

Web-Based Information System for Monitoring and Evaluating the Quran Memorization of Tahfidz Students

Holida Izzatilla^{1✉}, Abd. Ghofur², Lukman Faqih Lidimilah³

¹ Information Systems, Faculty of Science and Technology, Universitas Ibrahimy, Indonesia

^{2,3} Information Technology, Faculty of Science and Technology, Universitas Ibrahimy, Indonesia

✉ **Corresponding Author** : Abd.Ghofur (e-mail: apunkbwi@gmail.com)

Article Information	ABSTRACT
Article History Received : May 30, 2026 Revised : June 14, 2026 Published : July 04, 2026	The use of information technology in the Islamic boarding school environment, particularly in the Qur'an memorization program, is a crucial tool for improving the effectiveness of monitoring students' progress. Currently, the management of memorization data at the Salafiyah Syafi'iyah Sukorejo Islamic Boarding School is still conducted conventionally, resulting in a high risk of data loss, inefficient report compilation, and a lack of transparency in information for students' guardians. This study aims to design and implement a web-based memorization monitoring information system that integrates workflows among administrators, educators, and parents. System development employs the Software Development Life Cycle (SDLC) methodology using the Waterfall model, encompassing the stages of requirements analysis, architectural design, implementation using the Laravel framework, and system testing. Black-box testing results indicate that all system features functioned according to specifications, with a functional success rate of 100%. Additionally, white-box testing through conditional logic validation ensured that all program workflows, including the authentication module and target achievement calculations, operate stably. The main contribution of this research lies in the implementation of a personalized automatic notification mechanism, which allows guardians to monitor their children's memorization progress in real-time while facilitating proactive coaching interventions.
Keywords: <i>Information system; Monitoring; Evaluation; Website.</i>	

INTRODUCTION

Advances in information technology have made significant contributions across various sectors, including education. Information technology plays a crucial role in the rapid and accurate collection, storage, processing, and presentation of data to support effective decision-making (Zainab et al., 2025). The use of information systems in educational institutions has proven capable of improving the efficiency, effectiveness, and transparency of both academic and non-academic data management (Sumardi, 2024). The adoption of integrated digital systems has proven effective in reducing administrative barriers and improving academic services in real-time (Sudipa et al., 2023).

In the context of Islamic education, particularly in Quran memorization programs, the process of monitoring and evaluating memorization is a vital component for ensuring the quality of students' achievements. Monitoring is conducted to continuously track progress in memorization, including the fluency of recitation, the accuracy of tajwid rules, and the

consistency of review sessions. Meanwhile, evaluation is applied to determine students' memorization achievements automatically, objectively, and systematically as a basis for determining follow-up guidance (Luthfi & Subando, 2025). Therefore, a structured system is needed to support the monitoring and evaluation process so that tahfidz learning activities can proceed optimally.

Systematic data management is a strategic tool for supporting sound educational decision-making (Tri et al., 2024). The Tahfidzul Qur'an Dormitory at the Salafiyah Syafi'iyah Sukorejo Islamic Boarding School is an institution dedicated to fostering the memorization of the Qur'an among its students. Currently, the process of recording memorization progress is still carried out conventionally using individual memorization logs kept by each student. This manual method presents several challenges, such as the risk of losing the memorization logs, recording errors, and the difficulty of tracking students' memorization history over time. As a result, instructors face obstacles in conducting accurate and continuous monitoring and evaluation.

In addition to challenges faced by teachers, the process of compiling memorization data by the education division administrators takes a relatively long time because they must review each student's memorization logbook individually to prepare progress and attendance reports. This manual process not only consumes time and effort but also increases the risk of human error in report preparation. On the other hand, parents cannot directly monitor their children's memorization progress because the data has not yet been integrated into a digital system. This situation results in suboptimal parental involvement in overseeing the memorization training process..

To address these challenges, previous innovations have focused on transitioning the tracking of Quran memorization from error-prone manual methods to an integrated web-based monitoring system. The first system was designed to address the inefficiencies of physical monitoring logs, which are prone to damage, loss, and illegibility, and are unable to provide real-time data updates to parents. Developed using a prototyping method with the Laravel framework and a MySQL database, this platform allows for direct user feedback during the design process. Through black-box testing and feasibility testing, the system achieved a feasibility score of 94%, indicating high validity in digitizing student progress tracking and administrative oversight (Amelia & Baharsyah, 2025).

