

## Development of a Web-Based Library Application at SMK Lugina Rancaekek

Aminudin<sup>1</sup>, Egi Abinowi<sup>2</sup>

<sup>1,2</sup> University of Widyatama Indonesia



**ABSTRACT:** The school library is essential for enhancing the educational process and fostering intellectual growth within the school community, serving as a key resource for teaching and learning. However, at SMK Lugina Rancaekek, library administration and data processing are still handled manually with books and Excel spreadsheets, causing inefficiencies in service speed, data management, and report generation. To address these issues, this research proposes the development of a web-based library application. The study aims to evaluate current procedures, identify the functional and non-functional requirements for the new system, and design the necessary hardware and software infrastructure. The goal is to improve library operations through technological advancement, with the expected outcome being a published scientific article and copyright registration.

**KEYWORDS:** School Library, Data Processing, Web-Based Library Application, Optimization of Library Functions, Technological Advancement

### 1. INTRODUCTION

Libraries are fundamental to the dissemination of knowledge and information, serving as key institutions for providing diverse materials in both print and digital formats. Their primary role is to enhance users' knowledge, skills, and insights while supporting education, research, and professional development (Suryani, 2023). By expanding access to educational resources, libraries play a crucial part in national intellectual development and contribute significantly to the cultural and educational advancement of society.

Presidential Decree No. 11 of 1989 underscores the essential role of libraries in preserving library materials and serving as vital sources of information in the fields of science, technology, and culture. Libraries are entrusted with the task of contributing to the intellectual development of the nation and supporting national development initiatives (President of the Republic of Indonesia, 1989). This mandate highlights the importance of libraries not only in safeguarding but also in actively disseminating knowledge and cultural heritage.

In the context of education, school libraries are indispensable facilities that support the teaching and learning process. They are integral to achieving high standards of education by fulfilling the information needs of students and staff, thus functioning as effective learning resources (Hidayati, 2022). An optimized school library can significantly enhance educational quality and enrich students' learning experiences, making it a vital component of the educational system.

With the rapid advancement of information technology, the integration of computerized systems into library management has become increasingly crucial. At SMK Lugina Rancaekek, the library currently relies on manual processes for recording and data processing, which negatively impacts service efficiency and report generation (Putra, 2023). Manual systems, while traditional, are often prone to inefficiencies such as slower service, higher chances of error, and difficulties in generating accurate reports. This highlights the urgent need for modernization.

The development of a web-based library application at SMK Lugina Rancaekek represents a promising solution to these challenges. A web-based system would streamline data recording, facilitate more efficient book borrowing and return processes, and introduce additional features like book searches and data visualization. These enhancements are expected to significantly improve the overall management of the library, making it more responsive to the needs of its users and more effective in its operations. In light of these issues, this research focuses on the development of a web-based library application for SMK Lugina Rancaekek. The research seeks to address several key problems:

## Development of a Web-Based Library Application at SMK Lugina Rancaekek

1. **Procedures for Book Borrowing and Returns:** The research will examine the current procedures for book borrowing and returns at the SMK Lugina Rancaekek library. Understanding these procedures is essential for designing a system that aligns with existing practices while introducing improvements.
2. **Functional and Non-Functional Requirements:** Identifying the functional and non-functional requirements for the web-based library application is a critical aspect of this research. Functional requirements include the core features needed for the system to operate effectively, such as user management, book cataloging, and transaction processing. Non-functional requirements encompass aspects like system performance, reliability, and usability. These requirements will guide the development process to ensure the application meets the needs of both librarians and users.
3. **Infrastructure Needs:** Analyzing and designing the necessary hardware and software infrastructure to support the web-based library application is another key objective. This includes selecting appropriate technologies, determining system specifications, and ensuring compatibility with existing infrastructure. A well-designed infrastructure will support the smooth operation of the application and enhance its overall effectiveness.

To achieve these objectives, the research will follow a systematic approach that includes an initial survey of current library procedures, problem formulation, and research method determination. Data processing and analysis will be conducted to identify areas for improvement and design the web-based application. The final stage will involve preparing a comprehensive report detailing the findings and recommendations.

