

Web-Based Tuition Payment Information System Design Using Codeigniter at SMA Negeri 2 Bungku

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Abstract

The advancement of digital technology has transformed administrative processes in the education sector, driving the need for modern and efficient solutions. At SMA Negeri 2 Bungku, tuition payment (SPP) management was previously conducted manually, posing risks such as data inaccuracy, loss, and delays in reporting. This study introduces an innovative web-based tuition payment information system developed using the CodeIgniter framework and the Waterfall development model, encompassing stages of requirements analysis, system design, implementation, and testing. The proposed system offers a significant shift from manual to automated financial administration, enabling real-time data recording, transparent transaction histories, and automated report generation. A key innovation lies in the integration of features such as digital receipts, printable transaction summaries, and centralized student data management, all accessible through a user-friendly web interface. Evaluation results show a marked improvement in administrative efficiency, user satisfaction, and data accuracy. This system not only streamlines school financial operations but also sets a practical example for other educational institutions seeking to digitize their administrative services. The research contributes to the development of scalable and adaptable digital solutions in the education sector, enhancing transparency, accountability, and service quality.

Keywords: Web-Based Information System; Tuition Payment; CodeIgniter; Educational Administration; Digital Innovation.

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Introduction

Technological development in today's era continues to evolve rapidly, influencing almost every aspect of human life (Gusman, 2024; Nosratabadi et al., 2023). These advancements not only bring convenience but also reshape patterns of social and economic interaction within society (Saputra et al., 2023; Nagy & Somosi, 2022). As a result, society has increasingly become technology-dependent, with digital tools becoming essential in day-to-day activities (N.M.A.W Putri, 2021; Aly et al., 2022). The integration of technology, both in hardware and software forms, has been applied across various sectors, including communication, transportation, public services, and economics (Susetyo et al., 2024; Yoo & Yi, 2022). Most human needs today can be fulfilled through efficient, fast, and interconnected digital systems (Yuswadi & Soekarno, 2024).

In the field of education, digital transformation, particularly in information systems, has significantly changed the way schools operate (Latifah et al., 2022). Information systems have become vital in supporting administrative processes and educational services, offering greater accessibility, efficiency, and transparency (Aini et al., 2024; Alyoussef, 2023). The application of technology in schools includes web-based academic portals, digital attendance tracking, online report cards, and tuition payment systems (Nashrullah et al., 2025; Han & Trimi, 2022). These innovations help meet the evolving needs of students, teachers, parents, and administrative staff in a digital society (Idroes et al., 2023; Saif, 2023).

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However, at SMAN 2 Bungku, administrative activities such as data storage and tuition (SPP) payment records are still handled manually using paper documents (Prayatna et al., 2023). This conventional approach is space-consuming, inefficient, and prone to data loss or damage. Retrieving specific information becomes time-consuming and error-prone (Arifin et al., 2023). In terms of SPP payments, several recurring issues have been identified, such as scattered recording books, missing receipts, and inconsistencies in payment records between staff members (Abdu et al., 2022; A. Putri et al., 2024). These problems complicate monthly and yearly financial recapitulations, which must be re-entered into Excel manually, a process that consumes significant time and resources (Kamilah et al., 2024).

To address these challenges, this study proposes the design of a web-based tuition payment information system using the CodeIgniter framework. The system aims to streamline administrative tasks, facilitate accurate and efficient payment tracking, generate automated reports in Microsoft Word format, and allow printing of transaction records (Imanda et al., 2023; Sani et al., 2023). Moreover, the system minimizes human error and manual input, enabling staff to retrieve specific data through an intuitive date-range filter (Ahmad & Ratnasari, 2019). Based on these observations, the researcher initiates the development of a web-based SPP payment information system tailored for SMAN 2 Bungku, aiming to offer a practical and sustainable solution to the school's administrative inefficiencies.

Method

This study adopts the Waterfall model as the development methodology for the web-based tuition (SPP) payment information system. The Waterfall approach is chosen for its linear and systematic process, which is ideal for systems requiring structured planning and sequential execution (Mustapa et al., 2023). Each phase must be completed in order, ensuring thorough analysis, design, implementation, and evaluation. The first stage, requirement analysis, involves identifying the key data, user needs, and system functionalities. This includes recognizing different user roles (admin and student) and the essential features needed to support operations such as payment tracking, report generation, and transaction logging (Sari et al., 2023). The outcome of this phase directly informs the system design.

