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ProManageTI: Integrated System for Managing Internships, Proposals, and Final Projects in Informatics Engineering Students

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ABSTRACT

This study presents the design and development of ProManageTI, a web-based integrated system for managing and monitoring Internship (KP), Final Project Proposals (Proposal TA), and Final Projects (TA) in the Informatics Engineering Study Program at Universitas Dian Nusantara. The research problem addressed is the inefficiency and lack of integration in the manual process using Google Workspace tools, which led to fragmented data, delays in academic workflows, and limited real-time progress tracking. The objective of this study is to provide a structured digital platform that enhances effectiveness, transparency, and accountability in academic process management. The system was developed using the Agile methodology with the Scrum framework, implemented with PHP, MySQL, and Bootstrap, and designed through Unified Modeling Language (UML) diagrams. It integrates features such as title submission, supervision monitoring, scheduling, document verification, notifications, and centralized document storage. Functional testing applied the Black Box method with Equivalence Partition and Boundary Value Analysis techniques, confirming that all features met requirements. The findings indicate that ProManageTI improves operational efficiency, data accuracy, and coordination among students, supervisors, and program administrators. The contribution and novelty of this research are the provision of a scalable and adaptable model for integrated academic management, enabling structured, accountable, and responsive academic services that can be replicated in broader higher education contexts.

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1. INTRODUCTION

The rapid development of information technology (IT) has significantly transformed various sectors, including education. In this context, IT enables educators to prepare and deliver learning processes more effectively, thereby improving educational quality [16]. IT also facilitates data processing, retrieval, storage, and manipulation to produce relevant and accurate information for decision-making [2]. Such technology adoption has been proven to streamline workflows and enhance data accuracy in educational institutions [5].

In higher education, IT plays a vital role in academic administration, such as managing Internship (KP), Final Project Proposals (Proposal TA), and Final Projects (TA). It simplifies academic processes, accelerates services, and

enhances students' skills [7]. Studies highlight that technology integration improves stakeholder coordination [11] and boosts document management efficiency [18], although many institutions still face challenges in achieving optimal system integration [8].

At Universitas Dian Nusantara, KP, Proposal TA, and TA are still managed manually, causing administrative backlogs, recording errors, delayed submissions, and difficulty tracking student progress. Students often struggle to ensure their progress is well monitored, while lecturers require more time to provide feedback [20]. Similar challenges were noted, who found that manual communication and recording can directly delay final project completion [12].

Several previous studies have attempted to address these issues. For example, [10] developed a Waterfall-based academic information system for managing and monitoring student internship data. [8] created an Android-based academic monitoring application, and [9] designed an integrated academic management system using the ADDIE model. Agile-based approaches have also been widely adopted for their flexibility, as shown in [14] and [1], which effectively integrated iterative, user-driven process management.

Additionally, [12] built a Waterfall-based monitoring system to track interactions between supervisors and internship students, improving the quality of supervision. [18] demonstrated that a web-based monitoring system for KP and theses accelerates data collection and reduces document loss risks. Similar benefits were reported in Agile-based academic systems at private universities [15].

Based on these conditions and prior research, the objective of this study is to design and develop ProManageTI, a web-based integrated system that supports KP, Proposal TA, and TA with real-time monitoring and a user-friendly interface. The contribution of this research lies in providing a unified academic management platform that streamlines submissions, monitoring, and evaluations, reduces bureaucracy, and facilitates transparent communication between students, lecturers, and administrators [18]. The novelty of ProManageTI is the combination of integrated monitoring, scheduling, document verification, and notification features in one centralized platform, which has not been comprehensively implemented in existing systems. Similar systems have been proven to enhance user satisfaction in integrated academic systems [5] [10].

It is expected that ProManageTI will improve the effectiveness and quality of academic services at Universitas Dian Nusantara. The system has the potential to support fast and accurate academic decision-making and serve as a model for other universities facing similar challenges in academic administration. Ultimately, ProManageTI aims to create a more structured, transparent, and efficient academic process for all stakeholders [13] [19].

