

Development of A Web-Based Study Program Accreditation Monitoring Information System for The Information Systems and Technology Study Program at Universitas Muhammadiyah Kotabumi

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ARTICLE INFO	ABSTRACT
Article history: Received Sep 29, 2026 Revised Oct 03, 2026 Accepted Oct 09, 2026 Keywords: Accreditation Monitoring; Black Box Testing; Information System; Laravel, Dashboard; Web-Based System.	Study program accreditation requires structured management of documents, progress monitoring, task allocation, validation, deadline control, and report preparation. At the Information Systems and Technology Study Program, Universitas Muhammadiyah Kotabumi, the previous accreditation monitoring process faced several challenges, including scattered document storage, difficulties in monitoring the progress of each criterion, and unintegrated document coordination and retrieval. This study aims to develop a web-based study program accreditation monitoring information system capable of integrating document management and monitoring processes within a centralized system. System development was carried out through the stages of requirements identification, data collection, prototype design, design evaluation and refinement, implementation, and system testing. The system was implemented using Laravel, PHP, Bootstrap, and MySQL, with UML used for system design. The developed features include a monitoring dashboard, document management, progress monitoring for each accreditation criterion, timeline management, reminders and notifications, document verification, document search, audit trail, document versioning and revision, and reporting. Testing was conducted using the Black Box Testing method on the main system functions, including the monitoring dashboard, accreditation progress monitoring, document search, document verification, and report generation. The test results show that all tested functions produced outputs consistent with the predefined test scenarios and were declared successful. The developed system provides a more centralized accreditation monitoring workflow, enabling document information, progress, verification status, and reports to be managed within a single web-based application environment. <i>This is an open access article under the CC BY-NC license.</i>



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1. INTRODUCTION

Study program accreditation is a quality assurance process requiring structured management of data, supporting documents, performance evidence, and evaluation information. Recent studies show that digital quality assurance applications can support accreditation evidence, dashboards, and continuous quality processes (Schellekens et al., 2023); (Mello Silva & Vargas, 2021); (Zhang et al., 2022). At the Information Systems and Technology Study Program of Universitas

Muhammadiyah Kotabumi, accreditation monitoring initially relied on printed documents and scattered file storage. This condition made document retrieval, progress monitoring, task allocation, deadline control, and coordination difficult. Similar challenges have been reported in accreditation document management (Alim & Subari, 2024) ; (Purnomo et al., 2023) ; (Sudin et al., 2022).

A web-based application provides a centralized approach in which data can be managed through a single database and accessed according to user permissions. Higher education research emphasizes system integration, structured databases, and alignment between technology and institutional processes (Kustitskaya et al., 2023) ; (Mohamed et al., 2023) ; (Petchamé et al., 2023) . In this study, Laravel is used as a PHP-based web application framework, while MySQL is used for relational data management. The research problem concerns not only document storage but also the disconnection between documents, work status, progress, schedules, reminders, validation, and activity histories. Integrated information environments and data governance are important for data quality and traceability (Biloshchytskyi et al., 2024) ; (Putrama & Martinek, 2024). Therefore, the proposed system integrates document management, progress monitoring, timelines, notifications, audit trails, versioning, search, and reporting.

This study aims to develop a web-based study program accreditation monitoring information system for the Information Systems and Technology Study Program at Universitas Muhammadiyah Kotabumi. The specific objectives are to: (1) identify user requirements and accreditation monitoring business processes; (2) design the system using UML and a relational database; (3) implement a web-based system using Laravel and MySQL; and (4) evaluate system functionality using Black Box Testing. The contribution of this study lies in integrating document management with progress monitoring within a single workflow. The proposed features include a dashboard, task allocation, timeline management, reminders, audit trails, versioning, revision history, Smart Search, and reporting. Dashboard-based quality monitoring and audit platforms have been emphasized in recent studies (Sequeira et al., 2024) ; (Sorour & Atkins, 2024) ; (Sudin et al., 2022) ; (Yi & Liu, 2025). An information system is used to collect, process, store, and present information required by an organization. In accreditation, it functions as an integration medium for data and documents, enabling monitoring based on status, criteria, responsible personnel, and schedules. Integrated information systems can support institutional management and decision-making processes (Gürkut et al., 2023) ; (Zhou & Li, 2024).