In the design phase, visual tools such as use case diagrams and flowcharts are created to describe the flow of processes and interactions between system components. Figure 1 illustrates the flowchart of the tuition payment system, showing two main pathways: one for admin users and one for students. Admins are provided with access to manage student data, record and monitor payments, and generate reports. Students, on the other hand, can view their tuition bills, upload proof of payment (if transferring manually), review their payment history, and print receipts. This dual-path structure ensures each user type has access to functionalities relevant to their role, thereby improving the system's usability and clarity (Wulandari & Wibisono, 2024).

The implementation stage involves translating this design into code using the CodeIgniter framework. Each feature outlined in the flowchart is implemented accordingly to fulfill the system's objectives. The final stage, evaluation and testing, is carried out through functional testing and feedback analysis to ensure the system operates reliably and meets user expectations. Necessary adjustments are made prior to full deployment. By progressing through these systematic stages, and as depicted in Figure 1, the resulting system offers a practical solution to improve efficiency, accuracy, and transparency in tuition payment administration at SMAN 2 Bungku.

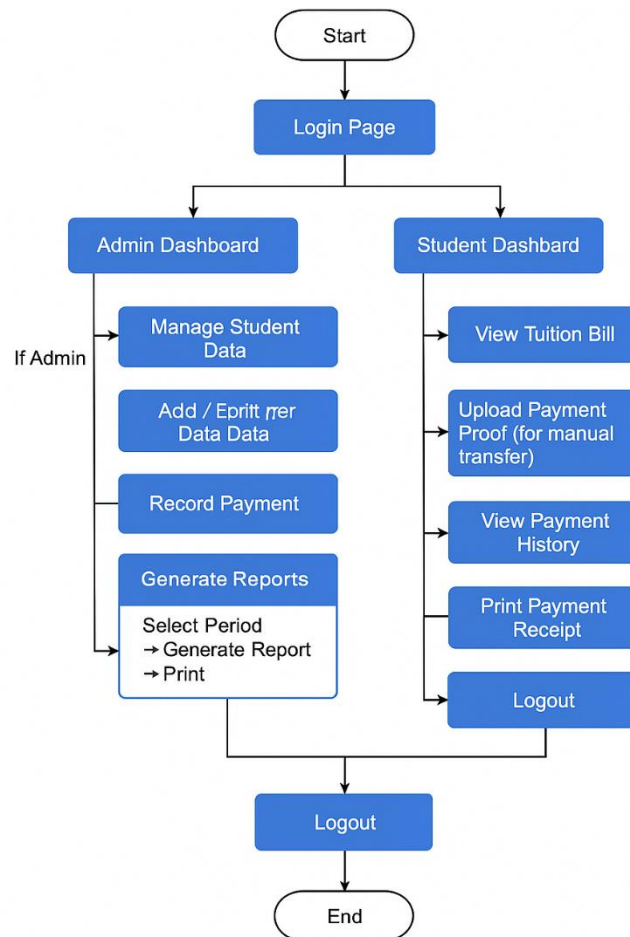


Figure 1. Flowchart of the tuition payment system

The overall workflow of the tuition payment information system can be illustrated clearly through Figure 1, which presents the system flowchart. This flowchart serves as a visual guide that outlines the step-by-step interactions between users (admin and students) and the system's core functionalities. It helps in understanding how each user role accesses the system, performs specific tasks, and completes their respective processes within the application environment. The system is designed to be user-oriented, with interfaces that are adjusted based on the type of user logged in.

The flow begins with the login process, where the system identifies whether the user is an admin or a student. After authentication, each user is directed to their designated dashboard. Admins are provided with access to manage student data, record tuition payments, and generate reports, while students can view their bills, upload payment proof, check past transactions, and print receipts. As shown in Figure 1, each operation follows a structured sequence, from start to logout, ensuring that every function is carried out efficiently and with minimal user error. This structure not only enhances the usability of the system but also promotes accuracy and accountability in tuition payment management.