Furthermore, another web-based approach was developed to address the vulnerabilities of paper-based documentation, such as the risk of physical damage and the lack of data backups, which hinder the evaluation process and parental involvement. This framework utilizes Unified Modeling Language (UML) modeling, including use case, class, activity, and sequence diagrams, to systematically map the system's workflow. Built using the PHP programming language and MySQL, this system successfully simplifies the processes of data recording, summarization, and evaluation for various levels of academic users (Alfitra & Tanti, 2024).

In addition, a web-based tracking application was implemented to address similar manual challenges in the boarding school environment, where paper records are often lost or misplaced. This manual system significantly hindered teachers during periodic data compilation and limited parents' access to their children's daily progress. By implementing a centralized web platform, the institution successfully automated the reporting process using the Extreme Programming methodology, which enabled teachers to compile memorization statistics efficiently and achieve a 100% functional testing success rate. (Dhita Aprilian Nur Fatah, 2023). To provide a clear picture of how this study compares to previous research, a comparative analysis was conducted and is presented in Table 1.

Table 1. Comparison of Related Studies

Researcher (Year)	Method	Focus Key Features	Gaps
Amelia & Baharsyah (2025)	Prototype	Digitization of Record-Keeping	Passive system; no early warning system yet
Alfitra & Tanti (2024)	Waterfall	Monitoring, evaluation, and reporting	There are no memorization targets for each grade level yet
Fatah & Basir (2023)	Extreme Programming	Monitoring & Parent Access	There has been no automatic training intervention yet

Based on Table 1, it is evident that previous studies have collectively succeeded in digitizing the manual memorization recording process, but still have significant gaps in terms of functionality and methodology. Functionally, the systems developed by Fatah & Basir (2023), Alfitra & Tanti (2024), and Amelia et al. (2025) tend to be reactive, where the system functions only as a passive data repository that awaits input from instructors without any automatic verification mechanism regarding achievement targets. This results in a functional shortcoming: the system is unable to detect delays in students' memorization early on, leading to interventions that are often implemented too late. In terms of methodological limitations, the majority of previous studies prioritized the speed of interface implementation through the Prototype method or simple procedural development, without integrating rule-based evaluation logic that aligns with the educational curriculum in Islamic boarding schools.

This study positions itself as a solution to this gap by integrating the strengths of the previous monitoring system—namely, the digitization of record-keeping and data accessibility—into a more proactive information system ecosystem. The primary focus of this study is not merely data collection, but rather the implementation of an automated evaluation mechanism based on memorization targets for each grade level, integrated with a warning system. Unlike previous systems, which were reactive in nature, the designed system acts as an active coaching tool that provides intervention notifications to supervising teachers. Using the Waterfall methodological approach, which ensures a thorough analysis of curriculum needs, this research is expected to improve data management efficiency, enhance evaluation accuracy, and serve as an accurate guidance tool for the Salafiyah Syafi'iyah Sukorejo Islamic Boarding School.

RESEARCH METHODS

This study employs the System Development Life Cycle (SDLC) methodology, using the Waterfall model as the software development framework. The selection of this model is based on its structured, linear, and sequential workflow characteristics, which have proven effective in ensuring the stability of documentation and the traceability of user requirements at every phase of system development (Darmawan et al., 2023). This approach enables a disciplined process for each stage, from requirements analysis, architectural design, and code implementation to system maintenance, which is crucial for maintaining software reliability (Mumtaz et al., 2022).

This study involved five key informants, consisting of two teachers, one education division administrator, a dormitory supervisor, and a dormitory director. All informants were selected using purposive sampling, a method of selecting informants based on their in-depth understanding of the issues under study (Afifah et al., 2023). Data were collected through participatory observation and semi-structured interviews to comprehensively identify the functional requirements of the system. Additionally, an observation sheet was used to map the workflow of the current manual memorization monitoring process. All interview and observation results were analyzed using an interactive model encompassing data reduction, data

presentation, and drawing conclusions to ensure that every field finding is incorporated into the system requirements specification.

