

Development of a Web-Based Academic Information System and School Health Unit Using the Laravel Framework at State Senior High School 3, Salatiga

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ABSTRACT

The development of information technology has driven digital transformation in various aspects of education management, including academic administration and School Health Unit (UKS) services. SMA Negeri 3 Salatiga still faces obstacles in administrative management because some processes are carried out manually or using separate spreadsheet files, resulting in inefficient data retrieval, potential data inconsistencies, and delays in report preparation. This study aims to develop a web-based Academic Information System for SMA Negeri 3 Salatiga (SIA-SMANTISA) and a School Health Unit Information System using the Laravel framework to support more integrated school administration management. The research method used is the System Development Life Cycle (SDLC) with a Waterfall model that includes stages of literature study, data collection, needs analysis, system design, implementation, testing using User Acceptance Testing (UAT), and system evaluation. The system was developed using the Laravel framework with a MySQL database. The results of the study show that the system successfully integrates the management of students, teachers, classes, subjects, class schedules, alumni data, student permits, and transfer administration, and UKS administration into one web-based system. Based on the UAT testing results, all of the system's main functions operate according to user requirements, including authentication, data management, information retrieval, and report generation. The system implementation facilitates data management, accelerates information retrieval, reduces data redundancy, and supports more effective administrative reporting. Therefore, the developed system can be a solution to support the digitalization of academic administration and student health services at SMA Negeri 3 Salatiga.

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1. INTRODUCTION

The development of information technology has brought significant changes in various sectors of life, including the education sector [1]. Digital transformation encourages educational institutions to integrate technology in various activities, not only in the learning process but also in school administration and management [2]. The use of web-based information systems allows data processing to be carried out more quickly, accurately, and easily accessed by all stakeholders [3]. Digitalization of administration is also an important indicator in improving the quality of school governance because it is able to support the effectiveness of services and data-based decision-making [4].

The implementation of information systems in school environments is increasingly important as the complexity of academic data management increases. [5]. Schools must manage a variety of information, such as

student data, teaching staff, class schedules, grades, student transfers, and various administrative reports that continue to increase each school year. In addition, supporting services such as the School Health Unit (UKS) also require a good recording system to document student health histories, medication management, and ongoing health activity reporting. Therefore, the use of information technology is a strategic need for schools in improving the quality of administrative services.

In Indonesia, the government's digital transformation policy for education is increasingly encouraging educational institutions to develop information systems that can improve efficiency, transparency, and accountability in school management [6]. The use of web-based applications offers the advantage of easy access, data integration, and flexibility in future system development [7]. Thus, developing information systems tailored to school needs is an important step in realizing more modern and service-oriented educational governance.

Despite the rapid advancement of digitalization, the implementation of information systems in many schools still faces various challenges. Based on observations during the Field Experience Practice (PPL) at SMA Negeri 3 Salatiga, most academic administration processes are still carried out manually or using several separate spreadsheet files. This situation results in longer data retrieval times, increases the risk of data redundancy, and complicates the process of updating information when data changes occur.

Similar problems were also found in the management of the School Health Unit (UKS). Health service administration is still carried out conventionally through manual record-keeping, resulting in suboptimal documentation of student visit history, medication inventory management, and activity reporting. Consequently, UKS staff have difficulty locating historical data and quickly compiling reports when needed by the school.

Furthermore, the academic administration and school health services (UKS) at SMA Negeri 3 Salatiga are still managed separately without integration within a single information system. This situation results in data being scattered across various storage media, potentially leading to information inconsistencies, increasing administrative workloads, and hindering coordination between departments. These issues highlight the need for an integrated information system capable of accommodating both academic administration and school health services within a single web-based platform.

Several previous studies have shown that the implementation of web-based information systems can improve the effectiveness of educational administration management. Research conducted by Prasetyo et.al. (2024) developed an academic information system using the Laravel framework and demonstrated that administrative digitization can accelerate data management, improve information accuracy, and simplify the process of preparing academic reports [8]. Another study by Ristina et.al. (2026) also concluded that web-based academic information systems can improve the efficiency of school administration services through more structured and centralized data management [9].

