

## **The Design and Implementation of a Web-Based School Asset Management System at SDN Pekayon 16 Pagi Jakarta**

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### **ABSTRACT**

This study focuses on the design and implementation of a school asset management information system at Pekayon 16 Pagi State Elementary School, Jakarta. The school previously relied on manual processes using physical records for managing assets, including loaning, returning, and generating asset reports. This method proved to be inefficient in terms of time, cost, and storage space. The proposed solution is a web-based asset management information system that automates asset data management, reduces human errors, and prevents asset loss. The system was developed using the Prototype Model methodology with UML-based system modeling, CodeIgniter as the framework, and MySQL as the database. Key components include use case diagrams, activity diagrams, and class diagrams to represent the system's functionality. The result is an internet-connected information system that simplifies asset management, allowing employees to handle asset loans and returns more efficiently and accurately. This system ensures faster asset tracking, streamlined reporting, and reduced physical storage requirements, significantly improving operational efficiency at the school.

**Keywords:** Asset Management; Prototype Model; Information System

### **INTRODUCTION**

Effective asset management plays a vital role in ensuring that educational institutions operate smoothly. School assets, such as teaching materials, technology devices, and other resources, must be properly monitored and maintained to support learning activities. At Pekayon 16 Pagi State Elementary School in Jakarta, the current asset management system relies heavily on manual processes, particularly for recording asset loans, returns, and inventory updates. This manual method is not only time-consuming but also prone to human error, making it difficult for the school to generate accurate reports and maintain data consistency.

One of the primary challenges with manual asset management is the inefficiency in data retrieval. Searching for past asset records often requires sifting through stacks of physical books, resulting in operational delays. Additionally, physical records are vulnerable to damage or loss, which can lead to incomplete data and potential

mismanagement of school resources. Manual systems also limit the ability to monitor real-time asset usage, making it difficult to prevent asset misuse or loss. With the rapid advancement of information technology, many schools have transitioned to digital systems for asset management. Web-based information systems offer significant advantages, such as improved data accuracy, faster access to information, and reduced administrative workload. By digitizing asset management processes, schools can monitor assets in real time, minimize errors, and streamline the creation of asset reports. This technology-driven approach helps schools optimize resource utilization and make data-driven decisions.

The development of a web-based asset management system for Pekayon 16 Pagi State Elementary School is a strategic step to address these challenges. The system aims to replace the manual recording process with an automated platform that can manage asset loans, returns, and inventory updates more effectively. It will enable staff to track asset availability, reduce operational delays, and enhance overall efficiency.

This study uses the Prototype Model methodology for system development. The Prototype Model emphasizes iterative development, where a working prototype is continuously refined based on user feedback until it meets user requirements. The system design process involves several stages, including gathering user requirements, building a prototype, evaluating the prototype with users, coding the system, and testing it for functionality and performance. This approach ensures that the final system is user-friendly and aligned with the specific needs of Pekayon 16 Pagi State Elementary School.

Unified Modeling Language (UML) tools, such as use case diagrams, activity diagrams, and class diagrams, are used to model the system's functionality and structure. These diagrams help visualize how users interact with the system, the steps involved in asset management processes, and the relationships between different system components. The system is built using the CodeIgniter framework, which simplifies the development of web-based applications, while MySQL serves as the database for storing asset-related data.

The expected outcome of this study is a web-based asset management system that improves data accuracy and provides real-time access to asset information. The system will allow staff to manage asset loans and returns more efficiently, reducing errors and improving the speed of report generation. By adopting this system, Pekayon 16 Pagi State Elementary School will enhance its operational efficiency and ensure that school resources are properly managed and utilized. Ultimately, this study contributes to the broader field of school resource management by demonstrating how technology can address common challenges in asset management. It highlights the importance of integrating digital solutions into school operations to improve efficiency and support data-driven decision-making. The findings of this study may also serve as a reference for other schools seeking to transition from manual to digital asset management systems.

## LITERATURE REVIEW

An information system is a combination of information technology and activities designed to support an organization's operations and decision-making processes. A management information system (MIS) plays a critical role in providing accurate, timely, and relevant data to help organizations manage their operations more effectively. According to Pratama (2020), a management information system comprises three key elements: system, information, and management. These elements work together to ensure smooth data processing and provide actionable insights for decision-making.