The software development in this study employs the Waterfall model, which is known as a linear, sequential, and disciplined system development approach, in which each phase must be fully completed before proceeding to the next stage (Aşkın Demirağ, Elçin Nur Demirkol Öztürk, 2023). This methodology executes each stage sequentially, starting from requirements analysis, architectural design, code implementation, testing, to system maintenance (Kusyadi et al., 2022). The selection of the Waterfall model is based on the characteristics of its structured workflow, which ensures the stability of documentation and high traceability of user requirements in every phase of development (Maulana et al., 2022).

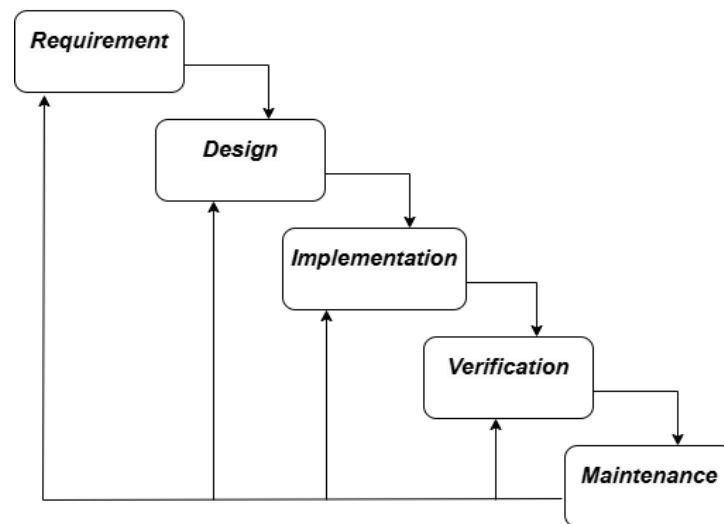


Figure 1. Stages of the Waterfall Method

As illustrated in Figure 1, the process begins with a requirements analysis through observation and interviews to document the system specifications, which are then translated into a system design serving as a blueprint for the database architecture and user interface. The next stage is the implementation of the program code using the Laravel framework and a MySQL database, which were selected for their scalability and proven security features (Sinlae et al., 2024). Following implementation, the system is tested via White Box Testing to validate the program's internal logic, as well as Black Box Testing to verify feature functionality, ensuring the entire system operates accurately in accordance with the requirements specifications. Finally, a maintenance phase is conducted to ensure the system's sustainability through post-implementation error fixes and feature adjustments to meet future user needs (Kusyadi et al., 2022).

RESULTS AND DISCUSSION

System Design

The design of this system utilizes the Unified Modeling Language (UML), a standard modeling language that serves as a tool for visualizing, designing, and documenting system workflows in a structured manner (Hendrawan et al., 2024). As the most dominant modeling language in the industry, UML serves as an effective communication tool to bridge technical understanding among developers, analysts, and relevant stakeholders (Sri Anardani, Yessi Yunitasari, 2023). Additionally, UML enables systematic standardization of documentation, thereby minimizing ambiguity in system logic before implementation into the coding phase.

Use Case Diagram

A Use Case Diagram serves to map the relationships and interactions that occur between users (actors) and a system (Redemptus Siga Dias, 2022). Use case modeling is crucial for

aligning users' functional requirements with the system's technical design (Sudipa et al., 2023). In this system, the Use Case Diagram illustrates the interactions between the administrator, the female religious teacher, and the student's guardian with the system according to their respective access rights.