On the other hand, research on the digitalization of School Health Units shows that health information systems can assist in the process of recording health services, managing drug stocks, and preparing reports more effectively [10]. However, most previous research has focused only on developing academic information systems or UKS information systems separately. There is still limited research that integrates these two services into a single web-based platform tailored to the operational needs of schools so that all administrative processes can be managed in an integrated manner.

Based on these conditions, this study aims to develop a web-based Academic Information System for SMA Negeri 3 Salatiga (SIA-SMANTISA) and School Health Unit Information System using the Laravel framework with the Waterfall System Development Life Cycle (SDLC) development method. The developed system is expected to be able to integrate academic data management and UKS administration so that the process of recording, data retrieval, information management, and report preparation can be carried out more effectively, efficiently, and structured.

This research is significant because it offers a solution that not only digitizes school administrative processes but also integrates two key services—academic administration and the School Health Unit—into a single web-based information system. This integration is expected to improve the quality of administrative services, minimize the risk of data management errors, accelerate decision-making, and serve as a model for information system development that can be adapted by other schools with similar needs.

2. METHOD

This research is a Research and Development (R&D) study that focuses on software development in the form of a web-based Academic Information System and School Health Unit Information System (UKS) [11]. The approach used is the System Development Life Cycle (SDLC) with the Waterfall model, because this model has systematic, structured stages and is suitable for developing systems whose user needs have been clearly identified from the initial stages of the research. [12]. The Waterfall model allows each stage of development to be carried out sequentially, starting from needs analysis to implementation and evaluation, resulting in a system that is more planned and well-documented [13].

The research was conducted during the Field Experience Practice (PPL) at SMA Negeri 3 Salatiga. The research object included the school's academic administration and the School Health Unit (UKS) administration, which were previously performed manually or using several separate spreadsheet documents. The development focused on providing a system capable of integrating academic data management and UKS services into a single web-based platform, thereby improving the effectiveness, efficiency, and accuracy of information management.

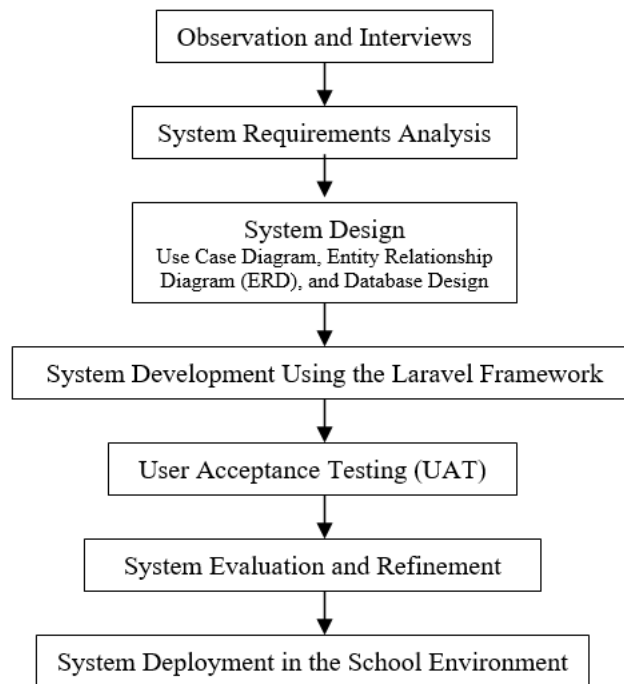


Figure 1. Framework Diagram

The research was conducted at SMA Negeri 3 Salatiga during the Field Experience Practice (PPL) activity. The research object included all academic administration processes and School Health Unit (UKS) administration, which are currently still carried out manually or using several spreadsheet files stored separately. This condition causes the data management process to be less effective, increases the risk of data redundancy, and complicates the process of searching for information and preparing administrative reports. Therefore, this research focuses on developing an information system capable of integrating academic administration management and UKS services in a single web-based application so that the data processing process can be carried out more effectively, efficiently, accurately, and structured.