In this study, accreditation monitoring refers to the monitoring of document status, progress for each criterion, task allocation, completion schedules, validation, and user activities. The dashboard summarizes these conditions through indicators, graphs, and status information, enabling management to obtain an overview of accreditation readiness without checking individual files. Dashboard-based monitoring has been applied to quality and performance information in higher education (Schellekens et al., 2023) ; (Sorour & Atkins, 2024). The system is developed as a PHP-based web application using the Model-View-Controller architecture. Laravel is used as the application framework, while MySQL manages user, role, criterion, document, progress, timeline, notification, activity, and report data. UML is used to model actor interactions, system processes, and database structures. Web-based quality-assurance applications also demonstrate the importance of centralized document management (Alim & Subari, 2024) ; (Purnomo et al., 2023) .

(Schellekens et al., 2023)(Sudin et al., 2022)(Alim & Subari, 2024)(Schellekens et al., 2023)(Wijaya & Alfian, 2023)(Sorour & Atkins, 2024)(Yi & Liu, 2025)(Biloshchytskyi et al., 2024)(Mohamed et al., 2023)(Mello Silva & Vargas, 2021) The development process follows requirements identification, data collection, prototype design, user evaluation, prototype refinement, implementation, testing, and final system development. The prototype was evaluated by users before implementation. This stakeholder-oriented sequence is consistent with digital quality-assurance development. The system was implemented using Laravel and MySQL, while its functionality was evaluated using Black Box Testing. Previous studies have proposed web-based accreditation and quality-assurance information systems, while recent studies have addressed digital quality assurance, online accreditation document management, accreditation data centers, dashboards, integrated data, and internal audit platforms. The research gap addressed in this study is the absence of an integrated workflow that connects accreditation documents with criterion-level progress, responsible personnel, timelines, reminders, validation, audit trails, version history, task allocation, and reporting in one system. Existing approaches commonly emphasize these functions separately. Therefore, the novelty of this study is not merely the use of Laravel or a dashboard, but the integration of these functions into a role-based accreditation monitoring

workflow tailored to the Information Systems and Technology Study Program at Universitas Muhammadiyah Kotabumi. This integration allows an accreditation team to move from evidence storage to progress control, validation, traceability, and reporting without switching between disconnected management mechanisms.

2. RESEARCH METHOD

The study was conducted at the Information Systems and Technology Study Program, Universitas Muhammadiyah Kotabumi. Requirements data were obtained through observation, interviews, literature studies, and documentation. Supporting documents included LED, LKPS, accreditation instruments, SOPs, monitoring formats, user data, and accreditation schedules. The emphasis on data quality and governance is consistent with recent research.

2.1 Development Stages

The research stages consist of requirements identification, data collection, prototype design, prototype evaluation, prototype refinement, system implementation, system testing, and the final system. The prototype was evaluated by users before implementation. This sequence is consistent with recent web-based accreditation and digital quality-assurance development (Schellekens et al., 2023) ; (Wijaya & Alfian, 2023) .

Figure 1 presents the sequence of the research and development stages, beginning with requirements identification and data collection and continuing through prototype design, evaluation, implementation, and system testing.

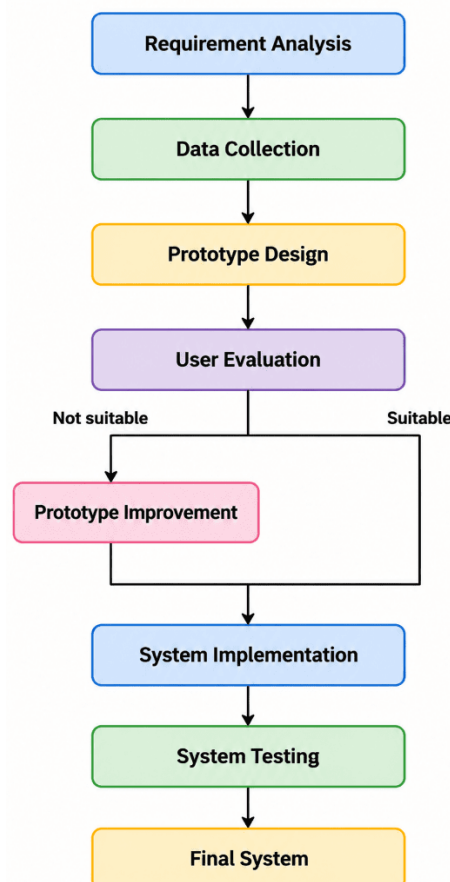


Figure 1. Research Stages

2.2 System Requirements Analysis

System requirements are divided into functional and non-functional requirements. Functional requirements identify services for each role, whereas non-functional requirements cover hardware, software, and user requirements. Role-specific functions are relevant to integrated higher-education information systems involving multiple stakeholders (Gürkut et al., 2023) ; (Mohamed et al., 2023) .

