Implementation of a Website-Based Proposal Seminar Registration System Using the Waterfall Method at Sheikh Abdul Halim Hasan Binjai Institute

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Registration of proposal seminars at the Sheikh Abdul Halim Hasan Binjai Institute is still done manually, which causes problems such as late information, errors in data recording, and lack of efficiency in administrative management. The institute currently has approximately 1,200 active students, with an average of 150–200 students submitting seminar proposals each semester. This increasing number of participants makes the manual system even more burdensome and prone to errors. To overcome these problems, a website-based proposal seminar registration system was implemented. This system is designed to make it easier for students to register, as well as help the administration in managing the data of seminar participants in a more effective and structured manner. The system development uses the PHP programming language with a MySQL database and the waterfall development method as a systematic approach in the implementation process. The results of the implementation show that the system is able to improve the efficiency of the registration process, minimize data errors, and provide real-time information for students and supervisors. With this system, it is expected that the proposal seminar administration process will become more organized and transparent.

Keywords: Information System, Proposal Seminar, Online Registration, Website, Implementation.

I. INTRODUCTION

The development of information technology has had a significant impact in various fields of life, including the higher education sector. Efficiency in academic administration management is one of the important challenges, especially in the process of registering student proposal seminars. Institut Sheikh Abdul Halim Hasan Binjai is currently still implementing a manual system in the registration process, which causes various obstacles such as delays in data processing, risk of losing documents, and inefficiency in validation and scheduling.

Moreover, the number of students has been increasing steadily—by approximately 15% each year—from around 1,000 in 2020 to about 1,150 in 2024. As a result, the manual system is no longer considered adequate to support the smooth running of the academic process. Therefore, the implementation of a website-based proposal seminar registration system is a strategic solution that not only addresses administrative inefficiencies but also supports the overall digital transformation of the campus. This system allows students to upload documents online, monitor their registration status in real-time, and reduce dependence on physical files [1].

In addition to providing convenience for students, the system also helps the administration in verifying data, preparing seminar schedules, and managing information in a structured and efficient manner. This transformation is in line with the concept of digital transformation in higher education, which emphasizes the importance of adopting digital technology to improve service quality and institutional governance (Vial, 2019).

II. RESEARCH METHODOLOGY

2.1 Research Location

Research and implementation of this system was carried out at the Institute of Sheikh Abdul Halim Hasan Binjai, which is located at Jl. Ir. H. Juandao. 5, Timbang Langkat, Kec. East Binjai, Binjai City, North Sumatra 20735. This location was chosen because it is an institution where practical work is carried out and has a real need for digitizing the administrative process of registering seminar proposals [2].

2.2 Research Time

Research and system development activities were carried out during the implementation of practical work which took place from August 5, 2024 to September 5, 2024. During this period, the author made observations, analyzed the old system, designed a new system, and tested the functionality of the website-based system [3].

2.3 Research Methods

The research method used in this project is the software engineering approach with the Waterfall model. This model was chosen because it offers a systematic and sequential development process that is suitable for projects with well-defined requirements from the outset.

Fig 1. Waterfall Development Model

The Waterfall model consists of the following stages:
1. Requirements Analysis
   Identifying the problems of the existing manual system and formulating the functional and non-functional requirements of the new system.

2. System Design

Designing the system structure, which includes flowcharts, use case diagrams, activity diagrams, and database design to provide a blueprint for system development.

3. Implementation

Developing the system based on the design using web technologies such as PHP and MySQL.

4. Testing

Conducting tests using the black-box testing method to verify whether each function of the system works according to the requirements.

5. Maintenance

Performing corrections or improvements after the system is implemented, including fixing bugs or adding new features as needed [4].

2.4 Technology Used

In developing this proposal seminar registration system, the technologies used include:

XAMPP: As a local server to run Apache and MySQL.

1. PHP: Server-side programming language for building application logic.
2. HTML & CSS: To build the structure and appearance of the system interface.
3. MySQL: As a database management system to store registration data.
4. phpMyAdmin: As a visual aid in database management.
5. Visual Studio Code: A text editor used to write, manage, and debug program code [5].

2.5 System Design

This system is designed to digitize the proposal seminar registration process with two types of users, namely students and admins. The main features of the system include:

1. Login page: To differentiate student and admin access.
2. Registration Form: Filled in by students with digital documents such as KTM, KHS, and proof of payment.
3. Admin Dashboard: Admin can verify data, approve/reject registration, and filter by faculty.
4. Status Notification: Students can see the status of their application whether it is approved, rejected, or pending.

System design includes:

The system design is carried out using the Unified Modeling Language (UML) approach, which includes several diagrams to facilitate understanding and implementation of the system, namely:

1. Use Case Diagram: To illustrate the interaction between the user and the system.
2. Flowchart: To visualize the workflow process of the system.
3. Activity Diagram: To describe the activity steps of the system.
4. Database Design: Using three main tables: student, admin, and registration.

This section presents the design process of a web-based seminar proposal registration system through several diagrams and modeling stages, as follows:

A. Use Case Diagram

The Use Case Diagram is a visual modeling tool that is part of the Unified Modeling Language (UML), commonly used in software engineering to describe the functional behavior of a system from the user's perspective. It outlines the interactions between external entities, known as actors, and the system itself through defined use cases, which represent specific functionalities or services provided by the system [6].

