

Implementation of the Rapid Application Development Approach for the Academic Information System at Muzakkir Islamic Primary School, Prabumulih

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Abstract

This study stems from the limited application of information technology, which continues to influence various aspects of human life particularly in the fields of employment, business, and, more specifically, at Muzakkir Islamic Elementary School in Prabumulih, where data management is still handled through conventional methods. Data for this research was collected using a descriptive method with a qualitative approach, employing observation, interviews, and literature review. The design of the academic information system applied the Rapid Application Development (RAD) methodology to assist developers in analyzing and designing the system based on actual needs. The Unified Modeling Language (UML) served as a tool for designing the school's academic information system, supporting the developers during the process. The developed system was implemented using the Hypertext Preprocessor (PHP) programming language and a MySQL database.

Keywords: Implementation; RAD; Academic Information System; PHP; MySQL

1. Introduction

The advancement of information technology is rapidly accelerating today, including in Indonesia. This growth has significantly impacted various aspects of human life, particularly in the fields of employment, business, and education, where the demand for technology continues to rise over time. Schools also play a vital role in the integration of information technology, with the number of users steadily increasing alongside the expansion of internet access. The internet, in turn, serves as a powerful medium that enhances the effectiveness of learning activities. Information system is the integration of analyzed and processed components that produce the necessary information to assist managers in making decisions [1]. (Ridwan et al. 2021:19) in their E-book state that the presence of information systems in human life today plays a crucial role in simplifying daily activities [2]. Across various fields, work processes now take advantage of technological advancements in automation tasks that once seemed distant and difficult can now be accessed almost instantly through the utilization of information system technology. Muzakkir Islamic Elementary School is a primary education institution located in Karang Jaya Subdistrict, Prabumulih City. It was established on December 6, 2013, by the head of the Al Muzakkir Prabumulih Education Foundation. For years, data management at the school has relied on software such as Microsoft Excel and Microsoft Word. Teacher and student data are recorded and organized in Excel or Word files for purposes such as managing grades or preparing class schedules. These documents are then stored in folders on a computer, which still poses risks of data processing errors, file loss, or document damage. Therefore, the implementation of an academic information system could serve as a solution to facilitate more efficient, organized, and accurate data management. Since the school's data management still relies on such software, it presents an opportunity for researchers to design an academic information system website for Muzakkir Islamic Elementary School in Prabumulih. This website is intended to help streamline and organize data management more effectively. In addition, it can enhance the learning process by providing teachers and students with faster access to academic information.

2. Theoretical Basis

2.1 Definition of Implementation

System implementation is typically performed once the system is considered complete and ready for evaluation [3]. Implementation as the execution of a carefully and thoroughly prepared plan, carried out after the planning stage is deemed correct based on specific guidelines to achieve a particular objective [4]. From these definitions, it can be concluded that implementation is the application of a planned activity

aimed at conducting tests to achieve the intended goals. Implementation refers to the act of executing or carrying out a system that has been designed and developed, which is ready to undergo testing.

2.2 Definition of the RAD (Rapid Application Development) Method

Rapid Application Development (RAD) is a software development method that focuses on completing the development cycle within a short timeframe [5]. According to Hasanah and Untari (2020:26), RAD is a software development model that falls under the incremental approach [6]. Based on these explanations, it can be concluded that the RAD method is a system development approach characterized by a series of short stages, which typically include requirements planning, system design, and implementation.

2.3 Definition of Academic Information Systems

Academic Information System (AIS) is a web-based application that consolidates all educational components into an information system supported by modern technology [7]. According to Solahudin (2021) Academic Information System is designed to manage a school's administrative data so that academic records can be better organized [8]. From these definitions, it can be concluded that an Academic Information System is a web-based application used to streamline the management of school administrative data, ensuring it is maintained in a more structured manner.

2.4 Definition of PHP (Hypertext Processor)

PHP (Hypertext Preprocessor) is an open-source programming language, meaning that users are free to use and explore it without restrictions. It inherits its syntax from C and C++, and PHP files use the .php extension, making it easy to identify them as PHP scripts [9]. PHP is a server-side language specifically designed for web applications. It can be embedded within HTML code, and because it operates on the server side, PHP scripts are executed on the server, sending only the final HTML output to the browser keeping the PHP code hidden from the user [10]. Based on these explanations, PHP (Hypertext Preprocessor) can be defined as an open-source programming language used to develop websites.

