Design of a Web-Based Digital Guestbook Application Using Barcode Technology

Isman Ismail[1]*, Zulfikar[2]

[1]Information System,UniversitasKH.A.WahabHasbullah
[2]Informatical,UniversitasKH.A.WahabHasbullah
*Email: ismanismail337@gmail.com

ABSTRACT

The advancement of information technology has significantly influenced numerous sectors, including administrative systems in educational institutions such as Islamic boarding schools (pesantren). One persistent challenge in this environment is the reliance on manual guest registration, which often hampers efficiency and data accuracy. This study aims to design and develop a web-based digital guest book application incorporating barcode scanning technology at Pondok Pesantren Nur Khodijah 3 Tahsin wal Tahfidz. The goal is to streamline and improve the accuracy of guest recording processes. The system was developed using a structured methodology that includes requirement analysis, system design, implementation, testing, and maintenance. The platform is built on web technologies, using specific programming languages and database systems, and is equipped with a barcode scanning feature to expedite the guest check-in process. Testing results indicate that the developed application significantly reduces the time required for data entry and minimizes input errors. The barcode system also simplifies the retrieval and management of guest information, resulting in a more organized and systematic administrative workflow. Furthermore, data security and consistency are enhanced, as each guest is assigned a unique code automatically stored in the database. This system has proven to improve speed, accuracy, and documentation in guest management. In the future, it can be further enhanced by integrating features for reporting and analyzing visitor data to elevate the overall quality of administrative services within the pesantren.

Keywords: Digital Guest Book; Barcode System; Web-Based Application; Islamic Boarding School Administration; Recording Efficiency.

INTRODUCTION

The digital guest book system replaces traditional manual entry methods with a more efficient and accurate electronic approach. According to (Santoso, 2021), this system enhances the speed of data entry while reducing input errors. The use of QR Codes as a form of digital identification in attendance systems is becoming increasingly popular due to its ability to accelerate identification and lower the risk of forgery (Saputra, 2019; Wibowo, 2020). In this web application development, the CodeIgniter 4 framework was selected for its strengths in performance and security (Prasetyo, 2019). MySQL was chosen as the database platform due to its speed and ease of integration with PHP (Rahman, 2022). Research by (Syahputra, D., & Handayani, 2023) also shows that digitalizing pesantren administration enhances operational efficiency and reduces reliance on physical documents. Therefore, the implementation of a QR Code-based digital guest book system at Pondok Pesantren Nur Khodijah 3 is expected to address the limitations of manual record-keeping while improving both the security and speed of administrative processes.

METHOD

This research applies a qualitative method with a descriptive design. The adopted research model is Research and Development (R&D), focusing on the creation of a web-based digital guestbook system integrated with barcode functionality at Pondok Pesantren Nur Khodijah 3 Tahsin wal Tahfidz. The main goal of this development is to replace the traditional manual guest logging process with a more practical, faster, and accurate digital solution to enhance administrative efficiency in managing visits.

The main subject of this study is the pesantren's administrative staff, who serve as the primary

users of the system. The development process is structured into five key stages: (1) requirement analysis conducted through observation and interviews with the admin; (2) system design involving database structure, system flow, and user interface layout; (3) application development using CodeIgniter 4 framework along with PHP, HTML, CSS, JavaScript, and MySQL; (4) system testing through functionality tests and User Acceptance Testing (UAT); and (5) implementation of the system within the pesantren environment, including training sessions for administrators.

The instruments utilized in this study consist of interview protocols and observation records. Data was gathered through on-site observations and structured interviews with relevant stakeholders. A qualitative approach was applied in the data analysis process, which involved data reduction, data display, and drawing conclusions. The evaluation of the system's performance was based on the comprehensiveness of its features and the usability experience reported by admin users.