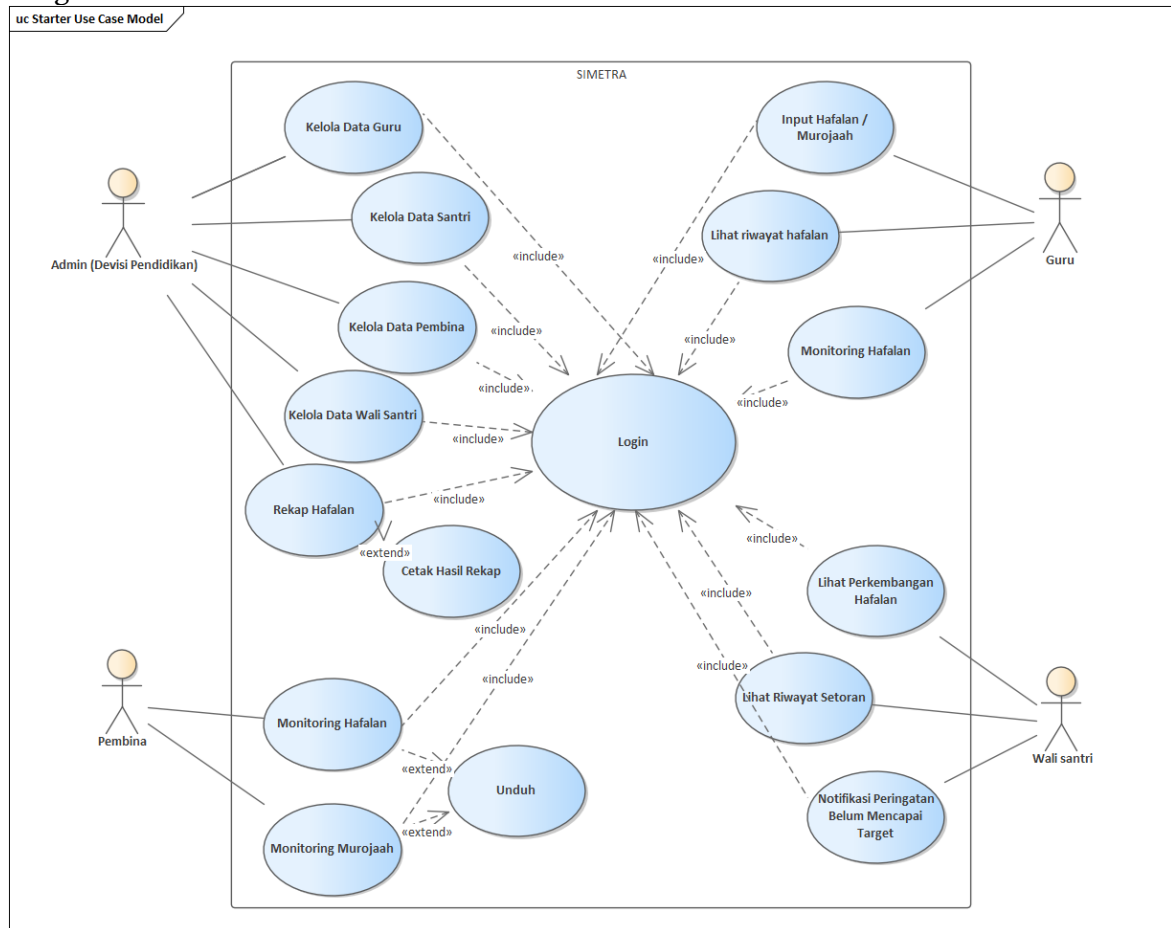


Figure 2. Use Case Diagram

Figure 2 illustrates the interactions among the four main actors: Admin, Teacher, Supervisor, and Student Guardian. The purpose of this diagram is to enforce strict access control based on each role: the Admin manages master data and the system; the Teacher enters payment data; the Supervisor oversees monitoring and evaluation; and the Student Guardian monitors the student's memorization progress. This division of access rights is a mitigation measure to maintain data security and limit operational responsibilities in accordance with the system's intended functionality.

Class Diagram

A Class Diagram serves to map the system architecture comprehensively. This diagram works by displaying class components, attributes, methods, and the relationships between classes within the system under development (Redemptus Siga Dias, 2022). In addition to maintaining the consistency of internal data structures within the database (Mochamad Alief Satria Wahyudi, Sumarno, 2024), the proper use of Class Diagrams is crucial in system development practice to minimize interface complexity and ensure alignment between class design and functional requirements (Elena & Cabot, 2020).