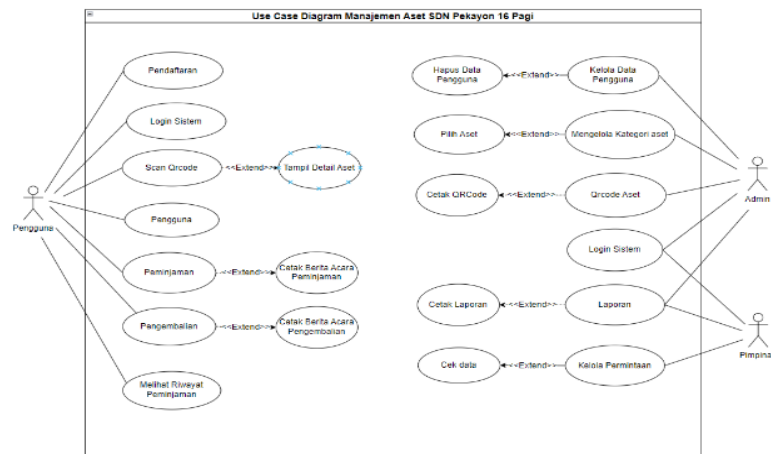


Figure 1: Overview of Information System Components)

In asset management, information systems help streamline processes such as inventory control, data retrieval, and asset reporting. Traditional asset management systems that rely on manual methods are often inefficient and prone to errors, as noted by Nafiudin (2019). Modern systems leverage web-based technologies to provide real-time access to data, improving efficiency and reducing operational costs. The system must possess key characteristics such as input, output, system boundaries, components, and interfaces to function optimally.

The Prototype Model is widely used for developing information systems because of its iterative and user-centric approach. This model focuses on continuous refinement of a system prototype based on user feedback, ensuring that the final

system meets user requirements. According to Mei Prabowo (2020), the Prototype Model involves several stages: needs gathering, prototype development, prototype evaluation, system coding, system testing, and system deployment. Each stage is crucial to producing a functional and user-friendly information system.

Unified Modeling Language (UML) is a standard tool used to model and visualize system design. UML diagrams such as use case diagrams, activity diagrams, and class diagrams help describe the system's functionality, the relationship between its components, and user interactions. Use case diagrams illustrate how users interact with the system, while activity diagrams provide a step-by-step overview of processes such as logging in and borrowing assets. Class diagrams detail the relationships between various components of the system and their attributes. In developing a web-based asset management system, several technologies are required. CodeIgniter is a PHP-based framework that simplifies web application development. It is known for its speed, ease of use, and ability to build scalable systems. MySQL serves as the database management system for storing asset-related data, ensuring reliable data storage and retrieval. According to Hoiriyah and Andriyanto (2018), the integration of web-based applications and database systems significantly improves data management processes, making them more efficient and accessible.

Asset management information systems have been implemented in various educational institutions with positive outcomes. Studies by Afriansyah (2022) and Hoiriyah and Andriyanto (2018) show that schools that adopt digital asset management systems experience fewer errors, faster report generation, and better resource management. These findings underscore the importance of transitioning from manual to digital systems for schools seeking to enhance operational efficiency and reduce administrative workload. The system proposed in this study aims to adopt best practices from existing literature to create an optimized asset management solution for Pekayon 16 Pagi State Elementary School. This web-based system will utilize a combination of the Prototype Model, UML-based design tools, CodeIgniter framework, and MySQL database to ensure a user-friendly, efficient, and scalable asset management platform.

## **METHOD**

### **Design and Sample**

This study adopts a quantitative approach with the Prototype Model as the primary design for developing the asset management information system. The Prototype Model focuses on iterative development, allowing continuous refinement based on user feedback to meet user requirements effectively. The sample for this research includes key stakeholders at Pekayon 16 Pagi State Elementary School, such as system administrators, school leaders, and staff directly involved in managing school assets. These participants were selected because of their significant role in

borrowing, returning, and monitoring school assets, making them essential for evaluating and improving the system.