Results and Discussion

Results

In this section, the results of the research and development of a website-based tuition payment information system built using the CodeIgniter framework at SMAN 2 Bungku will be presented. The research results include an analysis of the effectiveness of the system in improving the efficiency of payment data management, ease of access to information for

students and administrative staff, and the impact of system implementation on the financial administration process at the school. In addition, this section will also present an evaluation of system performance through testing of functionality, user interface, and user satisfaction levels, all of which are carried out to ensure that the system meets the needs and expectations of users in the school environment.

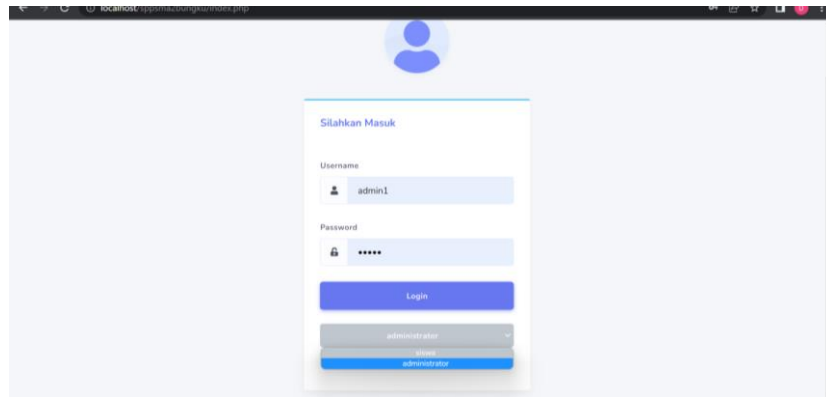


Figure 2. Admin login page

Figure 2 shows the login page display of the website-based SPP payment information system. At the top, there is a user icon that illustrates the area for authentication. Users are asked to enter a username and password to access the system. There is also an option to select the type of user, namely "administrator" or "student". The purple Login button functions to start the authentication process after the data is entered. This simple and intuitive interface design makes it easy for users to log in to the system.

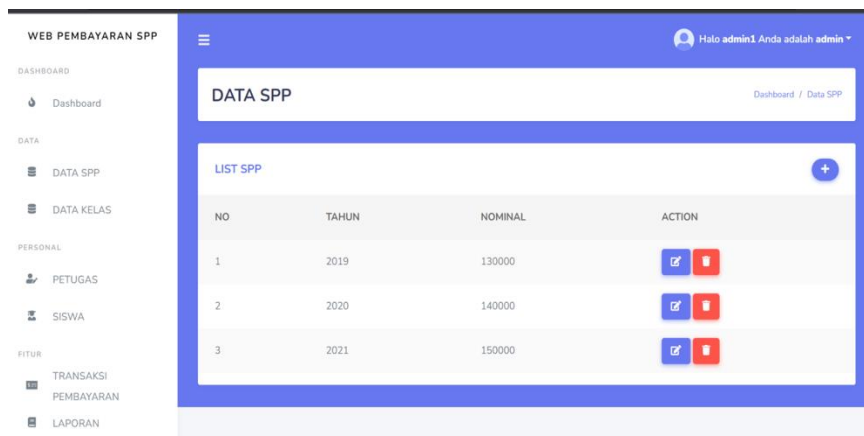
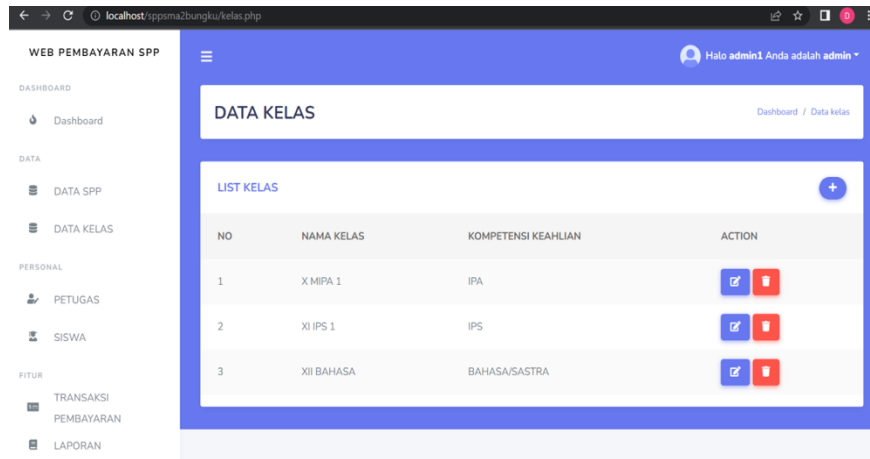