Data collection was conducted through three techniques, namely observation, interviews, and documentation. Observations were conducted by directly observing the academic administration process and UKS services to obtain an overview of the current system workflow, identify problems encountered, and determine user needs for the system to be developed [14]. Semi-structured interviews were conducted with the Head of Administration, administrative staff, school operators, homeroom teachers, UKS officers, and parties involved in managing school administration to obtain more in-depth information regarding the functional and non-functional needs of the system [15]. In addition, documentation was conducted by collecting various documents related to school administration, such as student data, teacher data, class schedules, alumni data, student transfers, permission letters, UKS visit data, and other supporting documents used as a basis in the system requirements analysis process [16]. To strengthen the theoretical basis, this research is also supported by literature studies sourced from books, scientific articles, proceedings, official Laravel documentation, and various relevant previous studies.

The system development stages are carried out in accordance with the Waterfall SDLC model flow, which consists of seven stages [17], [18]. The first stage is a literature study aimed at obtaining a conceptual basis for information systems, academic information systems, School Health Units, the Laravel framework, MySQL databases, and software development methods. The second stage is data collection through observation, interviews, and documentation to identify user needs and problems in the current system. The third stage is a system requirements analysis, which includes identifying functional and non-functional requirements. At this stage, various features that must be available in the system are determined, such as managing students, teachers, classes, subjects, class schedules, alumni data, student permits, student transfers, managing UKS medication data, recording UKS visits, data searches, and generating reports. In addition, an analysis is also carried out on aspects of system security, ease of use (*usability*), access speed, data integrity, and system compatibility on various devices.

The next stage is system design, which includes the preparation of application architecture, database design using *Entity Relationship Diagram* (ERD), preparation of *Use Case Diagram*, *Activity Diagram*, and user interface design that is tailored to the needs of each system user. The design results are then implemented into program code using the PHP programming language with the Laravel framework that applies the *Model-View-Controller* (MVC) concept, while data storage uses the MySQL database management system. The Laravel framework was chosen

because it provides an organized development structure, supports application security, and simplifies the process of system development and maintenance in the future.

After the implementation process was completed, system testing was conducted using the User Acceptance Testing (UAT) method. Testing was conducted by involving end users consisting of administrative staff, school operators, homeroom teachers, student affairs staff, and school health unit (UKS) officers. Testing focused on all main system functions, including user authentication, academic data management, student permit and transfer management, UKS administration management, data retrieval, and report generation. Each test scenario was compared with predetermined system requirements to ensure that all functions ran according to specifications and were able to meet the school's operational needs.

The final stage is a system evaluation conducted based on the results of UAT testing and input from users during the implementation process. The evaluation aims to assess the level of suitability of the system to user needs, identify obstacles that still arise during system use, and formulate recommendations for development in the next stage. Data obtained during the study were analyzed descriptively and qualitatively through the process of data reduction, data presentation, and drawing conclusions [19]. The results of this analysis were used to evaluate the effectiveness of the information system developed in improving the quality of academic administration management and School Health Unit services at SMA Negeri 3 Salatiga.

3. RESULTS AND DISCUSSION

3.1 Analysis of Administrative Problems Before System Implementation

Observations during the Field Experience Practice (PPL) showed that the administrative process at SMA Negeri 3 Salatiga is still dominated by manual recording and the use of several separate spreadsheet files. This condition causes academic data to be scattered across various storage media, making the information retrieval process relatively time-consuming. Furthermore, the use of multiple documents also increases the possibility of data inconsistencies due to differences in updates between files. Similar problems were also found in the administration of the School Health Unit (UKS), where recording student visits, medication stock, and health reports is still done manually, complicating the monitoring and reporting processes.