2.5 Definition of MySQL

MySQL is a widely used open-source database system that has gained significant popularity in recent years. Data in MySQL is stored within database objects known as tables, where each table consists of related entries organized in a structure of rows and columns [11]. MySQL is a Database Management System (DBMS) that utilizes basic SQL (Structured Query Language) commands. It is open source and operates under two licensing models: Free Software, which allows unrestricted use, and Shareware, which is proprietary software with limited user rights [12]. From these definitions, MySQL can be described as an open-source database software that uses SQL as its primary query language.

2.6 Definition of Xampp

XAMPP is an application that enables the creation of a local web server for developing projects locally. It supports various platforms, including Apache, MySQL, PHP, and Perl [13]. The name XAMPP stands for X (representing any operating system), Apache, MySQL, PHP, and Perl. It is a tool that provides a complete software package in a single installation. The XAMPP package includes Apache (web server), MySQL (database), PHP (server-side scripting), Perl, FTP server, PhpMyAdmin, and various supporting libraries [14]. Based on these descriptions, XAMPP can be defined as a tool that offers a bundled software package containing Apache, MySQL, PHP, Perl, FTP server, PhpMyAdmin, and other auxiliary libraries.

2.7 Definition of Database

A database is a collection of structured data stored in an integrated system that can be accessed and managed by users or applications. The data within a database is typically organized into tables or relationships and can be retrieved or modified using query languages such as SQL [15]. A database is an organized set of data arranged in a format that facilitates the retrieval, storage, and manipulation of information. This data is usually stored in tables with a defined structure, consisting of rows and columns, making searches and processing more efficient [16]. From these definitions, a database can be described as a structured collection of information stored on a computer that can be accessed and managed by applications or users.

3. Research Methods

3.1. Data Sources

1. Primary Data
Primary data refers to information obtained directly by the author through interviews with relevant parties and direct observation of the research object. Examples include the institution's vision and mission, organizational structure, current data management systems in use (such as Microsoft Word and Excel), and the specific system requirements needed.
2. Secondary Data

Secondary data refers to information gathered from various sources, yet still originating from the research object. Examples include the school’s history (sourced from the Ministry of Religious Affairs website) and school data (obtained from official documents).

3.2 Data Collection Techniques

The techniques used in this study were as follows:

1. Observation
In this study, the author conducted direct observations of activities and operations at Muzakkir Islamic Elementary School in Prabumulih to identify existing issues within the institution.
2. Interview
In this research, the author conducted face-to-face interviews by visiting Muzakkir Islamic Elementary School in Prabumulih and engaging in discussions with the principal and teachers at the institution.
3. Literature Review
In this study, the author obtained information from e-books, journals, and previous research to support the data collection process for this thesis.