The specific goals of this research are to:

1. **Identify Current Procedures:** The research will document the existing procedures at the SMK Lugina Rancaekek library, providing a baseline for understanding current practices and areas that require improvement.
2. **Analyze Requirements:** The study will analyze both functional and non-functional requirements for the web-based library application. This analysis will ensure that the system is designed to meet the needs of librarians and users, offering a user-friendly experience while delivering essential functionality.
3. **Design Infrastructure:** The research will design the hardware and software infrastructure needed to support the web-based library application. This involves selecting suitable technologies and ensuring that the infrastructure supports the application's performance and reliability.

In summary, the development of a web-based library application at SMK Lugina Rancaekek aims to address the limitations of the current manual system by enhancing data management, service efficiency, and user experience. By focusing on procedural analysis, requirement identification, and infrastructure design, the research aims to create a modern library system that supports educational goals and improves library operations. The expected outcomes include a more efficient library management process, better service delivery, and enhanced access to information for users.

## 2. METHODS

### 2.1 Type of Research

The researcher employs a qualitative method because the focus is on understanding and interpreting the needs of library users and administrators regarding the features to be included in the library application for SMK Lugina Rancaekek Bandung. As noted by Basri (2014), qualitative research concentrates on human elements, objects, institutions, and the relationships or interactions among these elements, aiming to understand events, behaviors, or phenomena. In this research, the approach will be objective, free from the researcher's own opinions.

### 2.2 Data Collection Techniques

Qualitative data is gathered through observations and in-depth interviews with respondents, specifically librarians at SMK Lugina Rancaekek. Additionally, data is obtained through document and literature reviews. The sampling is conducted purposively, designating Ms. Dinda as the primary informant regarding library services at SMK Lugina Rancaekek. Interviews are also conducted with three students, Ahmad, Desi, and Andri, as well as with academic expert Diah Sri Rejeki, S.Sos., M.I.kom, to compare insights with the field of digital library science.

### 2.3 System Development Method

To support the research, the author uses a website development method and gathers the necessary data. The development of the web-based library application for SMK Lugina Rancaekek employs the waterfall model. This model is chosen because its stages and sequences are carried out in a linear and sequential manner, resembling the flow of a waterfall.

## Development of a Web-Based Library Application at SMK Lugina Rancaekek

### 3.4 Data Analysis Techniques

The researcher employs an interactive model of data analysis, as described by Miles & Huberman (2007), which consists of data reduction, data presentation, and verification.

1. **Data Reduction:** The researcher undertakes the processes of selecting, simplifying, abstracting, and transforming raw data obtained from field notes. This involves isolating the collected data and reducing it according to the research criteria. Not all collected data will be analyzed in the research report; only data from key informants will be included. Data sorting is done continuously until information relevant to the research objectives is identified. The reduced data in this study includes interview transcripts, field notes, and descriptions of documents and photos collected during the research process. All data is edited, categorized, and summarized into main themes. Once these themes are established, the researcher develops conceptual frameworks and explanations related to the analysis of the needs of the managers and users at SMK Lugina Rancaekek.
2. **Data Presentation:** The researcher connects various pieces of data according to the theoretical framework employed. Data presentation is crucial because qualitative research typically generates a large amount of dispersed information. Using graphs, charts, images, diagrams, and other forms helps to organize, summarize, and consolidate the data. At this stage, the researcher creates brief summaries, charts, relationships between categories, and flows related to the needs analysis of the library managers and users at SMK Lugina Rancaekek Bandung.
3. **Verification or Conclusion Drawing:** The researcher performs verification or conclusion drawing based on the field findings related to the needs analysis of the library managers and users at SMK Lugina Rancaekek Bandung. This involves reviewing and reflecting on field notes to assess their accuracy.

### 3.5 Respondents

The respondents in this study are librarians from SMK Lugina Rancaekek, who provide clear explanations of the procedures required for various library activities.