These problems indicate that the previous administration system did not meet the characteristics of an integrated information system. According to Zebua et.al. (2025), an information system should be able to integrate humans, software, hardware, and databases into a single unit that produces information quickly and accurately [20]. Therefore, administrative digitization is an urgent need to make the data management process more effective.

Beyond efficiency, digitalization also impacts the quality of decision-making. Centrally stored data allows schools to access real-time information, allowing administrative decisions to be based on more valid data than manual record-keeping.

3.2 Implementation of Laravel-Based Academic Information System

The development of the Academic Information System (SIA-SMANTISA) resulted in a web-based system that integrates all academic data into a single MySQL database using the Laravel framework. The system's implementation includes managing students, teachers, classes, subjects, class schedules, and alumni data. With the availability of Create, Read, Update, and Delete (CRUD) functions, all administrative activities can be performed through a single application, reducing reliance on physical documents and spreadsheets, which were previously used separately.



Figure 2. SIA-SMANTISA Main Dashboard

Choosing Laravel as a development framework offers several advantages. The Model-View-Controller (MVC) architecture separates application logic, views, and data management, resulting in a more organized code structure. Furthermore, its routing, migration, authentication, and Eloquent ORM features accelerate the development process while enhancing system security. The centralized database implementation also reduces data redundancy because every user change is immediately saved to the server, ensuring that the information displayed to all users is always up-to-date. This minimizes the risk of previously common data inconsistencies.

These results support the research of Zulfa et.al. (2025), which states that a web-based academic information system is able to increase the effectiveness of school administration management through data integration and automation of administrative processes [21] .

3.3 Effectiveness of Digitalization of Student Permit and Transfer Administration

One innovation in this research is the addition of a module for student permit and transfer administration, which previously had not been digitally documented. Prior to the system's implementation, permit records were recorded using an administration book, while transfer data was stored in a separate document. This situation resulted in a lengthy archive search process, especially when schools required administrative reports for specific periods.

Through the developed system, all permit and transfer data is stored in a database, allowing it to be searched using a search feature based on student name, class, or date. This digitization improves administrative staff efficiency by automating report preparation, eliminating the need for manual searches through archived documents.

In addition to increasing efficiency, the system also improves the quality of school administrative documentation. All permit and transfer history is permanently stored, facilitating audits and data retrieval if needed in the future.

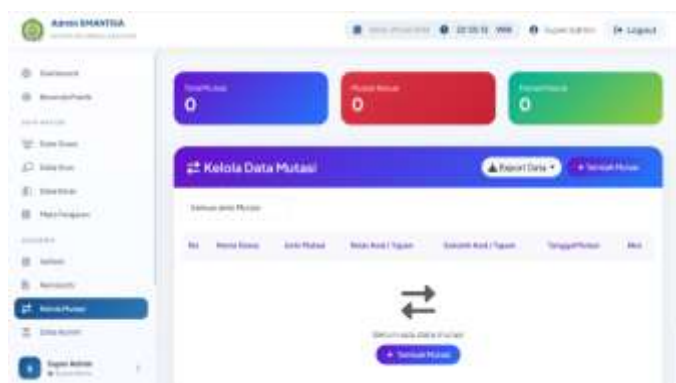


Figure 3. Mutation Management Interface

3.4 Implementation of the School Health Unit (UKS) Information System

The development of the UKS Information System is one of the strengths of this research compared to previous studies, which generally focused solely on academic administration. The UKS system is able to integrate student visit recording, medication stock management, on-duty attendance, and health report preparation into a single web-based platform.

This integration has had a positive impact on school health services. School health workers no longer need to perform repetitive recording because all data is automatically stored in the database. In addition to expediting student service, the system also allows for the storage of health records, which can be used as a basis for monitoring student health.