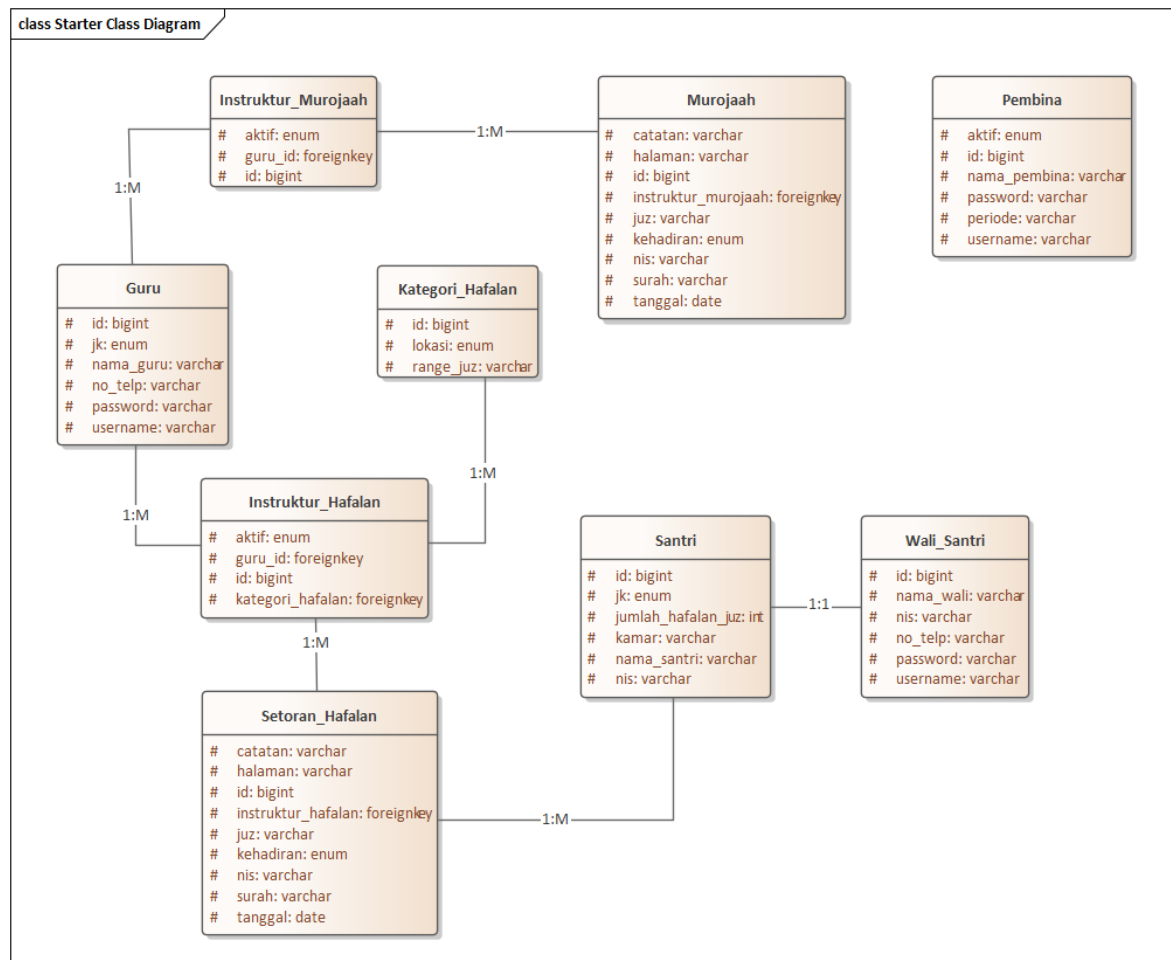


Figure 3. Class Diagram

Figure 3 presents the class diagram for the tahfidz information system. Architecturally, the Teacher entity is designed as a parent entity with a one-to-many (1:M) relationship to *Instruktur_Murojaah* and *Instruktur_Hafalan*. This design decision aims to create scalability, allowing the system to accommodate the addition of new teacher activity categories without having to fundamentally alter the database structure. Additionally, the separation of workflows between *Murojaah* and *Setoran_Hafalan* which are tied to *Kategori_Hafalan* constitutes a form of data normalization to improve storage efficiency and avoid unnecessary data redundancy.