## 3. RESULTS AND FINDINGS ANALYSIS

Flow Proses Perpustakaan SMK Lugina

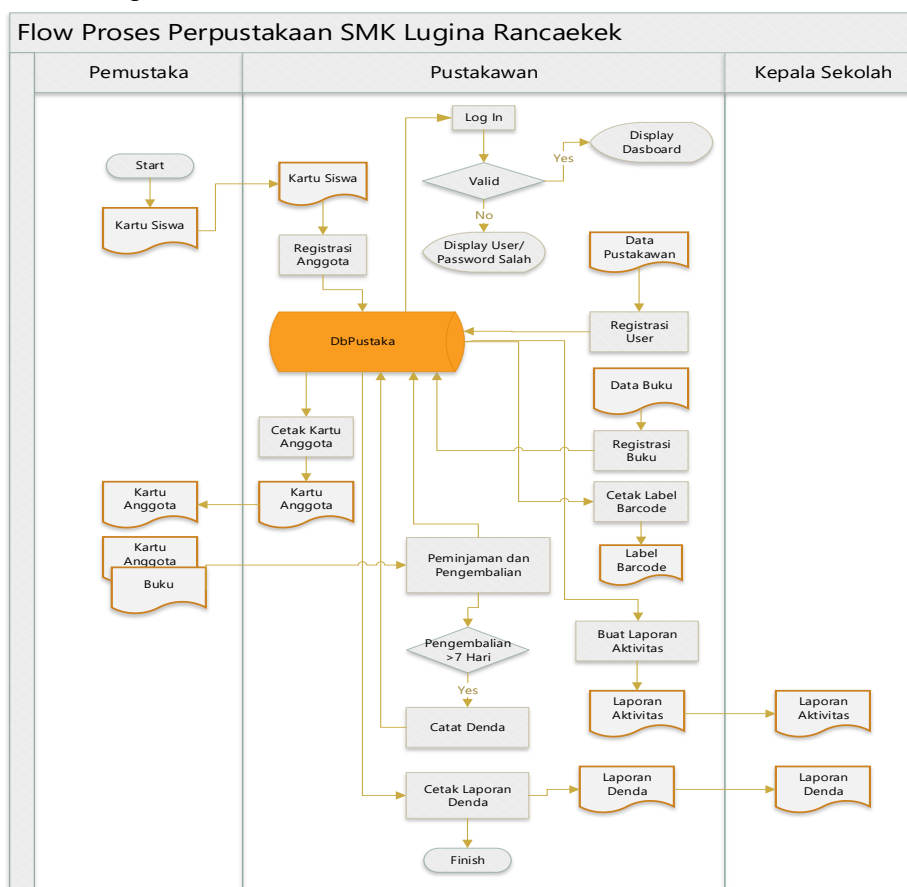


Figure 1: Flow proses library SMK Lugina Rancaekek

# Development of a Web-Based Library Application at SMK Lugina Rancaekek

## ER-Diagram

The following is the entity-relationship diagram for the SMK Lugina Rancaekek library