Table 1 presents the functional requirements according to the four user roles defined in the system. Each role is assigned functions that correspond to its responsibilities in the accreditation workflow. This separation supports role-based access and helps ensure that users interact with information and functions relevant to their tasks. The practical contribution of the integrated design is reflected in how each feature addresses a specific accreditation-monitoring inefficiency. The monitoring dashboard reduces the need to inspect individual files to obtain an overall readiness picture; document management centralizes evidence and its status; progress monitoring identifies incomplete work by criterion; timelines and reminders support deadline control; verification and comments formalize validation; the audit trail records who performed an activity and when; versioning and revision history preserve document changes; and reporting converts monitoring data into structured outputs for management and accreditation preparation. Consequently, the system connects operational activities that were previously handled as separate tasks.

Table 1. Functional Requirements by User Role

Category	Main requirements
Administrator	Login; user and access-right management; accreditation criteria; documents; timelines; notifications; dashboard; reports; audit trail; backup.
Head of the Study Program	Dashboard; progress monitoring; completion statistics; document approval; reports; timeline monitoring.
Accreditation Coordinator	Manage and validate documents; change status; comments; task allocation; progress monitoring; dashboard.
Accreditation Team	Upload and edit documents; view status; tasks; reminders; activity history.

2.3 System Design

The system was designed using UML, database design, and interface design. The Use Case Diagram represents four main actors: Administrator, Head of the Study Program, Accreditation Coordinator, and Accreditation Team. Main functions include login, user management, criteria, documents, timelines, notifications, dashboards, progress monitoring, validation, approval, upload, reminders, and reporting. Similar role-oriented structures have been used in integrated higher-education quality systems (Biloshchytskyi et al., 2024) ; (Mohamed et al., 2023).

The database uses MySQL with the main tables users, roles, criteria, documents, progress, timelines, notifications, activity_logs, and reports. Relationships maintain connections among users, documents, criteria, progress, schedules, notifications, activities, and reports. Integrated database structures support consistent and data-driven institutional management (Kustitskaya et al., 2023); (Putrama & Martinek, 2024) ; (Zhou & Li, 2024) . The relationships are visualized through the Entity Relationship Diagram (ERD), as shown in Figure 2.

Audit trails and versioning provide traceability beyond simple document storage. The audit trail records user activities so that changes to accreditation evidence can be associated with the responsible account and activity time, while versioning and revision history preserve successive document states. Together, these mechanisms help users identify what changed, follow the history of an evidence file, and distinguish the current document from earlier revisions. This is particularly useful when documents are reviewed repeatedly before being included in accreditation evidence.