Figure 3. SPP data page

Figure 3 shows the SPP Data page of the website-based SPP payment information system. At the top, there is a navigation menu that makes it easy for users to move to other pages, such as the Dashboard, Class Data, and Payment Transactions. The table that appears in the middle of the page shows a list of SPP with columns that include Year, Nominal, and Action. In the table, users can see SPP information for 2019 and 2020, with each nominal listed. There is also an action icon in the Action column, which allows users to edit or delete existing SPP data. This clear and structured design makes it easy for users to manage SPP payment data efficiently.



NO	NAMA KELAS	KOMPETENSI KEAHLIAN	ACTION
1	X MIPA 1	IPA	[Edit] [Delete]
2	XI IPS 1	IPS	[Edit] [Delete]
3	XII BAHASA	BAHASA/SASTRA	[Edit] [Delete]

Figure 4. Class data page

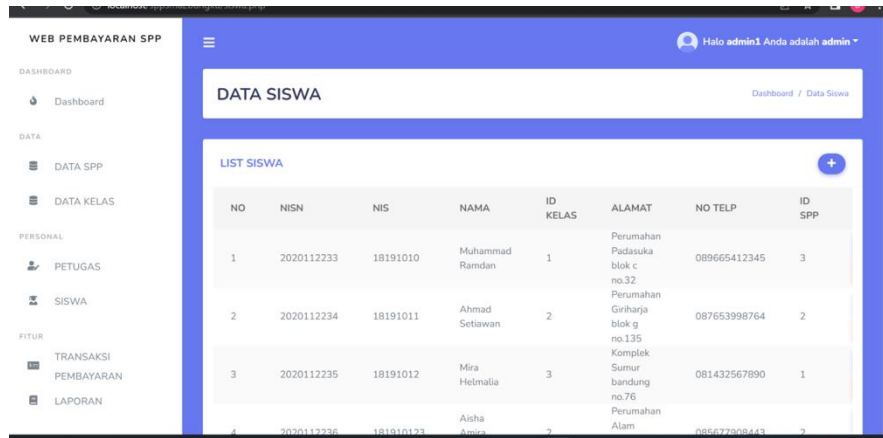
Figure 4 shows the Class Data page of the website-based tuition payment information system. At the top, there is a navigation menu that makes it easy for users to move to other pages, such as the Dashboard, Tuition Data, and Payment Transactions. The table displayed contains a list of classes, with columns that include Class Name and Expertise Competence. In the table, there are two entries for class XI, namely X IPA 1 and XI IPS 1, along with their respective expertise competencies. In the Action column, there is an icon that allows users to perform actions such as editing or deleting existing class data. This clean and informative interface design makes it easy for users to manage class information in the system.



NO	USERNAME	PASSWORD	NAMA PENGGUNA	LEVEL	ACTION
1	admin1	admin	April	admin	[Edit] [Delete]
2	petugas1	petugas	lia	petugas	[Edit] [Delete]
3	2020112233	ramdan	ramdan	siowa	[Edit] [Delete]

Figure 5. User data page

Figure 5 shows the User Data page of the website-based SPP payment information system. At the top, there is a navigation menu that makes it easy for users to move to other pages, such as Dashboard, Class Data, and Payment Transactions. The table visible in the middle of the page contains a list of system users with columns that include Username, Password, Username, and Action. In the table, there are several entries that show user information, including two administrator accounts and one officer account. In the Action column, there is an icon that allows users to edit or delete existing user data. This well-structured interface design makes it easy to manage and monitor users in the system.



NO	NISN	NIS	NAMA	ID KELAS	ALAMAT	NO TELP	ID SPP
1	2020112233	18191010	Muhammadi Ramdan	1	Perumahan Padastuka blok c no.32	089665412345	3
2	2020112234	18191011	Ahmad Setiawan	2	Perumahan Griharja blok g no.135	087653998764	2
3	2020112235	18191012	Mira Helmalia	3	Sumur bandung no.76	081432567890	1

Figure 6. Student data page

Figure 6 shows the Student Data page of the website-based SPP payment information system. At the top, there is a navigation menu that makes it easy for users to move to other pages, such as Dashboard, Class Data, and Payment Transactions. The table displayed contains a list of students with columns that include NIS, Name, Class ID, Address, and Telephone Number. In the table, several student data entries are visible, including information about NIS, the full name of the student, the class attended, the residential address, and the telephone number. This clear and organized interface design makes it easy for users to manage student information in the system.