The existence of this historical data adds value to schools by enabling the identification of students with a history of certain medical conditions, allowing for more precise health care delivery. This research finding supports Sutoyo's research, which states that digitizing school health services (UKS) administration can improve the effectiveness of school health services through more systematic record-keeping.

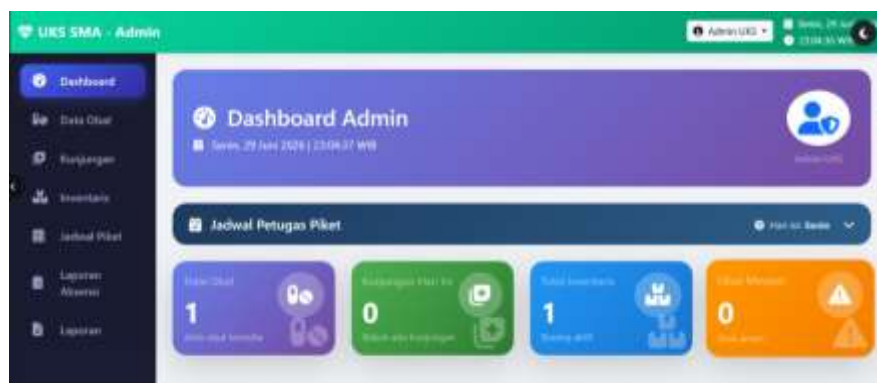


Figure 4. School Health Unit Information System Interface

3.5 Analysis of User Acceptance Testing (UAT) and User Interface Results

System testing using the User Acceptance Testing (UAT) method demonstrated success for all test scenarios, including user authentication, academic data management, permit management, student transfers, school health unit

administration, data retrieval, and report generation. These results indicate that all functional requirements identified during the analysis phase were successfully implemented into the system.

The success of all test scenarios demonstrates the appropriateness of the Waterfall SDLC method for this research, as user requirements were clearly defined from the outset. Each stage, from requirements analysis, design, implementation, and testing, was systematically executed, minimizing changes to requirements throughout the development process.

Although UAT testing demonstrated positive results, this study did not quantitatively measure user satisfaction using instruments such as the System Usability Scale (SUS) or the Technology Acceptance Model (TAM). Therefore, further research could measure user acceptance more objectively.

Table 1. UAT Interface Testing

No	Testing Scenario	Expected results	Test Results	Status
1	User login	Users can log in to the system according to access rights.	The system successfully authenticated the user.	Succeed
2	Manage student data	Admin can add, change, delete, and view student data	All functions run well	Succeed
3	Manage teacher data	Admin can manage teacher data	All functions are running as required	Succeed
4	Manage class data	Admin can manage class data	Function works well	Succeed
5	Manage class schedule	Admin can manage lesson schedules	Data successfully saved and displayed	Succeed
6	Manage student permissions	Permission data can be added and managed	The system successfully processed the permit data.	Succeed
7	Manage student transfers	Mutation data can be managed	The system is running as required	Succeed
8	Manage UKS data	UKS officers can manage visit and medication data	All functions run well	Succeed
9	Data search	Users can search for data quickly	The system displays data according to keywords	Succeed
10	Report creation	The system can display and print reports	Report successfully created	Succeed

The system interface is designed using usability principles so users can operate the application without requiring complex training. The main dashboard presents a structured administration menu based on each user's access rights. Furthermore, simple navigation makes it easy for users to access all system features.

According to Alya, ease of use is one of the main factors in the success of information system implementation. [22] . Therefore, the interface design in this study considers aspects of learnability, efficiency, memorability, error prevention, and user satisfaction. The application of responsive design also allows the system to be accessed via computers or mobile devices, thereby increasing the flexibility of use in daily administrative activities.

3.6 Research Contribution and Comparison with Previous Research

This study offers a unique contribution compared to previous research by integrating two systems that have been developed separately: the Academic Information System and the School Health Unit Information System. Most previous studies have only addressed the management of academic administration or the School Health Unit administration independently, while this study develops both services within the same system.