Figure 2. Use Case Diagram of the Accreditation Monitoring Information System

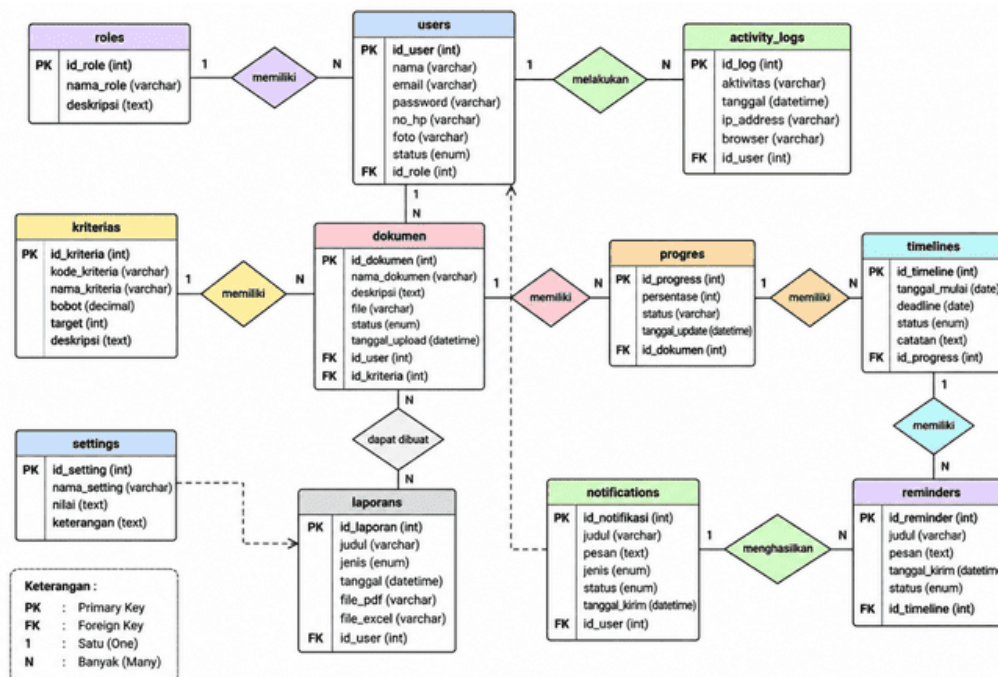


Figure 3. Entity Relationship Diagram (ERD)

2.4 Implementation and Testing

The implementation uses Laravel 11, PHP 8.3, Bootstrap 5, MySQL 8, Composer 2.x, Laragon, Visual Studio Code, and modern web browsers. The implementation follows a four-role access structure. System testing was conducted using Black Box Testing by examining inputs and outputs against predefined functional scenarios. Black Box Testing is appropriate for verifying

functional behavior, but it does not by itself provide a complete assessment of usability, security, performance, or reliability. Therefore, the present study limits its empirical claim to functional suitability of the tested features. For broader system-quality evaluation, usability can be measured using a standardized questionnaire such as SUS or UEQ; security can be examined through vulnerability scanning, authentication and authorization testing, and penetration testing; performance can be evaluated through response-time, load, and stress testing; and reliability can be assessed through repeated execution, availability monitoring, error-rate measurement, and backup/recovery testing. These additional methods are evaluation extensions rather than results claimed in the present study.

3. RESULTS AND DISCUSSIONS

The development resulted in an accreditation monitoring application with role-based access control. The Administrator manages users, roles, criteria, documents, timelines, notifications, reports, audit trails, and backups. The Head of the Study Program monitors progress and approvals. The Accreditation Coordinator manages and validates documents, tasks, progress, and reminders, while the Accreditation Team uploads documents and follows assigned tasks. This multi-role arrangement supports coordinated quality-assurance processes (Schellekens et al., 2023) ; (Yi & Liu, 2025).

The process begins with the configuration of users and access rights, followed by the establishment of criteria and schedules, task allocation, document uploading, progress status updates, verification, and the provision of revision notes. The dashboard presents the condition of each criterion, while timelines and reminders support deadline control. The audit trail records activities so that changes and user activities can be traced.

The implementation results show that the accreditation requirements have been translated into an integrated application interface. The dashboard provides a concise view of document conditions, completeness, schedules, and accreditation progress. Research on higher-education dashboards indicates that visualization can help stakeholders interpret institutional information and identify areas requiring follow-up (Sorour & Atkins, 2024) ; (Mello Silva & Vargas, 2021) .

The integration of the features produces practical efficiency at several points in the accreditation workflow. The dashboard reduces repeated manual checking of documents; progress monitoring makes unfinished criteria visible; document search reduces retrieval effort through structured filters; verification and comments shorten coordination for approval or revision; timelines and reminders reduce dependence on personal deadline tracking; audit trails reduce uncertainty about user activities; versioning prevents confusion between current and previous evidence; and reporting reduces repeated compilation of monitoring information into separate documents. The principal benefit is therefore not any single feature, but the continuity of information from document evidence to progress, validation, traceability, and reporting within one workflow.

Figure 4 shows the monitoring dashboard, which provides a summary of the accreditation status in a single view. Information such as the number of documents, complete documents, incomplete documents, provisional scores, reaccreditation schedules, and overall progress can be monitored without opening documents individually. The progress section for each criterion also helps users identify areas that require further action.