RESULT AND DISCUSSION

The findings indicate that the implementation of the Web-Based Digital Guest Book System at Pondok Pesantren Nur Khodijah 3 Tahsin wal Tahfidz has significantly improved the efficiency of guest visit recording. Based on data collected through observation, interviews, questionnaires, and document analysis, the system was found to simplify the registration process, speed up verification, and enhance the accuracy of guest visit data. Respondents, including administrators and student guardians, expressed high levels of satisfaction with the system's accessibility and effectiveness. These findings align with previous studies that highlight how web-based administrative digitalization can enhance the quality of service in educational institutions.

The application underwent button functionality testing using the Black Box Testing method to verify that each interface element performed as intended. Table 1 summarizes the outcomes of the test conducted on ten key buttons. All buttons functioned correctly based on the expected user scenarios. These results confirm that the system not only supports administrative processes effectively but is also technically reliable. The success of these tests affirms that the system is ready for operational deployment and offers a strong foundation for future enhancements.

Table 1 Button Function

No	Button Tested	Test Scenario Description	Result
1	Login Button	Enter username and password, then click login	Functioning
2	Register Link	Redirects to new user registration page	Functioning
3	Register Button	Fill out registration form and click register	Functioning
4	CRUD Buttons on Student Page	Add, edit, delete, or view student data	Functioning
5	CRUD Buttons on Guardian Page	Add, edit, delete, or view guardian data	Functioning
6	Make Appointment Button	Add a queue for QR code issuance	Functioning
7	Download PDF/JPG QR Code	Download QR Code in image or PDF format	Functioning
8	Toggle Camera Button	Turn QR scanner camera on or off	Functioning
9	QR Code Scanner	Scan QR Code and auto-fill visitor data	Functioning
10	End Visit Button	Save visit data to history upon visit completion	Functioning

Page Homepage

The homepage of the Web-Based Digital Guest Book Application with Barcode System is designed to be both user-friendly and informative. Its clean and professional interface allows users to easily access key features such as guest registration, barcode scanning, visit logs, and data search. Additionally, the homepage displays real-time visitor statistics, enabling administrators to monitor daily

guest traffic effectively. The use of a responsive layout and visually comfortable color scheme ensures a smooth and efficient user experience.
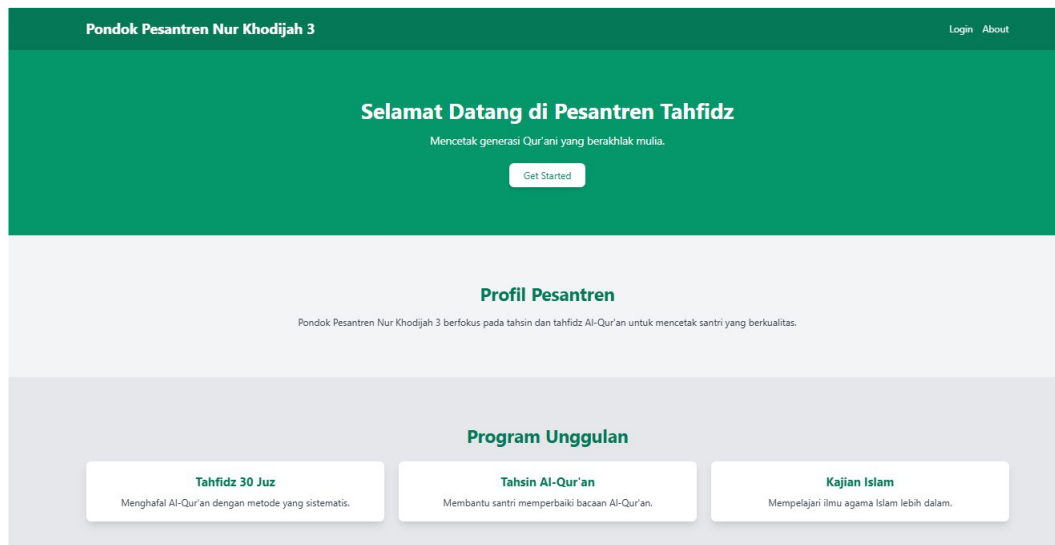