Dalam aspek implementasi teknis basis data, sistem menerapkan prinsip integritas referensial. Setiap tabel menggunakan *Primary Key* berupa dan saling terhubung melalui Foreign Key. In terms of technical database implementation, the system applies the principle of referential integrity. Each table uses a primary key and is interconnected via foreign keys (FK) such as seperti *guru_id*, *instruktur_murojaah* and *instruktur_hafalan*. This mechanism ensures that every transactional data entry, whether in the *Murojaah* or *Setoran_Hafalan* table, is always linked to valid student and instructor entities. With this relational design, the system is able to guarantee information consistency and generate accurate reports on memorization progress, proving that the implemented design has achieved the goal of efficient and integrated data normalization.

System Interface

After the design phase was completed, the process continued with the implementation of a web-based Quran memorization monitoring information system. This system was developed with personalized access rights for four key actors to ensure the security and integrity of operational data. The admin has full authority over master data management, which includes data on students, teachers, and mentors, and is fully responsible for automatically compiling data

and generating periodic reports on memorization progress. The login interface for this information system is shown in Figure 4.

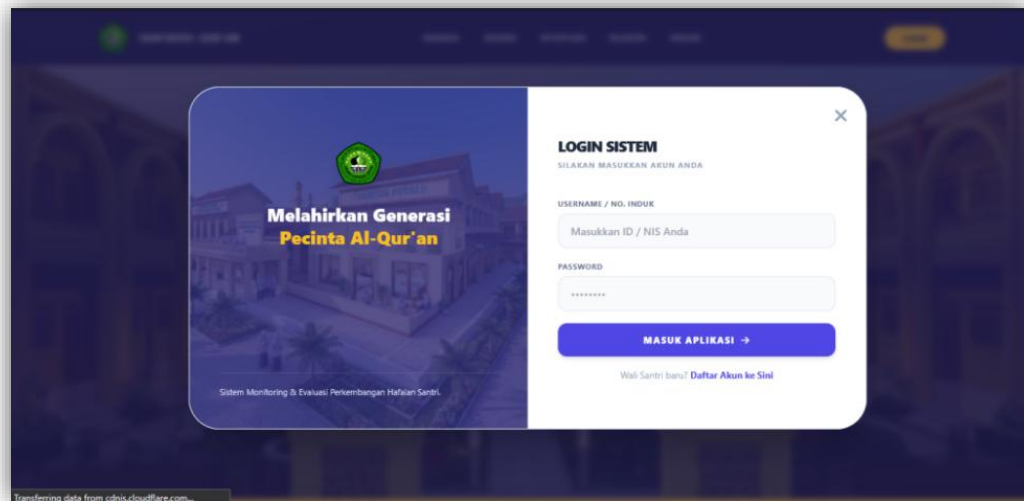


Figure 4. Form Login

After successful authentication, the administrator will be redirected to the main dashboard, as shown in Figure 5. These administrative access rights are specifically granted to the education division, which has full authority to manage the system and perform comprehensive administrative control functions.