### **Instrument and Procedures**

Several instruments were utilized to support the research process. System design instruments, such as Unified Modeling Language (UML) tools—including use case diagrams, activity diagrams, and class diagrams—were employed to model the structure and processes of the proposed system. The development process followed the Prototype Model stages, with CodeIgniter as the framework for web-based application development and MySQL as the database for managing asset data. Data related to user needs and existing asset management practices were gathered through surveys and direct observation. Usability tests were conducted to assess system performance, focusing on accuracy, speed, and user satisfaction in managing school assets. The research procedure began with a needs analysis to identify user requirements through observation and surveys. Based on these findings, system modeling was conducted using UML tools to visualize system processes and interactions. A prototype was then developed and refined iteratively, incorporating user feedback at each stage to ensure it met functional requirements. System testing followed, where usability tests were conducted to evaluate the prototype's performance and user experience. Finally, the system was implemented and deployed for use at Pekayon 16 Pagi State Elementary School.

### **Data Analysis**

Data analysis was conducted in two stages. First, the system development analysis focused on evaluating the prototype at each stage to ensure its functionality, usability, and performance. Any shortcomings identified were addressed in subsequent iterations. Second, quantitative data from surveys and system tests were analyzed using descriptive statistics to identify patterns in user satisfaction, system performance, and the accuracy of asset management. The results from the usability tests were used to measure the system's overall effectiveness and guide further improvements. The final analysis confirmed that the developed system significantly improved asset management efficiency at Pekayon 16 Pagi State Elementary School. The findings provide valuable insights into how digital solutions can address common challenges in asset management and serve as a reference for future system development in educational institutions.

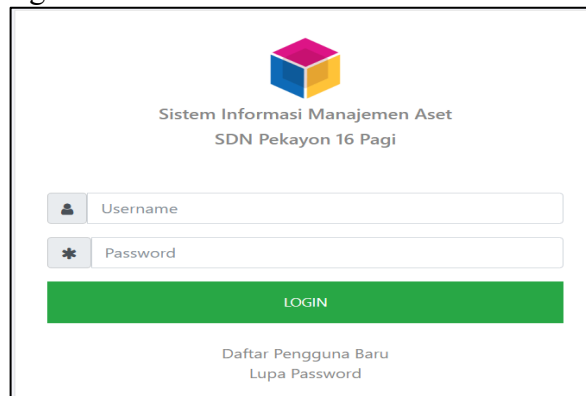
## **RESULT AND DISCUSSION**

The development of a web-based asset management information system for Pekayon 16 Pagi State Elementary School was successfully carried out using the Prototype Model. This system replaces the previous manual asset management process, improving data accuracy, operational efficiency, and the speed of reporting. Through iterative development and continuous user feedback, the system

was tailored to meet the specific needs of the school, ensuring usability and reliability.

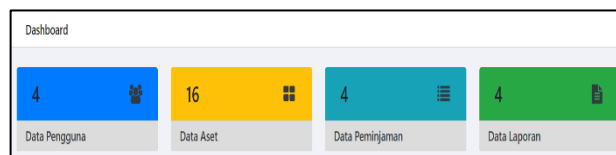
### System Features and Implementation

The system offers several key features, including user authentication, asset loan management, return tracking, and automated report generation. It was developed using CodeIgniter as the framework and MySQL as the database for secure and efficient data management.



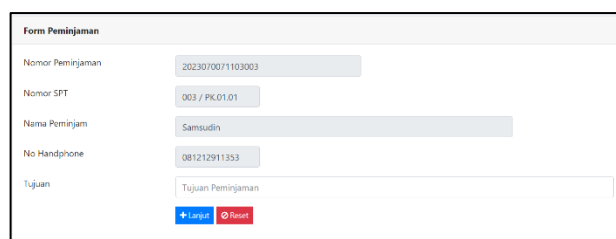
*Figure 2. Login Page*

The login page serves as the entry point for users, ensuring secure access to the system. Authorized users can manage asset data, monitor asset loans, and generate reports directly from the system. This authentication feature prevents unauthorized access and maintains data integrity.



*Figure 3. Dashboard Page*

The dashboard provides an overview of key system functions, allowing users to quickly access asset loan status, recent transactions, and reports. This page enhances user experience by organizing information in a clear and concise manner, enabling users to manage assets efficiently.