Figure 1. Page Homepage

Page Login

The login interface of the Web-Based Digital Guestbook Application featuring a Barcode System is built to provide secure access for users. To log in, users must enter a valid username and password. The system performs input validation to avoid errors or empty fields and displays alerts if authentication fails. A "Forgot Password" option is available to help users recover their accounts when necessary. Designed with a clean, responsive, and intuitive layout, this page ensures a secure and smooth login experience, especially for administrators responsible for managing guest visit data at Pondok Pesantren Nur Khodijah 3..
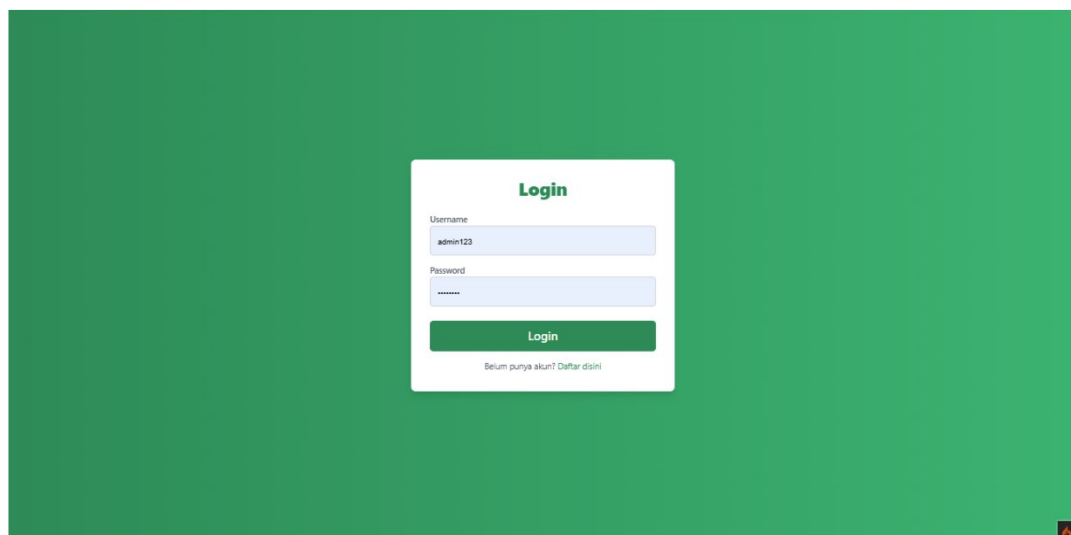

Figure 2. Page Login

Page Santri

The Santri page is designed to assist administrators in managing student data efficiently, including adding, editing, and deleting information. It features a table displaying essential details such as student name, NIS (student identification number), class, guardian's name, and active status, along with a search function. The "Add Santri" button opens an input form that allows admins to enter new data comprehensively. Each entry also includes "Edit" and "Delete" buttons for updating or removing