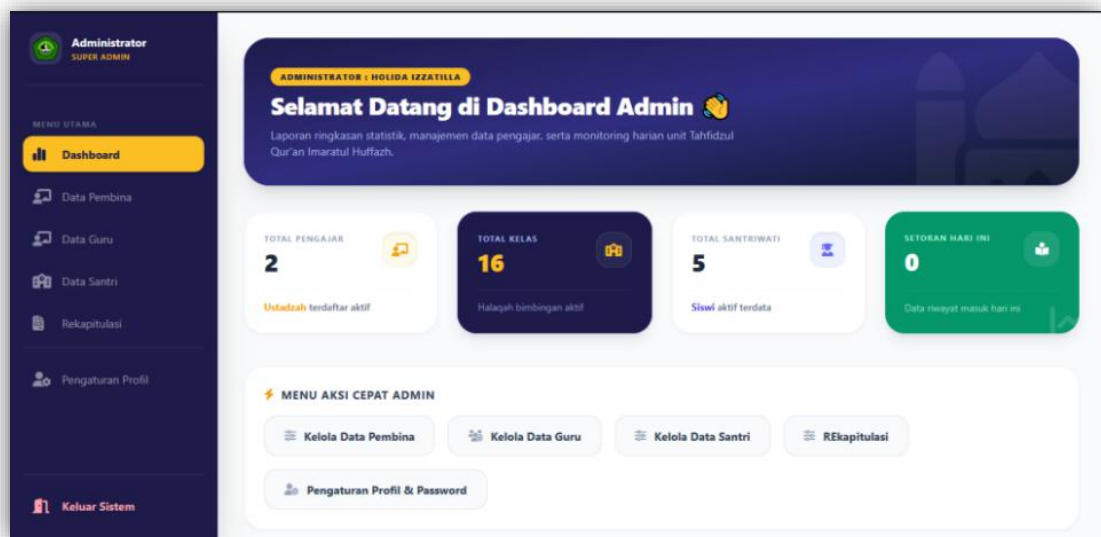


Figure 5. Admin Dashboard

Next, the instructors will be directed to a dedicated dashboard to monitor the students' memorization and review activities, as shown in Figure 6.

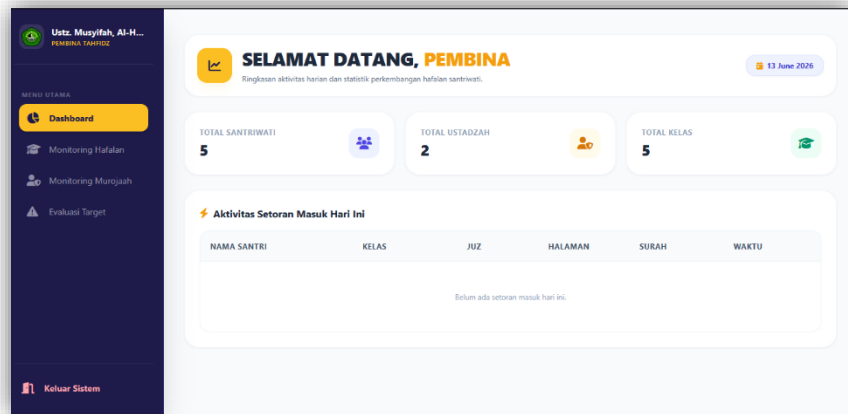


Figure 6. Advisor Dashboard

For teaching staff, the system provides a dedicated dashboard that serves as the main interface for instructors to enter data on students' memorization and review activities. When accessing the memorization or review input forms, instructors simply select a student's name, and the system automatically displays the student's ID number (NIS) and room information to streamline the data entry process. Through this dashboard, instructors for memorization and review can record details of the students' progress, including data on juz, surahs, pages, evaluation notes, and even the students' attendance status during the activity. This functionality is designed to minimize input errors and improve the efficiency of systematically documenting memorization progress, as illustrated in Figure 7.

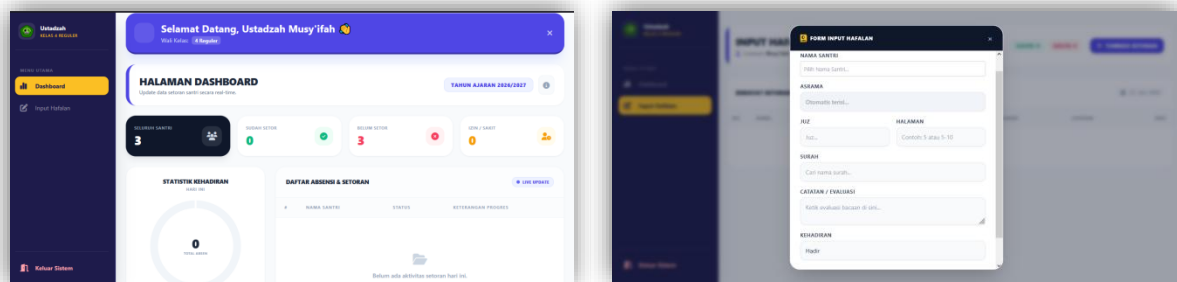


Figure 7. Teacher Dashboard and Memorization Input Form

Next, parents will be directed to a personal dashboard to monitor their child's memorization progress in real time after successfully authenticating their account. This page transparently displays a summary of the student's memorization history and daily achievements, which have been validated by the instructor. As a supporting feature, the system automatically sends a warning notification at the end of the academic year if the student's memorization achievements have not met the institution's targets. This functionality is designed to strengthen the supervisory synergy between parents and the Islamic boarding school, as illustrated in Figure 8..