4. System Analysis And Design

4.1 Proposed Class Diagram

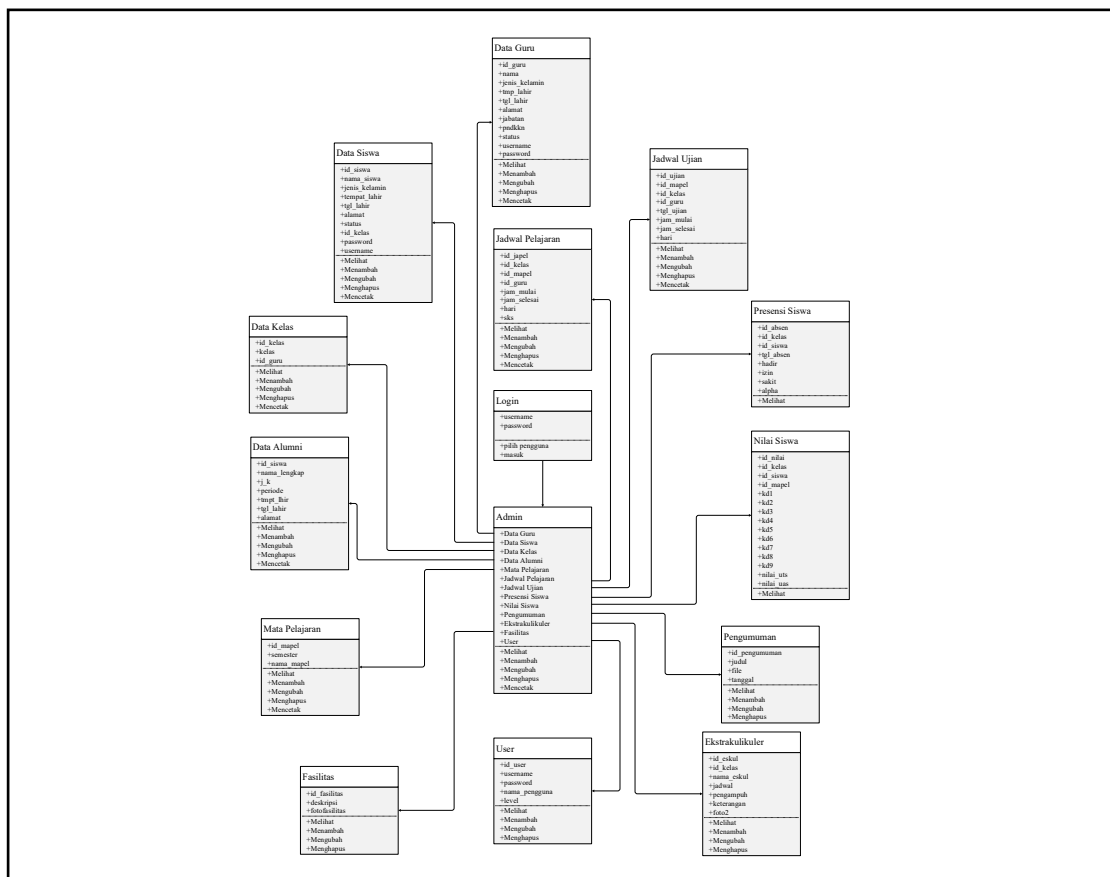


Fig. 1 : Proposed Class Diagram

This class diagram illustrates the data structure of the management system within the academic information system at Muzakkir Islamic Elementary School. The main entities include login, admin, teacher data, student data, alumni data, class data, subjects, class schedules, exam schedules, student attendance, facility data, announcements, student grades, extracurricular activities, and users.

5. Implementation and Testing

5.1 Interface Implementation

The front page of the academic information system of Madrasah Ibtidaiyah Muzakkir Prabumulih can be seen by the general public who visit the website to view information on the school.



Fig. 2 : System Home Page

Login can only be performed by admins, teachers, and guardians who have been granted access to their respective user pages as determined by the developer. Each user has different access rights and page views depending on their role and responsibilities within the system. For more details, here's an image of the user page:

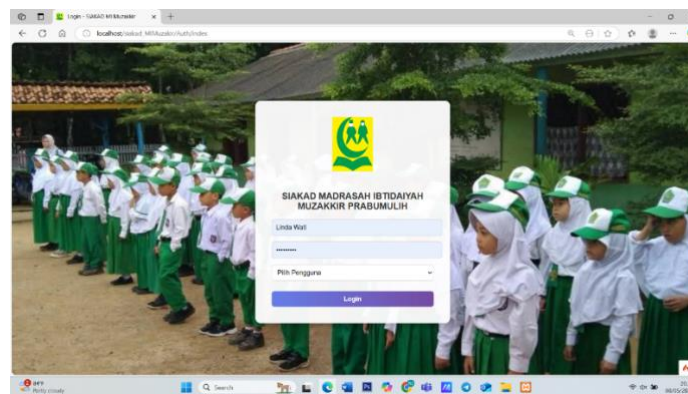


Fig. 3 : Login Page Display

This page displays school profile information, including the academic information system name, school name, full address, and logo. It also displays the main menus, which can be accessed directly without having to select them from the menu on the left side. The goal is to make it easier for users, especially administrators, to access important features such as teacher data, student data, alumni data, class schedules, and exam schedules.

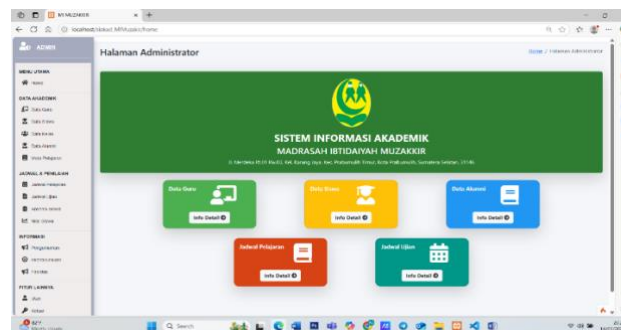


Fig. 4 : Admin Home Page

The teacher data page displays teacher data that can be added, printed, edited and deleted by the admin.