2. RESEARCH METHOD

2.1. Data Collection Methods, Research Instruments, and Testing Methods

2.1.1. Qualitative Approach

This study also incorporates a qualitative approach to gain deeper insight into the real challenges faced by users in academic administration processes. This approach is employed to explore the needs, obstacles, and experiences of students and lecturers in managing internships, proposals, and final projects in a more contextual manner. Qualitative research emphasizes subjective meaning and understanding of phenomena within their natural context, making it highly suitable for studies on user-driven information systems [17]. Supporting this, a study by [7] also used a qualitative approach to explore the impact of technology in education, showing that adaptive use of technology can enhance learning processes and improve academic service efficiency.

2.1.2. Agile Method

The Agile method is a software or system development approach that emphasizes flexibility, iterative cycles in small increments, and close collaboration between developers and stakeholders, enabling responsive adaptation to changing requirements [14]. Its implementation has been proven to manage projects efficiently and deliver direct value to end-users [1], while facilitating intensive communication and continuous iteration so that features can be adjusted based on user feedback [15]. In various contexts, Agile also enhances responsiveness in inventory management and adaptation to changing needs in real-time [4], accelerates development processes, and improves product quality through fast and repeated feedback cycles [13]. Furthermore, Agile supports risk reduction by enabling early detection of issues and continuous delivery of functional components, ensuring the system evolves effectively with user needs. This adaptability makes Agile a preferred approach for modern software projects that operate in dynamic and fast-changing environments.

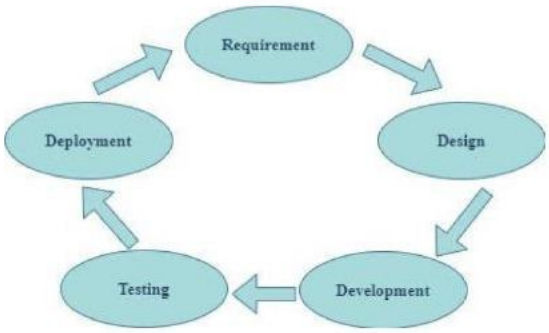

Figure 1. Agile Method

Figure 1 illustrates the Agile method adopted in this study, specifically the Scrum framework, which emphasizes iterative development cycles and close collaboration between developers and stakeholders. The diagram shows how work is divided into sprints, enabling continuous feedback and adjustment to meet user requirements. This figure is essential to understand the methodological foundation of ProManageTI, as it demonstrates how flexibility and adaptability are integrated into the system development process.

2.2.3. Black Box Method

This study applies the Black Box method to test application functionality without accessing internal code, using input values to verify outputs through the Equivalence Partitions technique [3]. [6] demonstrated its effectiveness with Boundary Value Analysis for testing input limits, ensuring accurate handling of various scenarios. Similarly, [19] achieved 100% functional success in a web-based academic monitoring system for students with disabilities, confirming Black Box testing as a simple yet efficient method for detecting software errors.

2.2.4. Integrated System and Monitoring

Integrated systems and monitoring are crucial for improving efficiency and transparency in academic management. [10] developed an industrial practice information system integrated with academic systems, while [20] created a thesis supervision monitoring system, both enhancing coordination and data accuracy. [8] designed an Android-based academic monitoring app, and [9] applied the ADDIE model for integrated academic management, improving responsiveness and structure. Using Agile, [12] built a monitoring system for tracking student progress, supported by [5] who linked academic system quality to user satisfaction. [11] emphasized digital monitoring's role in streamlining document tracking and communication, while [18] showed it boosts transparency and accuracy. Collectively, these studies confirm that digital monitoring integration helps students and lecturers achieve academic goals more effectively.