information. The page's responsive design supports streamlined and effective digital administration.
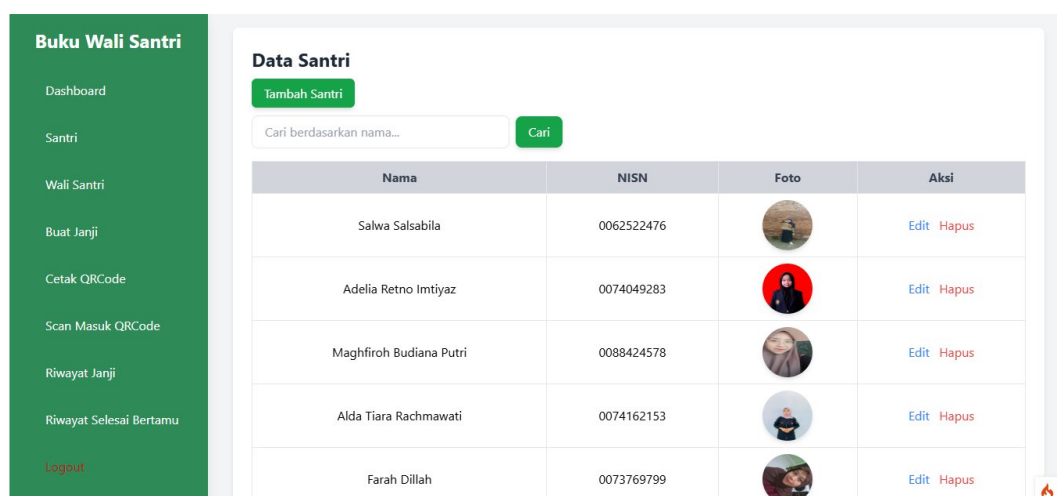

Figure 3. Page Students

Page Wali

This page enables administrators to efficiently manage guardian data. The table displays key details such as guardian name, student NIS, relationship to the student, phone number, and address. A search feature is included to help quickly locate records by name or NIS. The "Add Guardian" button opens a form for entering new information, while each row offers "Edit" and "Delete" options for updating or removing data as needed. The system also provides a confirmation prompt before any deletion occurs. With a simple and responsive interface, this page facilitates smooth digital administration and ensures guardian information is well-organized and easily accessible.
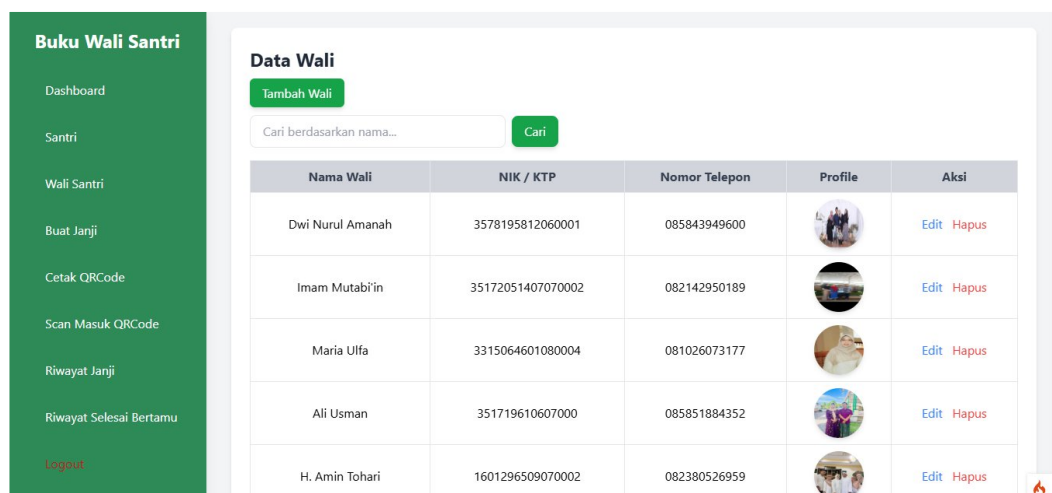

Figure 4. Page Guardian

Page of make an appointment

This page allows guardians to schedule meetings with students or the pesantren staff. Users simply fill out a form including the guardian's name, student's name, NIS, date and time, purpose of the visit, and additional notes. Once completed, the appointment request can be submitted and is automatically saved in the system. A search function is also available to help track schedules by student name. With a responsive and user-friendly interface, this page supports a smooth digital appointment process, ensuring that visit schedules at Pondok Pesantren Nur Khodijah 3 are well-organized and properly documented.