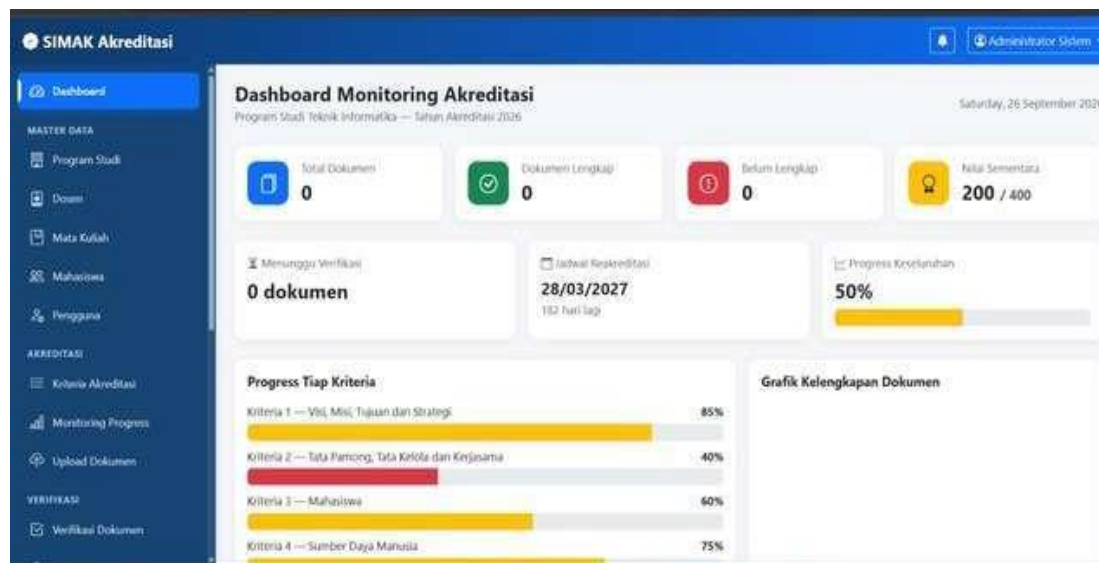


Figure 4. Accreditation Monitoring Dashboard

Figure 5 presents progress information for the accreditation criteria. The system provides percentage indicators and status information for completed, ongoing, revised, and unavailable documents. This view supports prioritization of unfinished work.

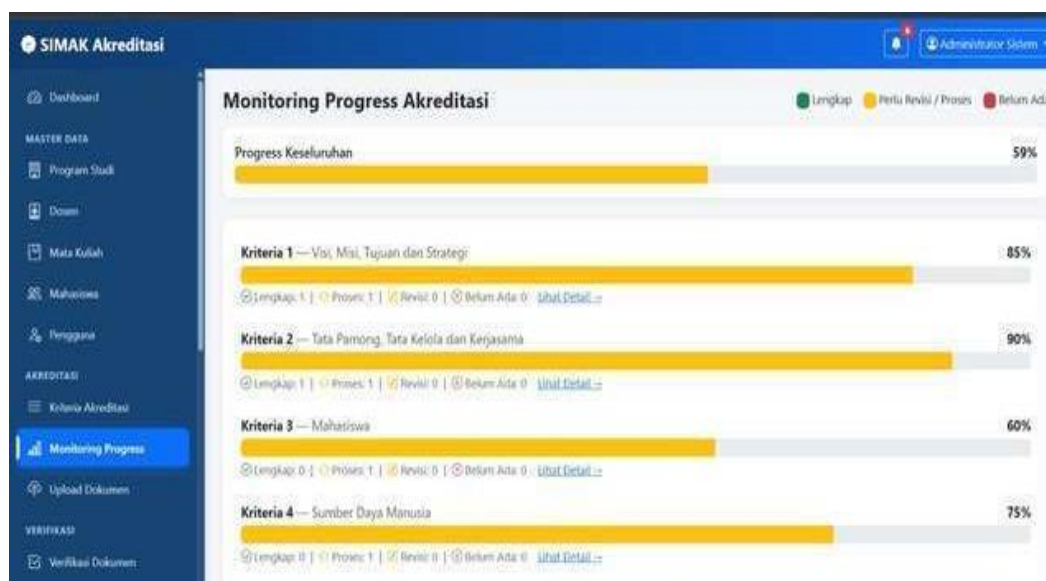


Figure 5. Accreditation Progress Monitoring

Figure 6 presents the document search facility used to locate accreditation evidence. Users can filter documents by name, category, criterion, PIC, status, and year. The results provide metadata needed to trace the relevant evidence.