2.2.5. Unified Modeling Language (UML)

Unified Modeling Language (UML) is a modeling approach used to describe the functional requirements and workflows of a system through diagrams such as Use Case, Activity, Sequence, and Class Diagrams, which depict user interactions, process flows, object communications, and system structures respectively. The use of UML ensures that system designs are clear, structured, and aligned with user needs, thereby improving communication between developers and stakeholders [8]. In the context of academic information systems, UML supports the development of features and workflows that enhance efficiency and adaptability to technological advancements in education [7]. Additionally, its role in guiding accurate system functionality design is closely linked to the testing phase, where methods such as Black Box with Boundary Value Analysis validate that each designed component operates as intended [6].

2.2. Research Stages

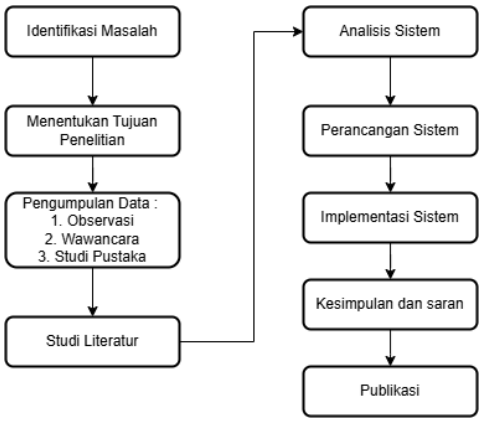

Figure 2. Research Stages

Figure 2 presents the stages of research conducted to design and implement ProManageTI. The diagram outlines sequential activities starting from problem identification, determining research objectives, system analysis and design, data collection, implementation, and testing, to conclusion and publication. This figure helps readers follow the logical flow of the research process and understand how each stage contributes to building a reliable and structured academic management system.

2.2.1. Problem Identification

The current system for managing internships (KP), final project proposals (Proposal TA), and final projects (TA) in the Informatics Engineering Study Program at Universitas Dian Nusantara is still manual, relying on Google Workspace tools such as Google Sheets, Google Forms, and Google Docs. This results in inefficiency, the absence of real-time monitoring across activities, and difficulties in academic administration management.

2.2.2. Research Objectives

The primary goal is to design and develop *ProManageTI* as a solution to improve efficiency and provide real-time monitoring features to support KP, Proposal TA, and TA processes.

2.2.3. System Analysis & Design

Based on the collected data, system analysis identified user needs, weaknesses, and opportunities, leading to the design of features such as document management, progress monitoring, and automated notifications. The system design incorporated UML diagrams (Use Case, Activity, Class, and Sequence) and UI mockups created in Figma, focusing on usability, efficient architecture, and a structured database.

2.2.4. Data Collection

Relevant data were gathered through direct observation of current workflows, interviews with students and lecturers to identify specific needs, and literature reviews to obtain theoretical foundations and best practices in academic management systems.

2.2.5. System Implementation

ProManageTI was developed using the Agile methodology, with PHP, MySQL, Bootstrap, and Visual Studio Code (VSCode). The system underwent testing to ensure all features operated correctly and supported real-time monitoring of academic activities.

2.2.6. Conclusion and Recommendations

The implementation of *ProManageTI* improved efficiency, enhanced communication between students and lecturers, and enabled structured progress monitoring. Recommendations include integrating the system with the university's academic platform and adding new modules to meet evolving needs.

2.2.7. Publication

The research outcomes are documented in a final project report and prepared for journal publication to contribute to the academic community and encourage similar developments in higher education.

3. RESULTS AND DISCUSSION

The implementation of ProManageTI produced various functional outputs, including dashboards for administrators, supervisors, examiners, and MPTI lecturers, each providing role-specific features. For instance, the Prodi dashboard (Figure 6) centralizes data management of students, lecturers, assessments, schedules, and documents, supporting administrative efficiency as highlighted in [10]. The supervisor dashboard (Figure 7) allows structured documentation of guidance sessions and assessments, consistent with [12] who emphasized that systematic monitoring reduces delays in final project completion. Functional testing using the Black Box method (Tables 1–5) confirmed that all key features, including login, title submission, supervision monitoring, assessment, and scheduling, returned "succeed" status. These findings validate the robustness of the system design and reinforce previous studies such as [6] and [19], which demonstrated the effectiveness of Black Box testing with Boundary Value Analysis in ensuring functional accuracy [21] [22].