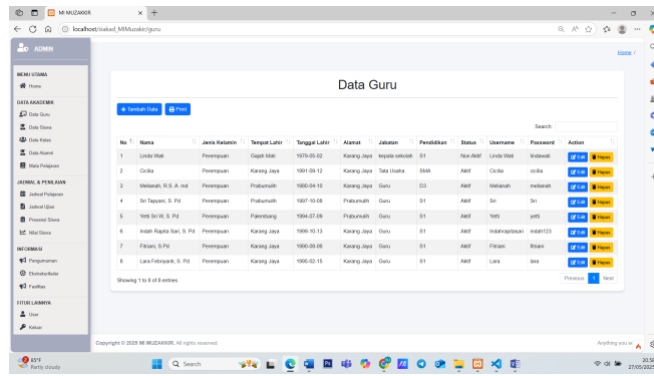


Fig. 5 : Teacher Admin Data Page

The student data page displays student data that can be added, printed, edited, and deleted by the admin.

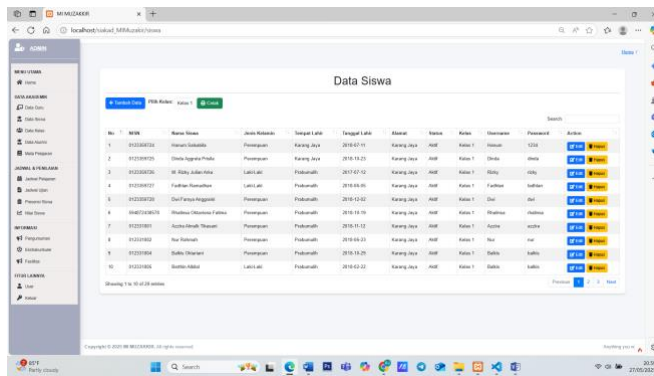


Fig. 6 : Halaman Data Siswa Admin

The class data page displays class data that can be added, printed, edited, and deleted by the admin.

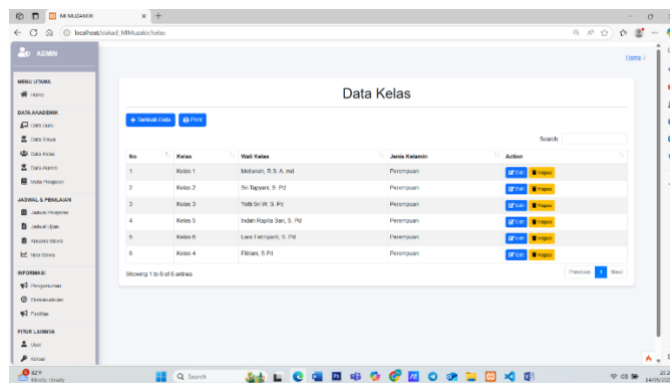


Fig. 7 : Admin Class Data Page

The alumni data page displays alumni data that can be added, printed, edited, and deleted by the admin.

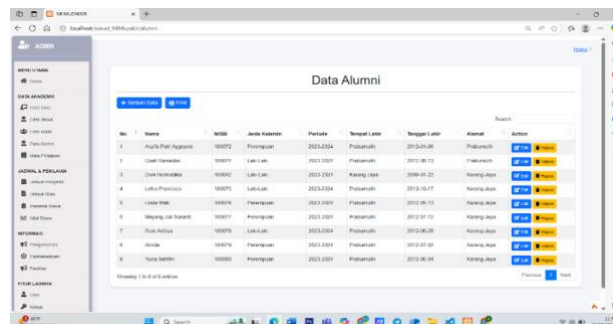


Fig. 8 : Alumni Admin Data Page

The subject data page displays subject data that can be added, printed, edited, and deleted by the admin.

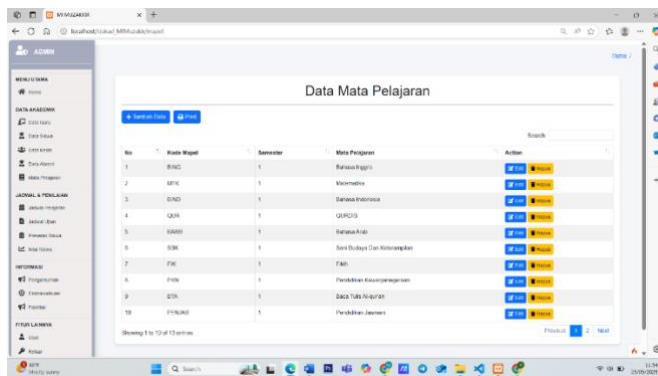


Fig. 9 : Admin Subject Page

The lesson schedule data page displays lesson schedule data that can be added, printed, edited, and deleted by the admin.