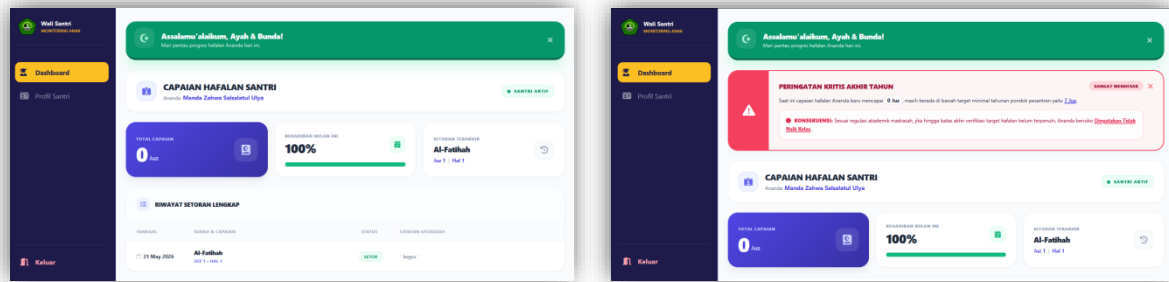


Figure 8. Student Guardian Dashboard and Alert Notifications

System Testing

System testing is conducted to verify the functionality and logical integrity of the application using two primary methods: black-box testing and white-box testing..

Table 2. Black-Box Testing

NO	Function Tested	Test Scenario	Expected Result	Value
1	Log In	Enter the correct username and password	Successfully logged into the dashboard	100 %
2	Enter Memorization Data (Teacher)	Enter the students' memorization data	Data saved to the database	100 %
3	Monitoring (Advisor)	View the memorization summary	Data displayed accurately	100 %
4	Download Reports (Admin)	Click the download/print button	Report file successfully downloaded/printed	100 %
5	Notifications (Wali)	Check the target notifications	Notifications appear based on the data	100 %

Table 2 presents the results of black-box testing, which focuses on testing the functionality of the user interface (user-level). The purpose of this testing is to ensure that every feature provided by the system from the login process to the notification feature for student guardians operates in accordance with the designed requirements. A score of 100% in the table indicates that these functions have worked optimally without any functional failures. This testing proves that the system has a high level of reliability from the user's perspective..

Table 3. White box Testing

NO	Input Condition	Logic/Condition (if/else)	Result	Status
1	Username & Password Correct	if (valid)	Successfully logged in to the dashboard	successful
2	Username/Password Incorrect	else	Login Error Message	successful
3	3 Juz < 5 Juz	if (total_hafalan < target)	Status: "Has not yet reached the target"	successful
4	Data available	if (data_exists)	Download/Print Successful	successful
5	Data empty	else	Status: "Data Not Available"	successful

Table 3 presents the results of white-box testing, which focuses on validating internal logic (source code). Unlike black-box testing, this approach analyzes decision-making flows using if-else conditional logic.

CONCLUSION

The developed web-based tahfidz monitoring information system has proven to streamline the operational process of recording memorization progress and automate real-time summary reporting. Testing results demonstrate the system's optimal effectiveness, with 100% functional success in Blackbox Testing and stable internal logic validity across all modules through Whitebox Testing.

The main contribution of this research is the integration of workflows between Administrators, Teachers, Mentors, and Student Guardians through personalized notifications of target achievements, thereby enhancing transparency and the accuracy of student progress evaluations compared to conventional methods. However, this research has limitations due to the system's accessibility being currently limited to a web-based responsive platform. Therefore, further development is recommended to migrate to a native mobile application (Android/iOS) to provide a more optimal user experience, more practical access, and more instant push notification features for system users.

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