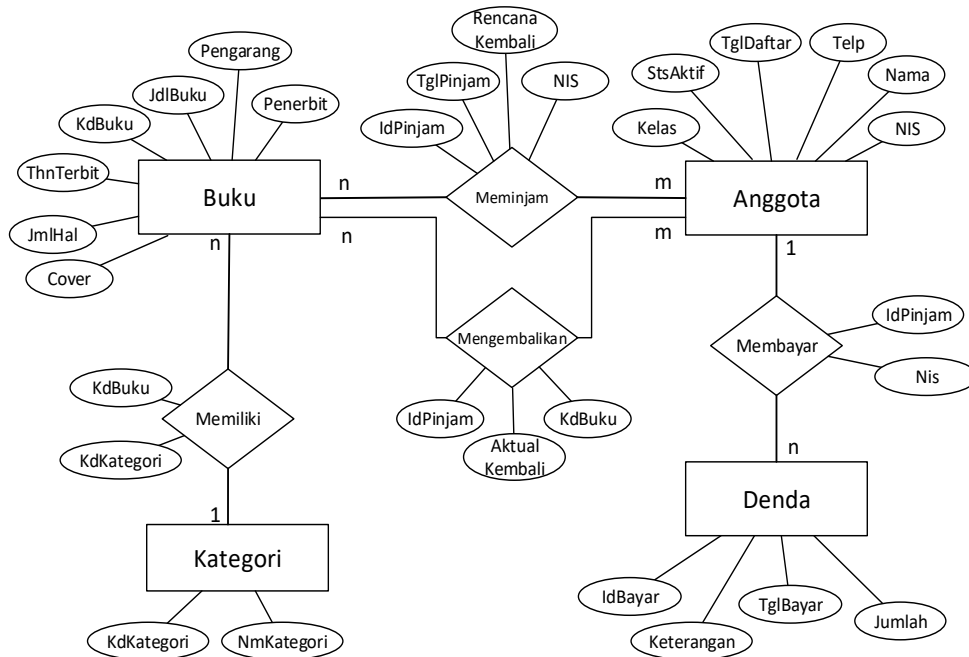


Figure 2: ER Diagram

## Database Structure

Database Name: dbperpus

1. Table Name: tbuser

#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
1	Username	varchar(30)			No	None		Change Drop Primary
2	Nama	varchar(50)			No	None		Change Drop Primary
3	Password	varchar(30)			No	None		Change Drop Primary
4	Level	varchar(30)			No	None		Change Drop Primary
5	StatusAktif	varchar(3)			No	None		Change Drop Primary

Figure 3 Structure Table User

2. Table Name : tbanggota

#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
1	Nis	varchar(10)			No	None		Change Drop Primary
2	Nama	varchar(50)			No	None		Change Drop Primary
3	Telp	varchar(25)			No	None		Change Drop Primary
4	TglDaftar	date			No	None		Change Drop Primary
5	StsAktif	varchar(3)			No	None		Change Drop Primary
6	Kelas	varchar(10)			No	None		Change Drop Primary

Figure 4 Structure Table Anggota

## Development of a Web-Based Library Application at SMK Lugina Rancaekek

### 3. Table Name: tbbuku

#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/>	1	KdBuku			No	None		Change  Drop  Primary
<input type="checkbox"/>	2	JdlBuku			No	None		Change  Drop  Primary
<input type="checkbox"/>	3	Pengarang			No	None		Change  Drop  Primary
<input type="checkbox"/>	4	Penerbit			No	None		Change  Drop  Primary
<input type="checkbox"/>	5	ThnTerbit			No	None		Change  Drop  Primary
<input type="checkbox"/>	6	JmlHal			No	None		Change  Drop  Primary
<input type="checkbox"/>	7	Cover			No	None		Change  Drop  Primary

Figure 5 Structure Table Buku

### 4. Table Name: tbkategori

#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/>	1	KdKategori			No	None		Change  Drop  Primary
<input type="checkbox"/>	2	NmKategori			No	None		Change  Drop  Primary

Figure 5 Structure Table Anggota

### 5. Table Name: tbpinjam

#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/>	1	IdPinjam			No	None	AUTO_INCREMENT	Change  Drop  Primary
<input type="checkbox"/>	2	Nis			No	None		Change  Drop  Primary
<input type="checkbox"/>	3	KdBuku			No	None		Change  Drop  Primary
<input type="checkbox"/>	4	TglPinjam			No	None		Change  Drop  Primary
<input type="checkbox"/>	5	RencanaKembali			No	None		Change  Drop  Primary
<input type="checkbox"/>	6	AktualKembali			No	None		Change  Drop  Primary

Figure 6 Structure Table Peminjaman

### 6. Table Name : tbdenda

#	Name	Type	Collation	Attributes	Null	Default	Extra	Action
<input type="checkbox"/>	1	Idbayar			No	None	AUTO_INCREMENT	Change  Drop  Primary
<input type="checkbox"/>	2	IdPinjam			No	None		Change  Drop  Primary
<input type="checkbox"/>	3	TglBayar			No	None		Change  Drop  Primary
<input type="checkbox"/>	4	Jumlah			No	None		Change  Drop  Primary
<input type="checkbox"/>	5	Keterangan			No	None		Change  Drop  Primary

Figure 7 Structure Table Denda

# Development of a Web-Based Library Application at SMK Lugina Rancaekek

## SMK Lugina Rancaekek Website Display

Below is the display of the SMK Lugina Rancaekek library website:

### a. User Login display

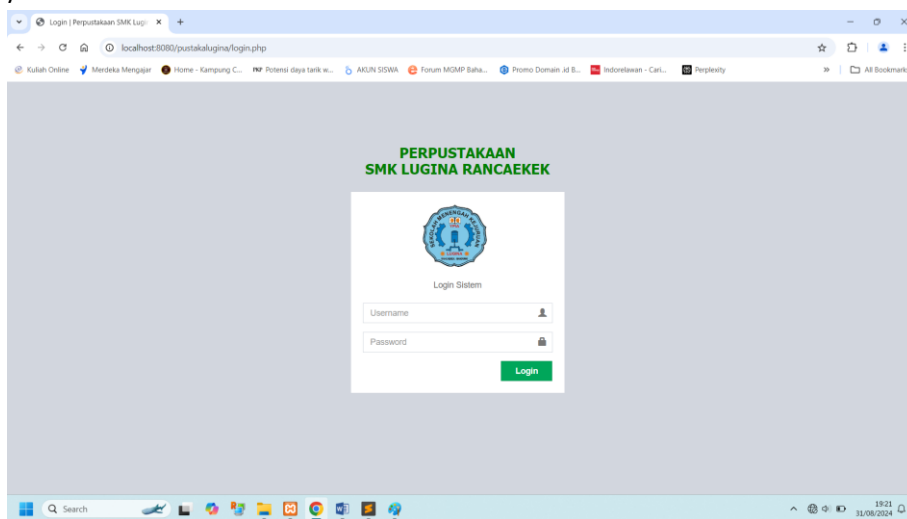


Figure 8 User Login

### b. Main menu display

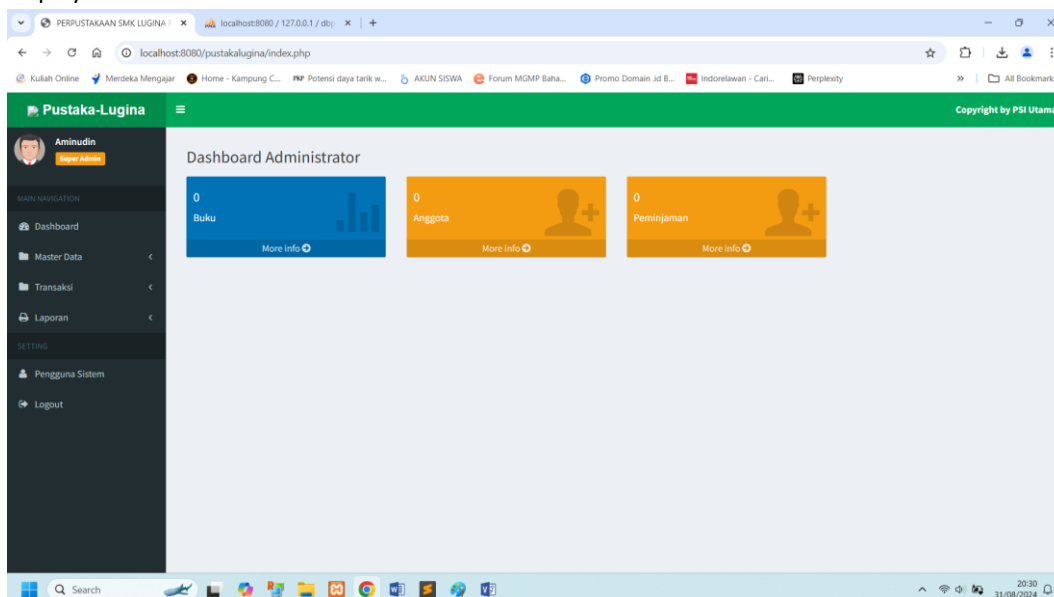


Figure 9 Main Menu

## 4. DISCUSSION

The development of a web-based library application has proven to be highly effective in enhancing both library resource management and user accessibility. By integrating features such as advanced book catalog search, streamlined borrowing and return management, and real-time tracking of book availability, the application simplifies the process for users to locate and borrow materials. This ease of access not only improves the overall user experience but also ensures that library resources are utilized more efficiently, reducing the time and effort required for users to find and manage library materials.

From an administrative perspective, the application significantly enhances library management by automating routine tasks. Features like book stock management, usage statistics reporting, and member management streamline administrative processes and reduce the manual workload on library staff. This efficiency enables librarians to focus on more strategic activities, such as improving library services and engaging with patrons, rather than being bogged down by repetitive administrative tasks. The automation of these processes also leads to more accurate and timely data, supporting better decision-making and resource allocation.

The application also addresses critical concerns related to data security and user privacy. By incorporating robust security measures such as user authentication and encryption of sensitive information, the application safeguards user data from

## Development of a Web-Based Library Application at SMK Lugina Rancaekek

unauthorized access and potential breaches. This focus on security not only protects personal information but also builds user trust in the library's digital services. Ensuring data privacy and integrity is essential for maintaining a positive user experience and complying with data protection regulations.