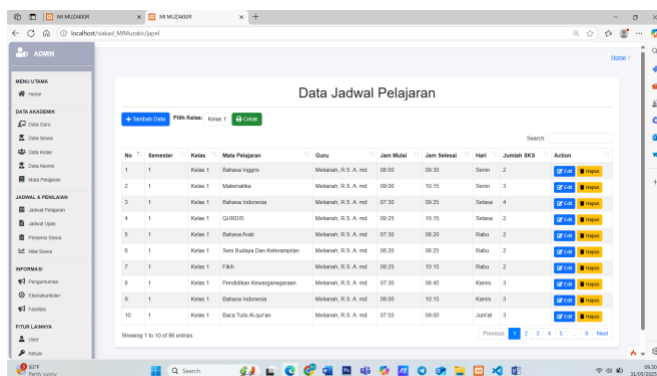


Fig. 10 : Admin Lesson Schedule Data Page

The exam schedule data page displays exam schedule data that can be added, printed, edited and deleted by the admin.

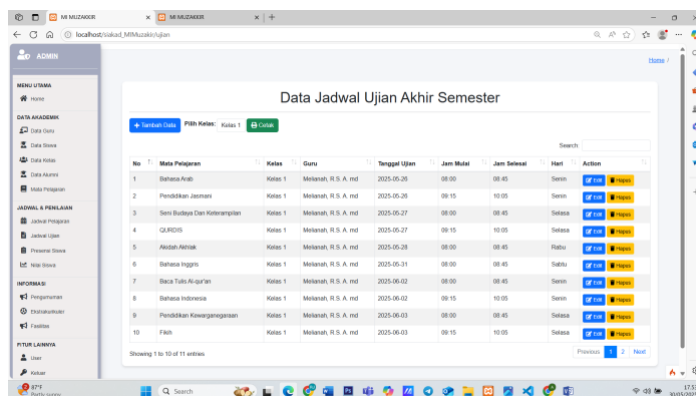


Fig. 11 : Admin Exam Schedule Page

The student attendance data page only displays student attendance data that can be seen by the admin.

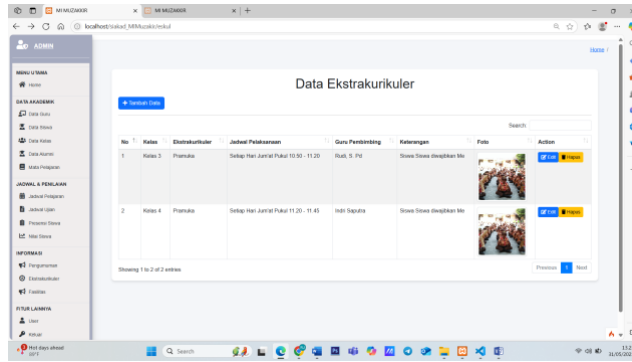


Fig. 15 : Admin Extracurricular Page

The facility data page displays facility data that can be added, edited, and deleted by the admin.

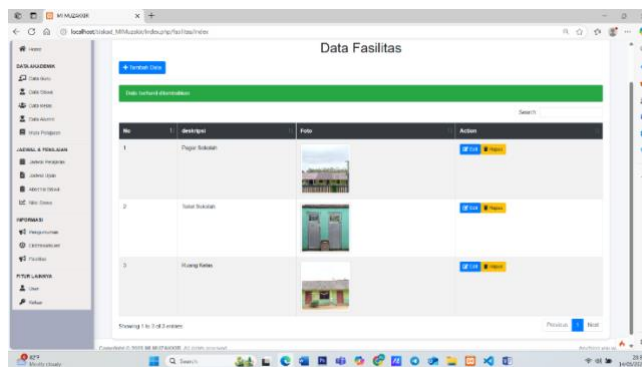


Fig. 16: Admin Facility Data Page

The user data page displays user data that can be added, edited, and deleted by the admin.