This integration provides several advantages, namely:

- All school administration data is stored in one centralized database.
- The data search process is faster than manual methods.
- Preparation of administrative reports can be done automatically.
- The risk of document loss and data inconsistency can be minimized.
- The work efficiency of school administrative staff is increased through automation of the recording process.

Thus, this research not only produces software but also provides a model for implementing the digitalization of school administration that can be replicated in other educational institutions with similar characteristics.

3.7 System Evaluation and Research Limitations

After the system was implemented and tested using the *User Acceptance Testing* (UAT) method, an evaluation was conducted on the suitability of the system to the user needs in the SMA Negeri 3 Salatiga environment. Based on the implementation results, the Academic Information System (SIA-SMANTISA) and the School Health Unit Information System (UKS) have been able to meet the main needs of school administration, which were previously still done manually or using several separate spreadsheet files. The integration of all data into a single database makes it easier for users to manage student, teacher, class, class schedule, alumni data, student permit and transfer administration, and UKS administrative services. This condition indicates that the developed system has met the functional needs that have been identified in the needs analysis stage.

The evaluation results also showed that implementing the Laravel framework simplifies the system development and management process. *The Model-View-Controller* (MVC) architecture resulted in a more organized application structure, simplifying maintenance and future feature development. Furthermore, the use of a MySQL database as a centralized storage medium helped reduce data duplication and improve the consistency of information accessed by each user.

However, this study still has several limitations. First, the system evaluation focused on functional testing using the *User Acceptance Testing* (UAT) method, so quantitative user satisfaction measurements using instruments such as the *System Usability Scale* (SUS) or the *Technology Acceptance Model* (TAM) were not conducted. Therefore, this study cannot yet provide numerical values for user ease of use or system acceptance.

Second, the system's implementation is still limited to internal school administration and has not been integrated with external systems, such as Dapodik, WhatsApp Gateway-based notification services, email notifications, or other school information systems. As a result, some processes for delivering information to teachers, students, and parents still have to be done manually outside the system.

Third, this study has not yet tested system performance, data security, or load testing. The testing conducted focuses on ensuring the system's functionality meets user needs. Therefore, further research is needed to test the system's ability to handle a larger number of users, improve data security, and develop data backup and recovery mechanisms to ensure the continuity of system services.

Overall, the evaluation results indicate that the developed system has successfully met the research objectives, namely, providing a web-based information system capable of supporting the management of academic administration and the School Health Unit in a more structured manner than previous methods. Although some limitations remain, this system has provided a strong foundation for the development of more integrated school administration services and can serve as a reference for the development of information systems in other educational institutions with similar characteristics.

4. CONCLUSION

This research successfully developed a web-based Academic Information System for SMA Negeri 3 Salatiga (SIA-SMANTISA) and School Health Unit Information System (UKS) using the Laravel framework with the Waterfall System Development Life Cycle (SDLC) development method. The developed system is able to integrate academic data management and UKS administration into a centralized database that includes student, teacher, class, subject, lesson schedule, alumni data, student permit and transfer administration, and UKS services. This integration supports a more structured information management process compared to the previous process, which was still done manually or using separate spreadsheets.

The results of the User Acceptance Testing (UAT) test showed that all of the system's main functions were operating according to user requirements, including user authentication, academic data management, student permit and transfer administration, school health services, data retrieval, and report generation. The system implementation facilitates more systematic data management for schools, accelerates information retrieval, and supports more effective administrative reporting.

However, this study still has limitations because the system evaluation focused on functional testing using User Acceptance Testing (UAT) and did not include measuring user satisfaction levels, performance testing, or system security testing. Therefore, further research is recommended to develop the system through integration with external services, such as Dapodik, WhatsApp Gateway, and email notifications, as well as conducting usability, performance, and security testing to improve the quality and reliability of the system in supporting the digital transformation of school administration.

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