Figure 7. Payment transaction page

Figure 7 shows the Payment Transaction page of the website-based SPP payment information system. At the top, there is a navigation menu to move to other pages, such as Dashboard, Class Data, and Student Data. The form displayed allows officers to make payment transactions. There are columns to fill in Officer ID, NIS, Payment Date, Payment Year, and Amount. Users can select the month and year for the payment to be made. Below the form, there are instructions or additional information that show student payment data according to the NIS entered. This simple and functional interface design makes it easy for officers to record SPP payment transactions.



Figure 8. Report page

On the admin interface, several menu options are provided based on the requirements identified in the use case and functional analysis diagrams. These include menus for managing tuition (SPP) data, class data, user accounts, student records, payment transactions, and report generation. Each submenu is equipped with operational features such as add, edit, and delete, all of which function properly during testing. Notably, the report submenu includes a feature to export reports directly into Microsoft Word format, significantly simplifying the reporting process and reducing the need for manual entry of payment data.

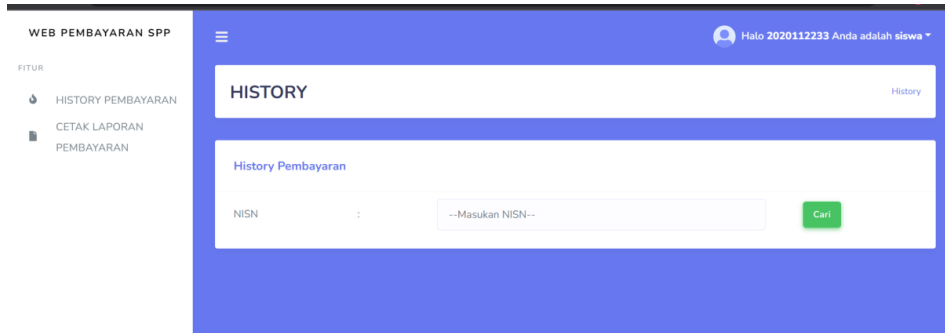


Figure 9. Payment history page

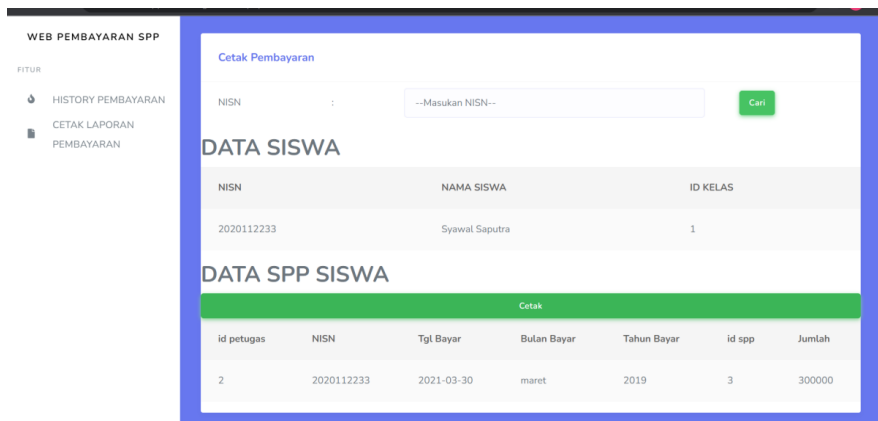


Figure 10. Payment transaction page

On the student interface, fewer menu items are presented, tailored to user-specific needs as outlined in the design phase. Students can access their payment history and perform actions through the payment transaction section. The transaction submenu also includes a print function that enables students to print their payment receipts independently, improving accessibility and convenience. System testing shows that the developed web-based tuition payment information system operates as intended and meets all key functional requirements. Core features such as login, data management, and transaction processing run smoothly without encountering technical issues. Usability testing further confirms that the interface is intuitive and user-friendly, enabling both students and administrative staff to quickly adapt to the system.