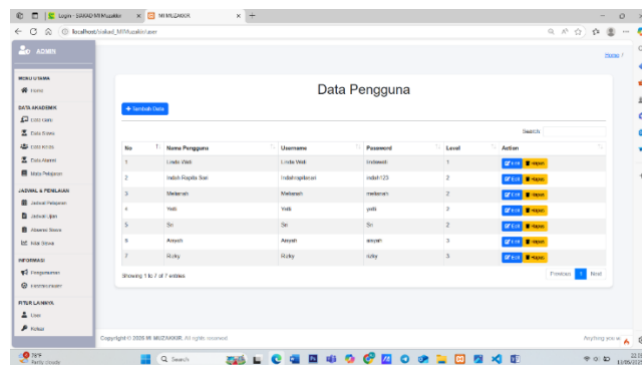


Fig. 17: Admin User Data Page

5.2 System Testing

System testing was conducted using the black-box testing method to determine whether the designed system's functionality was running as expected. The results of the system testing conducted by the author using the black-box testing method showed that the functionality ran well, as expected, for the purpose of creating this academic information system.

6. Conclusion

Several conclusions that can be drawn regarding the implementation of the Rapid Application Development method in the information system at the Muzakkir Prabumulih Elementary Madrasah school are as follows:

1. This study applied a descriptive method with a qualitative approach to gather essential data for designing the academic information system website at Madrasah Ibtidaiyah Muzakkir Prabumulih using the Rapid Application Development method.

2. The system simplifies school data management and allows teachers and parents to easily access academic information through the school's website.
3. The website also enables parents to monitor their children's academic activities anytime and anywhere with an internet connection, fostering better parental involvement.

References

- [1.] F. Soufitri, *Konsep Sistem Informasi*. Padang: PT. Inovasi Pratama Internasional, 2023.
- [2.] M. Ridwan et. al, *Sistem informasi manajemen*. Bandung: Widina Bhakti Persada Bandung, 2021.
- [3.] D. P. Sari, O. Mulyadi, dan A. E. Karlinda, *Implementasi Transaksi Penjualan menjadi Laporan Keuangan*. Padang: CV. Gita Lentera, 2023.
- [4.] R. Arundaa, S. A. Widiara, dan Y. B. Moku, "Sistem Informasi Akademik di SMK Muhammadiyah Kotamobagu," *J. Inf. Technol. Softw. Eng. Comput. Sci.*, vol. 1, no. 3, hal. 105–114, 2023.
- [5.] S. Wijayanto et al., *Buku Ajar Analisa perancangan sistem Informasi*. Jambi: PT. Sonpedia Publishing Indonesia, 2024.
- [6.] F. N. Hasanah dan R. S. Untari, *Buku Ajar Rekayasa Perangkat Lunak*. Sidoarjo: UMSIDA Press, 2020.
- [7.] G. Saputri, H. B. Setiawanto, H. P. Padli, dan I. Saputra, *MERANCANG WEB SISTEM INFORMASI AKADEMIK KAMPUS DENGAN HTML, CSS, DAN JAVASCRIPT*. Indramayu: Penerbit Adab, 2023.
- [8.] M. Solahudin, "Rancang Bangun Sistem Informasi Akademik Sekolah (SIAS) Berbasis Website," *DoubleClick J. Comput. Inf. Technol.*, vol. 4, no. 2, hal. 107, 2021.
- [9.] M. Z. Abdillah, *Dasar Pemrograman Web menggunakan PHP dan MySQL*. Ponorogo: Uwais Inspirasi Indonesia, 2024.
- [10.] T. Limbong dan Sriadhi, *Pemrograman Web Dasar*. Yayasan Kita Menulis, 2021.
- [11.] Risawandi, *Mudah Menguasai PHP & MySQL Dalam 24 Jam*. Lhokseumawe: Unimal Press., 2019.
- [12.] R. Namruddin et al., *Belajar Database Dengan Mudah Menggunakan MySql*. Makassar: CV. TOHAR MEDIA, 2023.
- [13.] R. A. Santoso dan I. Masitoh, "Analisis Kompetensi SDM Dan Independensi Audit Internal Terhadap Kualitas Laporan Audit," *J. Audit. Pajak, Akunt. Publik*, vol. 1, no. 1, hal. 46, 2022, doi: 10.32897/ajib.2022.1.1.1321.
- [14.] R. F. Wijaya, F. Kurniawan, R. R. Putra, dan A. Alvin, *Sistem Informasi Transparansi Pengelolaan Kegiatan Publik*. Serasi Media Teknologi, 2024.
- [15.] A. Zein et al., *Konsep Dasar Pengenalan Database Rumpun Ilmu Komputer*. Batam: Cendikia Mulia Mandiri, 2023.
- [16.] R. A. Putra et al., *Konsep Sistem Informasi*. PT. Sonpedia Publishing Indonesia, 2024.