Figure 5. Page Make an Appointment

Page of Print QR Code

The QR Code Print page serves as a tool for users such as guardians, students, or administrators to view, download, and print QR Codes used as digital identification during visits to Pondok Pesantren Nur Khodijah 3. When the page is accessed, the system automatically generates and displays a QR Code based on the stored user data, including details like name and unique ID.

Users can download the QR Code as an image file in formats such as JPG or PNG for storage or printing purposes. Additionally, there is an option to download a PDF version that contains extra information, serving as an official visit identification document. For those who prefer to print immediately without saving the file, the page provides a print button that opens a browser print preview.
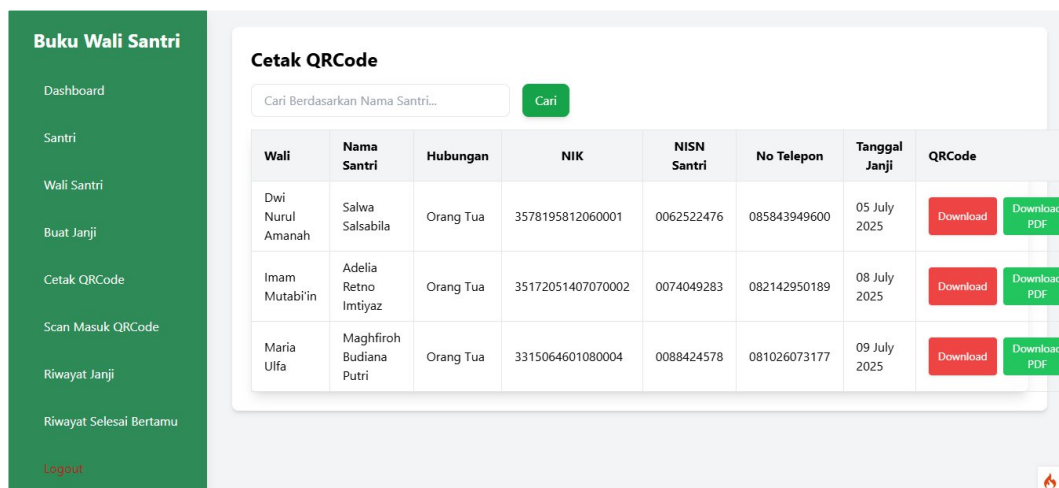

Figure 6. Page Print QRCode

Page Scan QR Code

The QR Code scanning page is developed to streamline visitor check-ins digitally by recognizing individual QR codes. Users can enable their device's camera to start scanning QR codes presented by guardians, students, or other guests. Once the camera is on, the system automatically captures and processes the data embedded in the code. Upon a successful scan, visitor details—such as name, student ID (if applicable), check-in time, and visit status—are promptly shown in a dynamic table beneath the camera view. This table updates automatically with each new visitor scanned.

To conclude a visit, a dedicated button allows guests to mark their departure. The system then records the checkout time, updates the visit status to completed, and removes the visitor from the active visit list. This entire process operates in real time and is accessible across multiple devices, including computers and smartphones. Featuring a responsive design and seamless functionality, this page ensures fast, accurate, and efficient visit tracking at Pondok Pesantren Nur Khodijah 3.
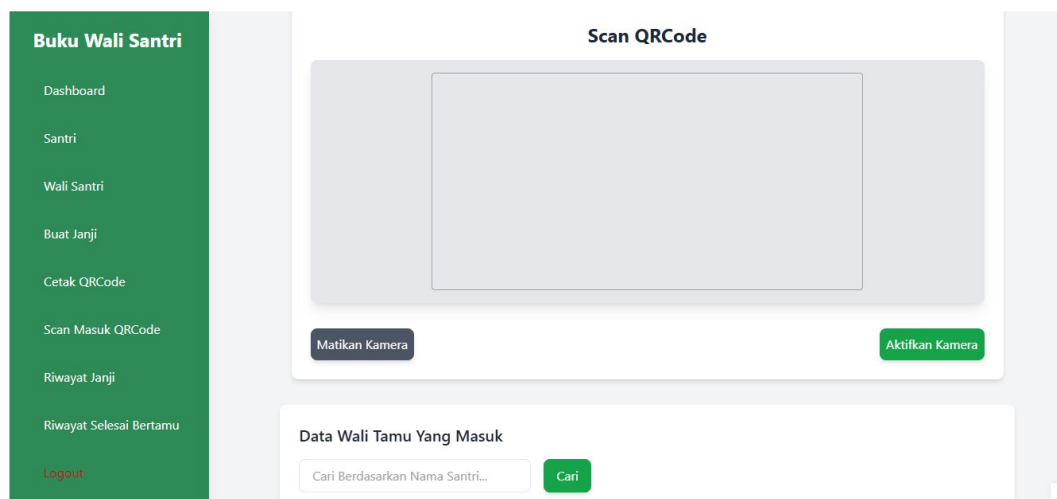
Figure 7. Page Scan QRCode