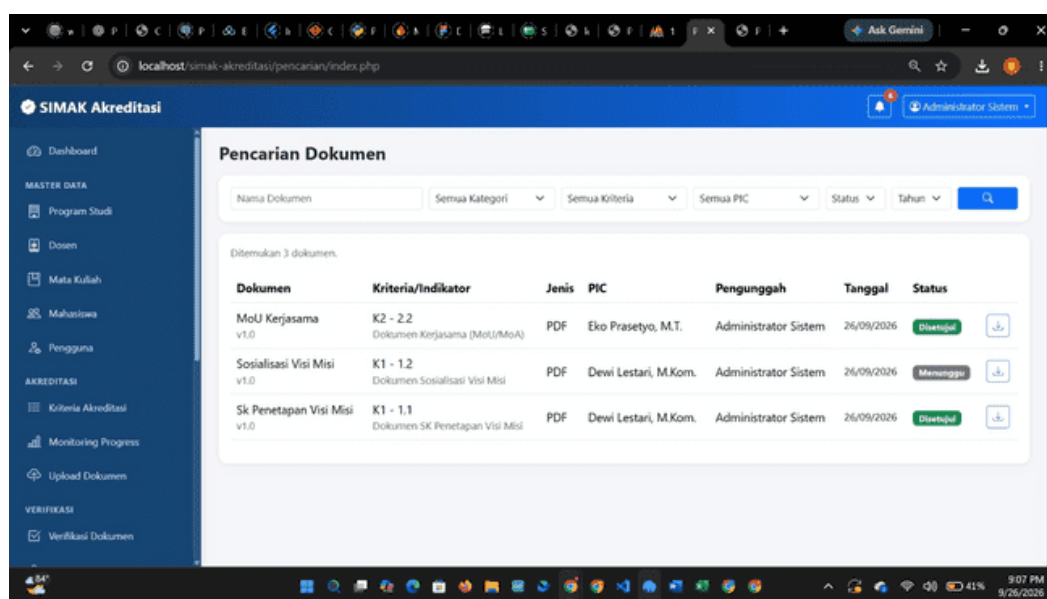


Figure 6. Document Search

Figure 6 shows the document search page, which helps users locate and trace accreditation evidence. The facility provides filters for document name, category, criterion, PIC, status, and year. Centralized repositories and structured document metadata can improve retrieval and traceability (Alim & Subari, 2024) ; (Purnomo et al., 2023) .

Figure 7 presents the document verification facility. Authorized users can inspect document status and process documents according to the available verification states. This function supports controlled validation before evidence is used in accreditation activities.

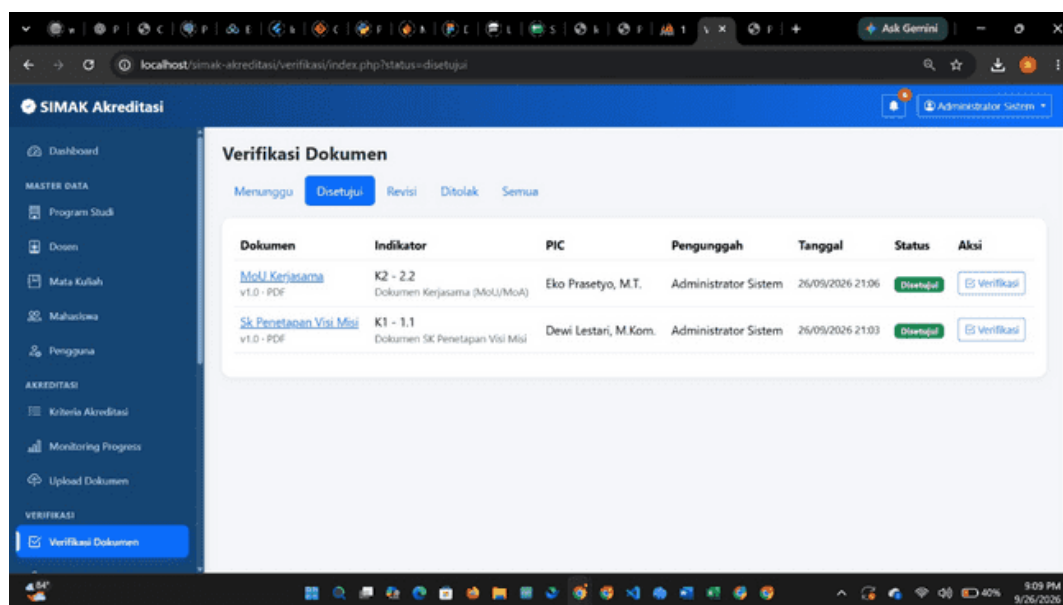


Figure 7. Document Verification

Figure 7 shows the document verification page. Users with appropriate access rights can view documents according to Pending, Approved, Revision Required, or Rejected statuses. Verification and audit functions support traceability over the status and handling of institutional evidence (Yi & Liu, 2025) ; (Zhang et al., 2022).