Compared with prior systems, ProManageTI offers broader integration by combining submission, monitoring, evaluation, document verification, and notifications in one platform. Previous works, such as [8] and [9], focused only on Android-based or partial academic management systems, while [18] emphasized data collection and document security without comprehensive role-based dashboards. ProManageTI addresses these gaps through its holistic features and Agile-based development process, in line with [1] and [14], which stress iterative design to accommodate user needs. Overall, the results indicate that ProManageTI improves efficiency, transparency, and coordination between students, lecturers, and administrators, consistent with [5] and [11] that linked integrated systems to higher user satisfaction and communication effectiveness. These contributions highlight ProManageTI as a novel and scalable model for integrated academic management in higher education [25][24][23].

3.1. Use Case Diagram

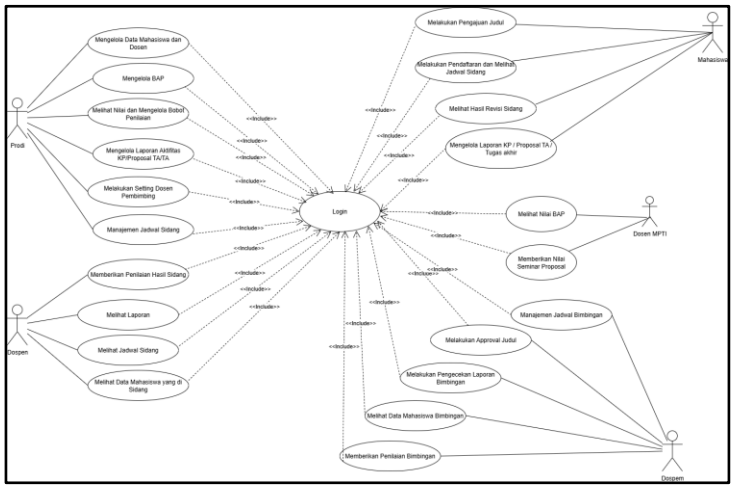

Figure 3. Use Case

The figure above shows the proposed ProManageTI use case designed by the researcher for the university. Before starting the coding process, the researcher created a use case design, including the actors. The researcher then explained each actor and their functions in the use case description table.

3.2. Class Diagram

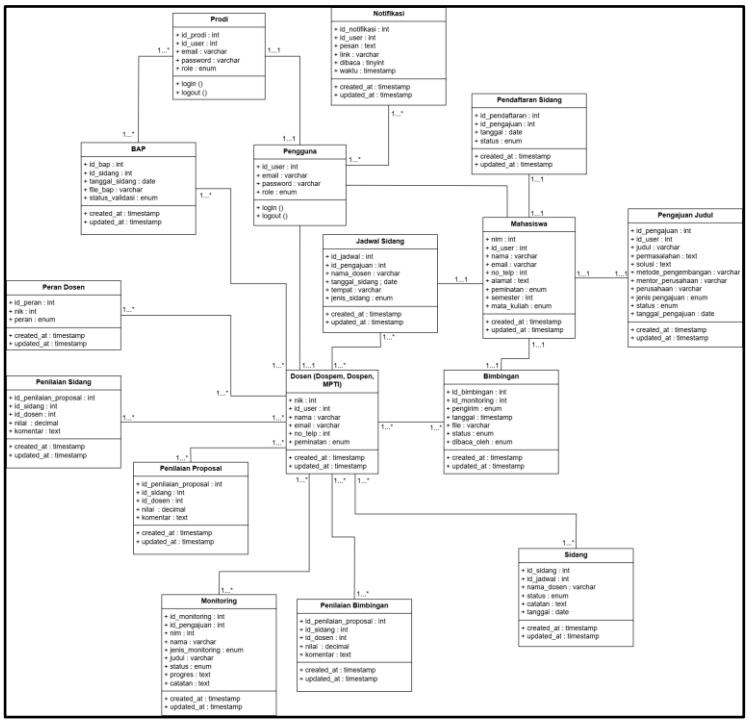

Figure 4. Class Diagram

The figure above is the class diagram of the web-based thesis submission and monitoring management system. The class diagram is essential in this system as it is used to model the data structure and relationships between entities, such as users, students, lecturers, title submissions, supervision, assessments, and defense schedules. With the class diagram, the management of academic processes—such as submissions, monitoring, scheduling, and defense assessments—can be carried out in a structured, efficient, and easily scalable manner.