In the long term, the implementation of the web-based library application is expected to lead to a reduction in operational costs by automating many processes that were previously handled manually. This shift not only lowers labor costs but also improves the overall efficiency of library operations. Additionally, the application's ability to enhance user satisfaction through improved accessibility and service quality positions the library as a more modern and responsive information center. As a result, libraries can better meet the needs of users in the digital era, offering more relevant and up-to-date services while adapting to technological advancements.

### 5. CONCLUSION

The development of a web-based library application demonstrates its effectiveness in enhancing library resource management and user access. Features such as book catalog search, loan and return management, and real-time book availability tracking make it easier for users to find and borrow books from the library. From a management perspective, the application streamlines administration through book stock management, usage statistics reporting, and member management. The application also supports data security with user authentication and sensitive information encryption, ensuring user privacy and data integrity. In the long term, implementing a web-based library application is expected to reduce library operational costs by automating many processes that were previously done manually, improve user satisfaction, and enhance overall library operational efficiency. Thus, the library can transform into a more modern and responsive information center that meets user needs in the digital age.

### ACKNOWLEDGMENT

We would like to express our gratitude to:

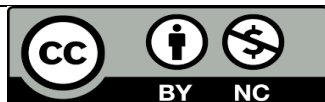
1. The librarians at SMK Lugina Rancaekek.
2. LP2M Universitas Widyatama for funding this research.
3. All parties who have assisted in the completion of this research.

### REFERENCES

- 1) Abinowi, E., Aminudin, Dzulfiqor, H. A., Sri, R. D., & Andini, K. N. (2024). Development of Digital Collections in Libraries and Archives in The Development of Economic Science in Bandung. *Jurnal Informatika Ekonomi Bisnis*, 6(1), 299-303. <https://doi.org/10.37034/infv6i1.860>
- 2) Aminudin, Abinowi, E., Andini, K. N., Sri, R. D., & Dzulfiqor, H. A. (2024). Analysis and Design of Web-Based Mobile Library Services from an Economic Perspective. *Jurnal Informatika Ekonomi Bisnis*, 6(1), 286-292. <https://doi.org/10.37034/infv6i1.858>
- 3) Amalia, D. R., Surya, R., & Kurniawan, B. (2020). Implementasi Sistem Notifikasi dalam Aplikasi Perpustakaan Berbasis Web di SMK. *Jurnal Teknologi Pendidikan*, 7(2), 123-135.
- 4) Basri. (2014). *Using qualitative research in accounting and management studies: not a new agenda*. China: J US-China Public Adm.
- 5) Basuki, S. (2006). *Metode Penelitian*. Jakarta: Wedatama Widya Sastra.
- 6) Disarpus. (2023, Maret 12). *Profil Dinas Perpustakaan dan Kearsipan Pemerintah Kota Bandung*. (n.d.). Retrieved from [https://dispusip.bandung.go.id/wp-content/cache/page\\_enhanced/dispusip.bandung.go.id/profil/\\_index.html](https://dispusip.bandung.go.id/wp-content/cache/page_enhanced/dispusip.bandung.go.id/profil/_index.html)
- 7) Effendy, F. (2019). Pengaruh Aplikasi Perpustakaan Berbasis Web terhadap Aksesibilitas Siswa di SMK. *Jurnal Ilmu Perpustakaan dan Informasi*, 11(1), 45-56.
- 8) Fauzi, H., & Widodo, S. (2018). Penerapan Teknologi Barcode dalam Sistem Perpustakaan Berbasis Web di SMK Teknologi Surabaya. *Jurnal Teknologi Informasi*, 14(3), 67-79.
- 9) Hardjoprakoso, M. (1992). *Panduan Penyelenggaraan Perpustakaan Keliling/ kata pengantar*. Ed.1, cet. 1. Jakarta: Perpustakaan Nasional RI.
- 10) Hakim, M. R., & Rachman, A. (2020). Pengaruh Implementasi Aplikasi Perpustakaan Berbasis Web terhadap Keterampilan IT Siswa SMK. *Jurnal Pendidikan Vokasi*, 10(1), 34-45.
- 11) Hidayat, M. A., & Fathurrahman, M. (2017). Tantangan dalam Implementasi Aplikasi Perpustakaan Berbasis Web di Sekolah Menengah. *Jurnal Manajemen Informasi*, 16(4), 210-223.
- 12) Hidayati, N. (2022). *Peran Perpustakaan Sekolah dalam Meningkatkan Kualitas Pendidikan*. *Jurnal Pendidikan*, 15(2), 89-103.