In practical use, verification, audit trail, and versioning form a traceability chain. A document can move through defined verification states, the activity history can record actions performed by authorized users, and revisions can be retained so that earlier evidence is not confused with the latest version. This chain strengthens document accountability and makes the accreditation preparation process easier to review internally. Figure 8 presents the reporting module used to summarize accreditation information. The module provides reports on completeness, progress, uploads, verification, activities, incomplete documents, and approaching expiration. Reports can be printed as PDF or exported to Excel.

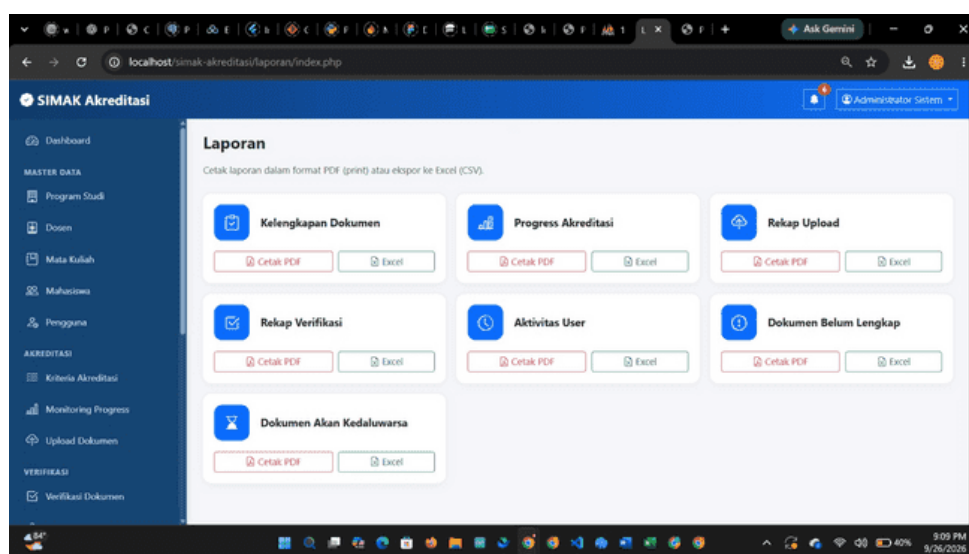


Figure 8. System Reports

Figure 8 shows the reporting module, which provides outputs for document completeness, accreditation progress, uploads, verification, activities, incomplete documents, and approaching expiration. PDF printing and Excel export allow monitoring information to be used for reporting. Data-driven reporting and business-intelligence approaches support monitoring and managerial decision making in higher education (Gürkut et al., 2023); (Sequeira et al., 2024). Based on the implementation results, the system contains several interconnected main features that support document management and accreditation process monitoring. A summary of the functions of each feature is presented in Table 3. Table 2 summarizes the main features implemented in the accreditation monitoring system. The features connect document management with progress, scheduling, notifications, verification, activity tracking, and reporting. Their integration is intended to support a centralized monitoring workflow rather than isolated file storage.

Table 2. Main System Features

No.	Feature	Function
1	Monitoring dashboard	Displays a summary of progress and criterion status.
2	Document management	Upload, edit, validation, status, and document history.
3	Progress monitoring	Displays completion progress for each criterion.
4	Timeline	Manages work schedules and deadlines.
5	Reminders/Notifications	Provides reminders for pending work or approaching deadlines.
6	Audit trail	Records user activities.
7	Reporting	Generates PDF reports and Excel exports.
8	Versioning & revision	Maintains document change history.