3.3 System Implementation and Output

3.3.1 Login

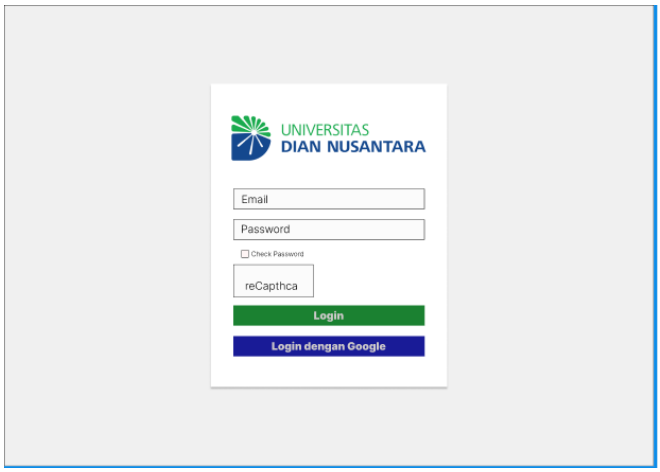

Figure 5. Login

The login page serves as the entry point to the ProManageTI system. Users must enter a valid email address and password to access the dashboard according to their role. New users are required to create an account before logging in.

3.3.2 Dashboard Study Program Page

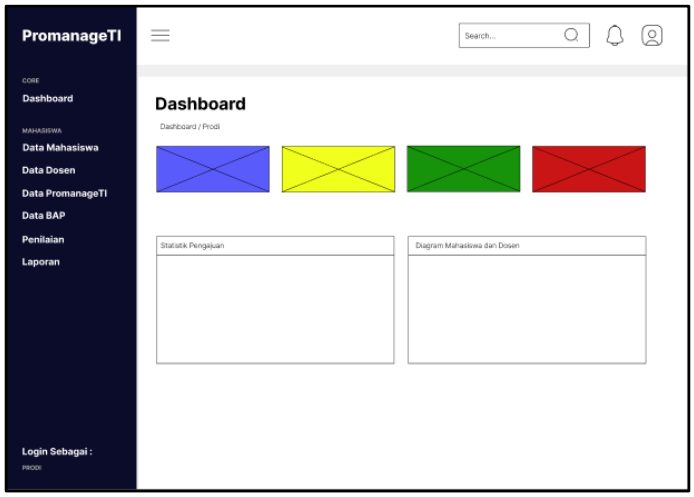

Figure 6. Dashboard Study Program Page

This view is the control center for the study program administrator. The available menus allow management of student data, lecturer data, lecture minutes (BAP), assessments, reports, trial schedules, and document verification. The dashboard also displays a real-time summary of students' academic activities.