*Figure 4. Asset Loan Form*

Users can request asset loans through a digital form on the system. Once submitted, the request is reviewed and approved by administrators. This process replaces the traditional paper-based system, reducing administrative workload and eliminating manual errors.

*Figure 5. Asset Return Form*

The asset returns form streamlines the return process, allowing users to document the condition and status of returned items accurately. This feature ensures real-time updates to the asset database, improving asset tracking and accountability.

### System Usability and User Satisfaction

System testing revealed that users were highly satisfied with the system's intuitive interface and functionality. The automated reporting feature was particularly appreciated for its ability to generate error-free reports quickly, reducing the time spent on administrative tasks. The report page enables users to generate customized asset reports in real time. This feature supports better decision-making and provides valuable insights into asset usage and availability, allowing the school to plan and allocate resources more effectively.

### Challenges and Solutions

While the system's implementation was largely successful, several challenges arose during the process. One of the main challenges was ensuring user adaptation to the new system. Training sessions and user manuals were provided to help staff familiarize themselves with the platform. Another challenge was integrating the system without disrupting ongoing school operations. The Prototype Model helped mitigate this by allowing for gradual system adoption and continuous improvements based on user feedback.

### Discussion

The results of this study align with previous research on the advantages of web-based information systems in enhancing asset management efficiency in educational institutions. Afriansyah (2022) and Hoiriyah and Andriyanto (2018) highlight that digital systems significantly improve data accuracy, streamline administrative processes, and reduce human errors commonly associated with manual asset management. The implementation of the web-based asset management system at Pekayon 16 Pagi State Elementary School supports these findings, demonstrating how a tailored digital solution can address operational challenges and improve asset tracking, reporting, and overall resource management. One of the key success factors of this system is its user-centered design and iterative development approach through the Prototype Model. This method allowed continuous feedback and refinement, ensuring that the system met user needs and was aligned with the school's operational requirements. The intuitive interface and automated processes were particularly impactful, enabling staff to reduce administrative workload and focus on strategic asset planning and decision-making. Additionally, the real-time data access provided by the system improved transparency and accountability in asset management. Administrators can now monitor asset usage and generate accurate, comprehensive reports quickly, facilitating better decision-making. This capability minimizes asset loss and optimizes resource utilization, making the system a valuable tool for school management.

Looking ahead, the system can be further enhanced to meet future needs and provide a more holistic solution. Potential improvements include integrating maintenance scheduling to track asset conditions and prevent equipment deterioration. Notification systems for overdue assets could help reduce delays in returns and improve asset availability. Moreover, integrating the asset management system with the school's financial management platform would offer a more comprehensive approach, linking asset data with budget planning and procurement processes.

The success of this project demonstrates the critical role of technology in transforming traditional asset management processes. It highlights the importance of adopting scalable, user-driven systems to address operational challenges and build more efficient, data-driven educational environments. This study also serves as a reference for other schools aiming to modernize their asset management practices and improve overall administrative efficiency.

## CONCLUSION

The development and implementation of a web-based asset management information system at Pekayon 16 Pagi State Elementary School successfully addressed the inefficiencies of the previous manual process. The system significantly improved data accuracy, operational efficiency, and the speed of reporting. Through the use of the Prototype Model and user-centered design, the



system was continuously refined based on feedback, ensuring that it met the specific needs of the school. The integration of features such as asset loan management, real-time monitoring, and automated reporting streamlined asset tracking and reduced administrative workload. System testing and user feedback indicated high levels of user satisfaction, particularly regarding the system's ease of use and accuracy in generating reports. The implementation of this digital solution not only enhanced asset management but also improved decision-making by providing real-time data access and accurate information. Furthermore, the automated features reduced errors and ensured greater accountability in asset management practices. Despite its success, the project identified areas for future improvement. Enhancements such as maintenance scheduling, notification systems for overdue assets, and integration with financial management systems could further expand the system's functionality. These additions would offer a more comprehensive resource management solution, optimizing the school's operations and supporting long-term sustainability. In conclusion, the web-based asset management information system serves as an effective tool for improving operational efficiency and resource utilization at Pekayon 16 Pagi State Elementary School. This study reinforces the importance of adopting digital solutions to overcome the limitations of manual processes and provides a reference for other educational institutions seeking to modernize their asset management practices.

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