Black Box Testing of the implemented system focused on functions that could be demonstrated through the system interface, namely the dashboard, progress monitoring, document search, document verification, and reporting. The actual test results are summarized in Table 4. Testing focused on functions that could be directly observed through the system interface, and each output was compared with the expected condition. Table 3 summarizes the Black Box Testing scenarios used to evaluate the main application functions. Each scenario was assessed by comparing the actual system output with the expected condition. The results indicate whether the tested function operated according to the defined requirements.

Table 3. Black Box Testing Results

No.	Tested function	Test scenario	Actual result	Status
1	Dashboard	Monitoring data are available	The dashboard displays a summary of documents, progress, and criterion status.	Passed
2	Progress Monitoring	Criterion data are available	Overall progress and progress for each criterion are displayed.	Passed
3	Document Search	A keyword/filter is selected	Matching documents are displayed together with the criterion, PIC, date, and status.	Passed
4	Document Verification	The document is included in the verification list	The document status can be displayed and verified according to access rights.	Passed
5	Reporting	The user selects a report type and prints a PDF	The report page provides options for PDF printing and Excel export.	Passed

The implementation results indicate that the system integrates documents with work status, responsible personnel, schedules, and user activities. The dashboard summarizes progress, while timelines and reminders support time-based control. These functions are consistent with recent approaches to quality monitoring, data integration, and digital governance in higher education (Biloshchytskyi et al., 2024) ; (Sorour & Atkins, 2024); (Yi & Liu, 2025) .

The system transforms manual inspection into data-based monitoring. Documents can be assigned statuses, progress monitored by criterion, deadlines managed through timelines and reminders, activities traced through the audit trail, and reports prepared through the reporting module. Data-governance research emphasizes consistent data structures, traceability, and coordinated information flows (Zhou & Li, 2024) .

Table 4 compares the accreditation management process before and after the implementation of the system. The comparison focuses on document storage, progress monitoring, deadlines, validation, user activities, and reporting. The developed system centralizes these activities through integrated web-based functions.

Table 4. Comparison of Accreditation Management Processes

Aspect	Previous condition	Developed system
Document storage	Documents/files were scattered	Documents are centrally managed
Progress monitoring	Manual inspection	Dashboard and progress status
Deadlines	Manual monitoring	Timeline and reminders
Validation	Manual coordination	Verification status and comments
User activities	Not centralized	Audit trail
Reporting	Prepared manually	PDF reports and Excel exports

The main limitation of this study lies in the scope of testing, which remains focused on core application functions. Black Box Testing verifies whether the dashboard, progress monitoring, document search, document verification, and reporting functions produce the expected outputs, but it does not comprehensively determine usability, security, performance under concurrent access, or long-term reliability. The five tested functions also represent selected core scenarios rather than exhaustive coverage of every role, boundary condition, failure mode, and infrastructure condition. Consequently, the successful Black Box results should be interpreted as evidence of functional operation under the defined scenarios, not as proof that the system is secure, highly scalable, or

fully reliable in all operational conditions. Further evaluation should include usability testing with representative users, security assessment, load/stress testing, and reliability and backup-recovery testing with larger datasets and concurrent users.

4. CONCLUSION

This study produced the design and implementation of a web-based study program accreditation monitoring information system for the Information Systems and Technology Study Program at Universitas Muhammadiyah Kotabumi. The system integrates user management, roles, criteria, documents, task assignment, progress, timelines, reminders, dashboards, audit trails, versioning, revision history, and reporting. The system uses Laravel and MySQL and is designed using UML to model processes and data structures. The four main roles—Administrator, Head of the Study Program, Accreditation Coordinator, and Accreditation Team—have functions tailored to their respective responsibilities. The primary contribution is the integration of accreditation evidence management with criterion-level progress, task allocation, deadlines, validation, activity traceability, document history, and reporting in one centralized workflow. This integration provides a more continuous monitoring process than treating document storage, progress tracking, validation, and reporting as separate activities. Black Box Testing was used to evaluate the main system functions, and all five tested core scenarios—dashboard, progress monitoring, document search, document verification, and reporting—produced the expected outputs and were declared successful. However, these results establish functional suitability only; they do not by themselves establish usability, security, performance, or reliability. Future evaluation should therefore complement Black Box Testing with usability, security, performance, reliability, and backup/recovery assessments before wider operational deployment. Evaluation scope and interpretation: The current evidence supports the conclusion that the tested core functions operate according to their predefined scenarios. Usability, security, performance, and reliability are identified as important complementary dimensions for future evaluation and are not presented as empirically measured outcomes in this article.

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