In terms of user satisfaction, a post-implementation survey revealed that 85% of respondents expressed satisfaction with the system's ease of access and the efficiency of its payment features. Many users highlighted the usefulness of the automated reporting tool, which notably reduced the time and effort involved in compiling monthly financial records. Feedback also suggested potential enhancements, including the addition of payment notifications and mobile application integration, indicating that users see value in further developing the system. In conclusion, the implementation of this tuition payment system at SMAN 2 Bungku has not only met its technical and functional objectives but also brought significant improvements to the school's administrative processes. The system has contributed to greater transparency, increased efficiency, and enhanced service delivery in school financial management.

Discussion

The development process of the web-based tuition payment information system utilizing the CodeIgniter framework follows the Waterfall model, which is characterized by its sequential and structured stages. These stages include the identification and analysis of system requirements, system design, implementation, and evaluation. A detailed explanation of these stages is presented in the research procedure section. The first phase involves requirements analysis, which focuses on identifying the essential features, data, and technical components needed to build the web application. This stage is critical to ensure that the system meets the needs of its intended users. The second phase, system design, translates these requirements into a technical blueprint, supported by the creation of use case diagrams and flowcharts that describe user interactions and system workflows in detail.

Once the design is completed, the next step is the implementation phase, where the system is developed based on the design specifications. After development, the system enters the evaluation and testing phase to verify whether it performs according to expectations. This includes a quality assurance process, data collection from user trials, and an analysis of testing outcomes. The results of this study indicate that the web-based SPP payment system has been successfully developed and functions effectively in supporting administrative tasks and assisting students in managing their tuition payments transparently and efficiently. The system provides automated processes that reduce manual workload, simplify data retrieval, and enable real-time monitoring of financial records.

These findings are consistent with previous research, which highlights that implementing a web-based tuition payment system can enhance administrative efficiency and financial transparency within educational institutions. The system facilitates faster transaction processing, reduces the likelihood of human error in recordkeeping, and improves the accuracy of financial reports (Ramdani et al., 2025). Moreover, the integration of web-based technology allows for real-time access by students, parents, and school administrators, promoting greater accountability and openness in the management of school finances (Prayoga, 2024). Several structured development approaches, including the Waterfall and Spiral models, have been widely utilized in building systems of this nature. Meanwhile, the Black Box testing method was employed in this study to validate that each system function performed as intended (Amaliah et al., 2025). The use of these methodologies contributed to the reliability and precision of the system prior to its deployment in the school environment.

The implementation results demonstrated positive outcomes, including improved operational performance, simplified access to payment information, and reduced risk of tuition arrears. For future enhancements, it is recommended that the system be integrated with other administrative modules, such as academic records or attendance systems, and that its security mechanisms be strengthened to protect sensitive financial data and maintain user trust (Ginting et al., 2024).

Conclusions and Suggestions

Conclusions

This study successfully designed and developed a web-based tuition payment information system for SMAN 2 Bungku using the CodeIgniter framework and the Waterfall development model. The entire development process was carried out in a linear and structured manner, starting from requirements analysis, system design, implementation, and evaluation, ensuring the final product aligned with user expectations. To support a more effective development process, visual modeling tools such as use case diagrams and flowcharts were utilized to accurately define user requirements and system behavior. These tools played a crucial role in translating user needs into technical specifications.

Following system development, an evaluation phase was conducted to validate the functionality and reliability of the application. This stage included quality assurance testing, user feedback collection, and analysis of test results. The outcome demonstrated that the system operates effectively and is well-integrated with essential data structures, providing a reliable and user-friendly platform for managing tuition payments. Overall, the implementation of this CodeIgniter-based system is proven to address key challenges in the school's administrative process. It supports efficient financial management, reduces the risk of human error, and aligns with current technological advancements in the educational sector.

Suggestions

For future development, it is recommended that the system be enhanced by integrating additional features, such as broader access to school information, notifications related to tuition deadlines, and support for academic policy dissemination. Moreover, expanding the system's capabilities to support mobile responsiveness or integration with mobile applications would further improve accessibility for students and parents. It is also hoped that this research can serve as a reference for other educational institutions aiming to adopt digital systems for administrative purposes. Continued innovation in this area is essential for supporting the transformation towards digital schools, ensuring that educational management systems remain responsive to the evolving landscape of information technology.

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