluation aims to identify weaknesses in the system, so that improvements can be made before the system is fully implemented.

Thus, this study used the Richey and Klein model, which focused on systematic product development, from planning to evaluation. The final result of this study was expected to produce a web-based library information system that simplifies library management, improves administrative efficiency, and supports the student learning process at SMP Negeri 3 Sungai Kakap.

RESULTS AND DISCUSSION

Results

This research was conducted at the Library of SMP Negeri 3 Sungai Kakap, involving two media experts, three expert librarians, and 30 students as respondents. The results of the study show that validation by media experts provides a comprehensive picture of the quality of the media developed. Media experts assessed based on 19 indicators that covered three main aspects, namely: (1) display quality; (2) display appeal; and (3) material organisation.

Meanwhile, from five assessment items in the aspect of display quality, four items in the aspect of attractiveness, and ten items in the aspect of organising the material, a score was obtained that was converted into a standard value with a range of 0-100. These results show that the media developed has met the quality standards set by experts.

In addition, the responses of the 30 students involved as respondents also gave a positive picture of the media tested. The students found the display of the media interesting and easy to understand, while the organisation of the material was considered systematic and helpful in the learning process. Thus, the validation results from media experts, librarians, and student responses as a whole show that the media developed is feasible and effective to be used in supporting learning activities in the library of SMP Negeri 3 Sungai Kakap. The results of expert validation can be seen in Table 1.

Table 1
Media Expert Validation Results

No	Validator	Display Quality	Appeal	Material Organizing
1	Media Expert 1	19%	14%	35%
2	Media Expert 2	18%	14%	36%
Average Score		**92%**	**87%**	**88%**
Information		**Highly Worthy**	**Highly Worthy**	**Highly Worthy**

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So, based on the validation results in Table 1, the web-based library information system is declared very feasible to use. The suggestions for improvement given by media experts include: (1) adding the school logo on the login page, (2) adding the Ministry of Education and Culture logo on the login page and printouts, and (3) tidying up the date format on the report page.

The results of the validation by expert librarians provide an in-depth overview of the management aspects and functions of the library, which are assessed based on 12 indicators. This assessment covers four main aspects, namely web-based library management, cataloguing, compiling collections according to the classification system, and the role of libraries as independent learning resources. In the aspect of web-based library management, it is assessed through four assessment items that emphasise the efficiency and ease of access to the system. Furthermore, two assessment items in the aspect of cataloguing assess the accuracy and completeness of the information provided. The other four items focus on the preparation of collections, which are assessed based on conformity with the applicable classification system. Finally, two assessment items measure the extent to which the library can serve as a source of independent learning for students. The results of media experts can be seen in Table 2.

Table 2
Librarian Expert Validation Results

No	Validator	Web-Based Library Management	Cataloging	Arrangement of Collections According to the Classification System	Library as a Source of Independent Learning
1	Expert Librarian 1	14	6	14	7
2	Expert Librarian 2	16	7	15	7
3	Expert Librarian 3	15	6	14	8
Average Score		**94%**	**79%**	**89%**	**91%**
Information		**Highly Worthy**	**Proper**	**Highly Worthy**	**Highly Worthy**

Overall, the results of the assessment by librarians show that the library system and services of SMP Negeri 3 Sungai Kakap have met the set standards. Experts appreciated the efforts to manage the library in a structured and systematic manner, especially in terms of organising collections and the use of web-based technology. This not only facilitates library management but also supports students in accessing learning resources independently. Thus, libraries can be an effective means to support the learning and literacy process in schools.

Based on the validation results, the web-based library information system was declared very feasible to use, although expert librarians provided some suggestions for improvement to improve its functionality. Mr. Randi Yudistira, S.Pd. suggested adding a manual setting feature on the borrowing date, while Mr. Sukasman, S.Pd., M.Pd. emphasised the importance of this system providing wider benefits for all aspects of the school.

In addition, Mr. Zulkarnain, S.Kom., recommends adding a book specification code and a manual book code box on the loan transaction page. The improvements made include the addition of a borrowing date setting feature and the inclusion of a book specification code box on the borrowing and borrowing transaction menus, so that this system becomes more complete and useful for users.

Characteristics of Developed Products

The product produced from this research is a Web-Based Library Information System for SMP Negeri 3 Sungai Kakap. The system is designed to automate the entire library management process, from collection recording, member management, borrowing and return transactions, to generating reports.

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Platform and Technology

- Programming Language: PHP
- Basis Data: MySQL
- Display: HTML, CSS, and JavaScript with responsive design for both computer and mobile access.
- Architecture: Web-based client–server with separate access rights for admins/librarians and general users (students/teachers).

Key Features

- Member Management: registration, editing, and deletion of members.
- Book Catalogue: data input, quick search, and collection grouping.
- Circulation: loan–return transactions with manual date setting.
- Reporting: a recap of collection, member, and transaction data in print format.
- Data Security: Log in with your username and password according to the level of access.
- School Branding: login display and report containing the logo of SMP Negeri 3 Sungai Kakap and the logo of the Ministry of Education and Culture.

Product Advantages

- Reduces manual recording errors and speeds up administration.
- Allows access to online catalogues without having to come directly to the library.
- Simple, user-friendly interface with diverse digital literacy.
- Automated reports that save librarians time.