3.3.3 Supervisor: Dashboard

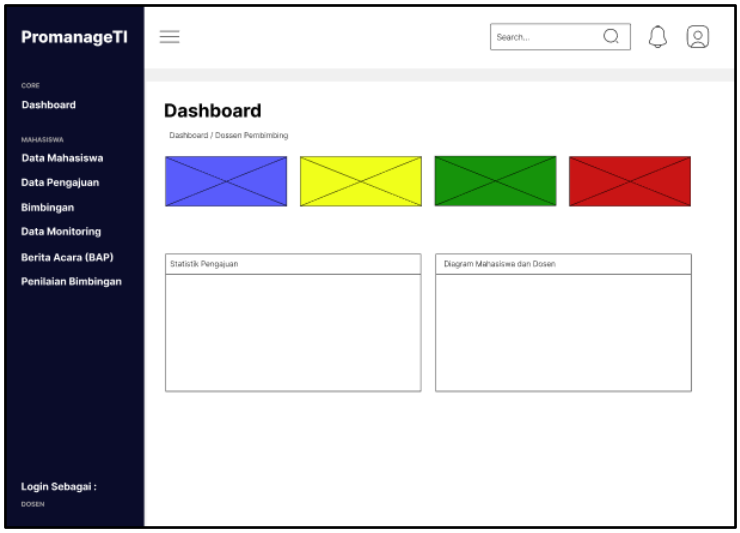

Figure 7 Supervisor: Dashboard

This dashboard enables academic supervisors to monitor their advisees' data, manage the supervision process, fill in lecture minutes (BAP), provide supervision assessments, and review the progress of internships or final projects. The displayed information helps supervisors conduct structured and well-documented monitoring.

3.3.4 Examiner: Dashboard

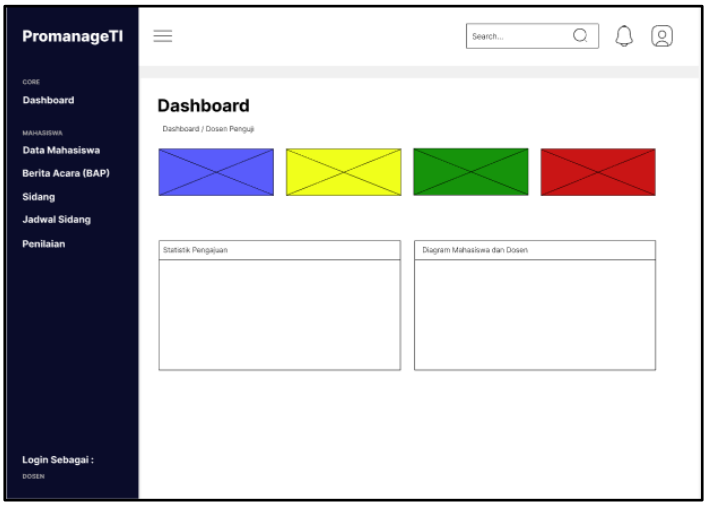

Figure 8. Examiner: Dashboard

This view is used by examiners to review the data of students under examination, access lecture minutes (BAP), monitor trial schedules, and provide defense assessments. All processes are conducted digitally to ensure accuracy and completeness of assessment data.

3.3.5 MPTI Lecturer Dashboard

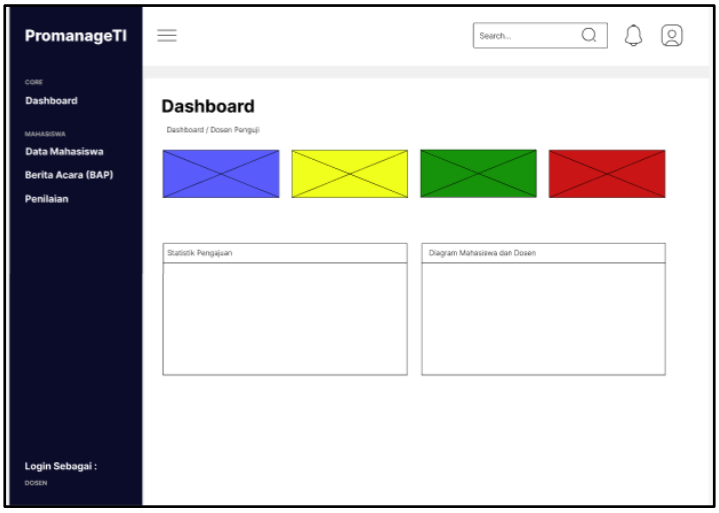

Figure 9. MPTI Lecturer Dashboard

This dashboard is used by MPTI lecturers to monitor student data, review and fill in lecture minutes (BAP), and provide proposal seminar assessments. The interface facilitates coordination and ensures that the seminar proposal administration process is well-documented.