Result

The adoption of this digital system has brought significant changes to administrative activities within the pesantren, particularly in terms of operational efficiency and data management. The comparison below highlights the improvements achieved:

Table 2 Research Result

Process	Before System (Manual)	After System (Digital)
Guest Registration	Approximately 10 minutes per guest	Around 2 minutes via admin
Arrival Verification	Manual checking	Barcode scanning
Report Preparation	Done manually	Automatically generated by system

Prior to the system implementation, visitor data was recorded manually in conventional notebooks, which were prone to damage, loss, or difficult retrieval. With digitalization, data is stored electronically in a database, making it more secure and accessible for admins whenever needed.

The barcode system provides more structured oversight of authorized visitors. Only guests issued official barcodes by the admin are allowed entry, preventing unauthorized visits. Admins can also easily monitor the full history of all past visits.

Featuring a straightforward interface and functions such as automatic report generation, this system offers a more professional workflow for admins. It enhances administrative accountability and supports organized, systematic documentation of visits.

CONCLUSIONS

This study successfully developed an integrated web-based visit management system at Pondok Pesantren Nur Khodijah 3. The system not only addresses the fundamental needs of managing student and guardian data but also facilitates scheduling visits and incorporates QR Code technology to streamline registration and visit validation processes. Findings indicate that all developed modules function effectively, simplifying administrative tasks that were previously handled manually.

The system significantly improves data recording efficiency and enables real-time monitoring of visits. This aligns with the study's primary goal of optimizing administrative services within the pesantren environment through a responsive and user-friendly digital approach.

However, some limitations remain that could be addressed in future development. For instance, integration with other hardware such as attendance machines or automatic notifications via mobile applications has yet to be implemented. Subsequent research is recommended to include these features and expand the system's scope for comprehensive connectivity with the pesantren's administrative

infrastructure. Overall, this system holds considerable potential to support administrative digitalization in similar educational institutions and serves as a foundation for developing more complete and adaptable applications tailored to users' future needs.

REFERENCES

Prasetyo, A. (2019). Penggunaan Framework CodeIgniter dalam Pengembangan Aplikasi Berbasis Web. *Pustaka Digital*.

Rahman, H. (2022). *Manajemen Basis Data dengan MySQL untuk Aplikasi Web. Bandung: Informatika Media*.

Santoso, D. (2021). Optimalisasi Layanan Kesehatan melalui Teknologi Informasi. *Universitas Kesehatan Surabaya*.

Saputra, A. (2019). Praktikum Rekayasa Perangkat Lunak dengan UML. *Informatika*.

Syahputra, D., & Handayani, R. (2023). Digitalisasi Administrasi Pesantren: Studi Kasus di Beberapa Pesantren di Indonesia. *Penerbit Ilmu Komputer*.

Wibowo, E. (2020). Teknik Pengujian Aplikasi Web: Konsep dan Praktik. *Grafindo*.