Product Display (Screenshots)

Fig. 1 *Login page with the logo of the school and the Ministry of Education and Culture*

Fig. 2 *The Admin dashboard displays a summary of collections, members, and transactions*

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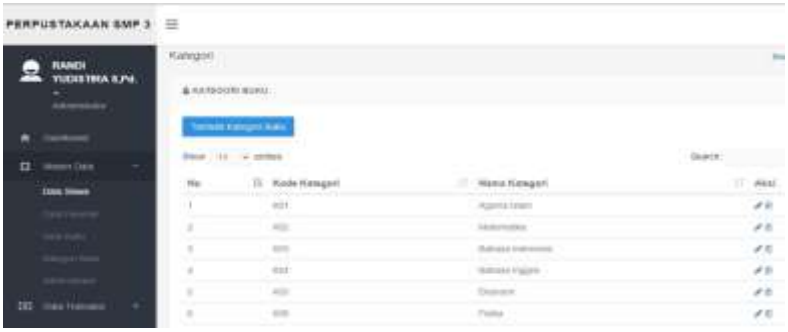

Fig. 3 *Book Data Input Form with specification code and classification category*

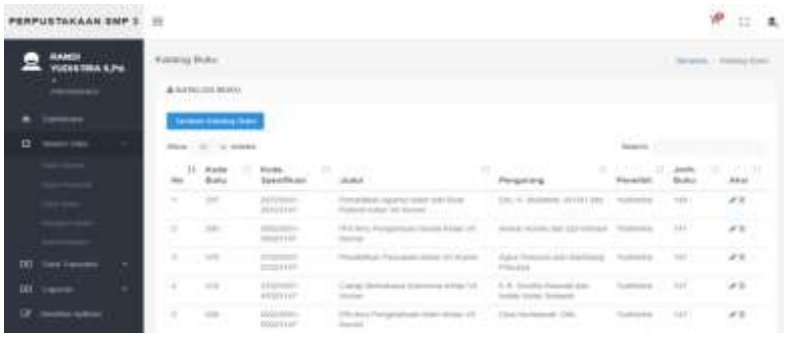

Fig. 4 *Book Catalogue Search page for students and teachers*

Fig. 5 *Loan Transaction Form with manual setting of borrowing and return dates*

Fig. 6 *Loan and Return Report ready to print*

With these characteristics, the web-based library information system developed not only meets

administrative needs but also provides added value in the form of efficiency, transparency, and service accessibility for all school residents. A total of 30 students participated in a trial of using a web-based library information system. The results of students' responses to this system are shown in Table 3.

Table 3
Student Response Results

Score	Score Percentage	Category
1345	86,13%	Good

Based on this data, the web-based library information system received an average score percentage of 86.13% with a good category, which shows that students feel comfortable and satisfied in using this system.

Discussion

The development of a web-based library system at SMPN 3 Sungai Kakap aims to improve efficiency in library management and support the needs of students and librarians. By switching from a manual system to a technology-based system, it is hoped that library services will be more effective. The development process of this system uses the Richey and Klein model, which consists of three main stages: planning, production, and evaluation. This model provides a clear framework for the development of educational technology products (Waruwu, 2024). In the planning stage, interview and observation methods are used to identify user needs, emphasising the importance of needs analysis in research as well as the development of appropriate and relevant products (Danang & Setiawan, 2022).

Validation results from media experts and librarians show that this web-based library system gets an average score of 89% and 88%, respectively, which is categorised as very feasible. This assessment covers aspects of user interface, information organisation, and library collection management. In line with the opinion (Juvenski & Susanto, 2023), which emphasises that technology plays an important role in improving the efficiency of information management in modern libraries. In addition, the trial on 30 students showed excellent results, with an average score of 86%, which is classified as good. These results show that students feel the benefits of the web-based library system in finding references and learning resources that support their learning process.

The main advantage of this web-based library system is its ability to quickly duplicate collections and distribute them widely, so that information can be easily accessed by users from various locations. As stated by Fismanelly et al. (2025) that web-based libraries allow for high flexibility in accessing library collections, without any geographical barriers. With this system, students and librarians can access various information needed more quickly, efficiently, and effectively. This system also has excellent features such as accessibility without time and place restrictions, ease of searching for collections, and integration with other library systems.

In addition to improving the efficiency of library management, this system also supports collaboration between librarians and students, so that the teaching and learning process becomes more effective. With a web-based library system, information management becomes more structured and systematic. In the development stage, this product is designed with important aspects such as library collection, catalogue, circulation, membership, reports, interface display, as well as ease of use. This aims to ensure that the system can better support library management. Web-based technology allows librarians to provide more systematic services, make it easier to find information, and assist in administrative work. Digital libraries can store information collections systematically, which increases the operational efficiency of libraries (Linda et al., 2024).

Based on the results of the evaluation, it can be concluded that the web-based library system developed at SMPN 3 Sungai Kakap has met the excellent eligibility criteria. Positive responses from media experts, librarians, and students show that this system is very useful and can support student

learning effectively. With this system, it is hoped that the management of the library at SMPN 3 Sungai Kakap will be more efficient, and students can take advantage of this technology to support their learning process more optimally.

CONCLUSIONS

Based on the results of the research, it can be concluded that the web-based library information system developed at SMP Negeri 3 Sungai Kakap had met the eligibility and effectiveness criteria. Validation by media experts and expert librarians showed an average score of 89% and 88%, respectively, which were categorised as very decent. The positive response from 30 students with a score of 86.13% also indicated that this system was easy to use and useful in supporting the learning process. This system had succeeded in improving the efficiency of library management, making it easier to search for information, and expanding access to digital learning resources for students and teachers. Thus, this web-based library information system was feasible to implement and can be a solution in supporting digital transformation in the educational environment.

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