3.4 Black Box Integrated System and Monitoring

Table 1. Black Box Integrated System and Monitoring Testing Table Study Program

Menu	Process	Status
Login	Enter your email address and password	Succeed
Home page	User has successfully logged in. after that the system redirects to the main page	Succeed
Manage Student Data	Add, update, or delete student records in the database.	Succeed
Manage Lecturer Data	Add, update, or delete lecturer records.	Succeed
Manage PromanageTI Data	Oversee and update core ProManageTI academic data.	Succeed
Manage BAP Data	Create, edit, and store lecture minutes (BAP) digitally.	Succeed
Managing Assessment	Input, verify, and store academic assessment scores.	Succeed
Managing Report	Upload, review, and validate academic reports.	Succeed
Log out	Exit the page and return to the login menu	Succeed

Table 1 presents the Black Box testing results for the Prodi (Study Program Administrator) dashboard. The processes tested include login, homepage access, management of student and lecturer data, supervision minutes (BAP), assessments, reports, and logout. Each process was successfully executed, showing that the Prodi dashboard supports full functionality for academic data management. This confirms that administrators can perform their duties efficiently within the system.

Table 2. Black Box Integrated System and Monitoring Testing Table Student

Menu	Process	Status
Login	User enters email address and password	Succeed
Home Page	User has successfully logged in. after that the system redirects to the main page	Succeed
Title Submission	Submit KP, Proposal TA, or TA title with required details	Succeed
Title Submission History	View previous title submissions and their status	Succeed
Guidance	Submit supervision requests and receive lecturer feedback	Succeed
Trial Registration	Register for proposal or final defense	Succeed
Court Schedule	View scheduled defense dates and details	Succeed
Upload Report	Upload academic reports for review	Succeed
Log out	Exit the page and enter the login page	Succeed

Table 2 shows the Black Box testing outcomes for the student role. Key processes tested include login, title submission and history, guidance requests, trial registration, schedule viewing, report uploads, and logout. All test results succeeded, indicating that students can independently carry out academic submissions and monitoring through ProManageTI. This ensures better accessibility and transparency for students in managing their academic progress.

Table 3. Supervisor: Black Box Integrated System and Monitoring Testing Table

Menu	Process	Status
Login	User enters email address and password	Succeed
Home Page	User has successfully logged in. after that the system redirects to the main page	Succeed
View Student Data	Access detailed data of supervised students	Succeed
PromanageTI Data	Review and manage academic progress records	Succeed
Guidance	Monitor and document student supervision sessions	Succeed
Monitoring Data	Track student progress in KP, Proposal TA, or TA	Succeed
Lecture Minutes	Fill in and store supervision records	Succeed
Guidance Assessment	Input grades for student supervision performance	Succeed
Log out	Exit the page and enter the login page	Succeed

Table 3 provides the results of functional testing for the supervisor (Dosen Pembimbing) dashboard. Tested processes include viewing student data, monitoring guidance sessions, recording supervision minutes, and giving supervision assessments. All functions returned successful outcomes, confirming that supervisors are able to conduct structured and well-documented monitoring. This aligns with findings in [12] that systematic supervision management reduces delays in project completion.

4. CONCLUSION

This research resulted in the development of ProManageTI, a web-based integrated system designed to manage and monitor Internship (KP), Final Project Proposal, and Final Project processes in the Informatics Engineering Study Program at Universitas Dian Nusantara. The system was developed to address limitations of the previously manual and fragmented processes, which often caused administrative delays, difficulties in tracking student progress, and inefficient data management. By applying the Agile method with the Scrum framework, ProManageTI was able to adapt to user needs through iterative development. Key features such as title submission, supervision monitoring, scheduling, document verification, notifications, and centralized data storage were successfully implemented and evaluated using Black Box Testing, with all functions operating as intended. The implementation of ProManageTI has proven to enhance efficiency, data accuracy, transparency, and coordination among students, lecturers, and program administrators, thereby supporting a more structured, accountable, and responsive academic service.

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