## Development of a Web-Based Library Application at SMK Lugina Rancaekek

- 13) Iskandar, I., & Rizky, M. (2019). Keamanan dalam Pengembangan Aplikasi Perpustakaan Berbasis Web. *Jurnal Sistem Informasi*, 12(2), 87-98.
- 14) Kurniawan, I., & Hartono, T. (2018). Regular Updates dan Penetration Testing untuk Keamanan Aplikasi Perpustakaan Berbasis Web. *Jurnal Keamanan Informasi*, 7(3), 301-314.
- 15) Miles MB, H. M. (2007). *Analisis data Kualitatis Buku Sumber Tentang Metode Baru*. Jakarta: UIP.
- 16) Moleong, L. (2004). *Metode Kualitatif*. Remaja Rosdakarya. Ar-Ruzz Media.
- 17) Putra, R. (2023). *Transformasi Digital dalam Pengelolaan Perpustakaan: Studi Kasus di SMK*. *Teknologi Informasi & Pendidikan*, 19(1), 45-58.
- 18) Purwanto, E. (2021). Framework dan Teknologi dalam Pengembangan Aplikasi Perpustakaan Berbasis Web. *Jurnal Teknik Informatika*, 20(1), 85-96.
- 19) Putra, A., & Aulia, N. (2019). Studi Kasus Implementasi Aplikasi Perpustakaan Berbasis Web di SMK Negeri 1 Bandung. *Jurnal Manajemen Perpustakaan*, 12(1), 90-101.
- 20) Presiden Republik Indonesia. (1989). *Keputusan Presiden Nomor 11 Tahun 1989*. Jakarta: Pemerintah Republik Indonesia.
- 21) Saputra, A. (2018). Pengembangan Sistem Informasi Perpustakaan Berbasis Web untuk SMK. *Jurnal Teknologi Informasi dan Pendidikan*, 10(2), 112-123.
- 22) Suryani, E., & Mustofa, M. (2020). Sistem Manajemen Perpustakaan Berbasis Web di SMK Yogyakarta: Studi Kasus. *Jurnal Sistem Informasi dan Manajemen Sekolah*, 12(3), 145-160.
- 23) Sugiyono. (2010). *Metode Penelitian Kualitatif, Kuantitatif & RND*. Alfabeta.
- 24) Suwarno, W. (2016). *Ilmu Perpustakaan & Kode Etik Pustakawan*. Jogyakarta:
- 25) Suryani, A. (2023). *Inovasi dalam Layanan Perpustakaan: Pendekatan Terbaru*. *Jurnal Informasi & Manajemen*, 20(3), 112-127.
- 26) Rizal, M. (2018). Fitur Utama dalam Aplikasi Perpustakaan Berbasis Web untuk SMK. *Jurnal Pengelolaan Informasi Sekolah*, 5(2), 78-89.
- 27) Santoso, B. (2017). Manfaat Aplikasi Perpustakaan Berbasis Web untuk Efisiensi Pengelolaan Sumber Daya di SMK. *Jurnal Administrasi Pendidikan*, 7(1), 89-101.
- 28) Wibowo, D., & Rahmawati, I. (2021). Tantangan dan Solusi dalam Pengembangan Aplikasi Perpustakaan Berbasis Web. *Jurnal Pengelolaan Informasi*, 9(2), 98-109.
- 29) Yusuf, A., & Pratama, F. (2019). Integrasi API dalam Aplikasi Perpustakaan Berbasis Web: Studi Kasus di SMK. *Jurnal Teknologi Informasi Sekolah*, 5(1), 55-66.



There is an Open Access article, distributed under the term of the Creative Commons Attribution – Non Commercial 4.0 International (CC BY-NC 4.0) (<https://creativecommons.org/licenses/by-nc/4.0/>), which permits remixing, adapting and building upon the work for non-commercial use, provided the original work is properly cited.