Use case diagrams typically consist of actors, use cases, and the relationships between them. Actors may be human users or external systems that interact with the application. The diagram helps stakeholders understand the system's scope and the boundaries of what it will do. It is especially useful during the early stages of system analysis and requirement gathering because it presents a high-level overview without delving into internal logic or implementation.

In addition to identifying interactions, use case diagrams provide clarity on user roles, system functionality, and expectations from different user types. This makes them a critical part of system documentation and a reference point throughout the development lifecycle.

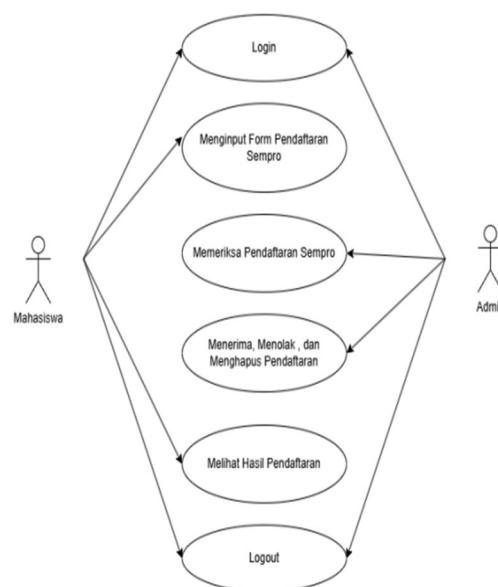In this system, there are two primary actors: students and the website admin.

Fig 2. Use Case Diagram of the Seminar Proposal Registration System

The admin has access to several key functions in the system, including logging into the platform, reviewing student registration data, approving or rejecting submissions, and deleting entries when necessary. After completing these tasks, the admin can log out of the system. On the other hand, students are able to log in to the system, fill out the seminar proposal registration form by uploading the required documents, check the status of their registration (whether accepted or rejected), and then log out after completing the process `[2].

B. Flowchart

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A flowchart is a graphical representation used to systematically illustrate workflows or processes. In a flowchart, process steps are displayed using standardized symbols, such as rectangles to represent process activities, diamonds for decision points, and arrows to indicate the logical sequence or flow of actions. These symbols help in understanding the order of operations and the decision-making paths within a process.

Flowcharts are highly beneficial in various contexts, including system design, business analysis, and software development. In system design specifically, flowcharts are used to visualize workflow, document procedures, and design systems in a more structured and comprehensible manner for different stakeholders. By using flowcharts, complex processes become simpler and easier to interpret.

The creation of a flowchart involves several steps, including identifying key actions, selecting appropriate symbols, and determining the logical flow between steps. Flowcharts enhance efficiency and effectiveness in understanding processes, facilitate communication across teams, and support more informed decision-making.

The flowchart is used to describe the system's workflow systematically using standard graphic symbols such as arrows, process boxes, and decision diamonds
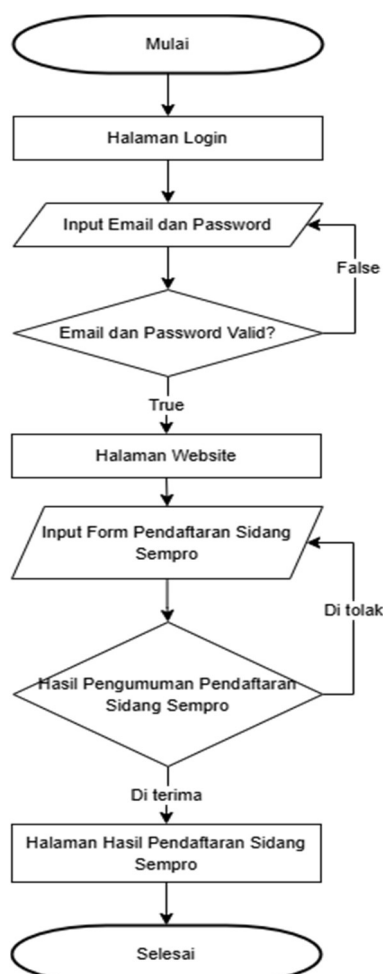
Fig 3. Flowchart of the Seminar Proposal Registration System

The registration process begins when a student accesses the login page and enters their email and password. The system then validates the credentials provided. If the login information is valid, the student is redirected to the main page; otherwise, they are returned to the login page to re-enter their data. Once successfully logged in, the student fills out the seminar proposal registration form with the required information and uploads supporting documents. The system processes and stores the submitted data, after which the student can view the result of their registration, whether it is approved or rejected.

C. Activity Diagram

An activity diagram is a type of diagram used to visualize the workflow or sequence of activities within a system. It focuses on the processes, system components, and the interactions between these components to ensure integrated and efficient functionality. In an activity diagram, the main activities are depicted using symbols such as circles for actions, arrows for flows, and structured boxes for process steps [7].

One practical example of an activity diagram is its application in a web-based seminar proposal registration system. The activity diagram illustrates the process flow from user login, registration form submission, to the validation and data management performed by the admin. It also shows how the collected information is processed and how the registration outcomes are presented to students. With the help of an activity diagram, the workflow of the system becomes more structured and easier to understand for all stakeholders involved.

The use of activity diagrams is essential in system design as it helps visualize how the system interacts with users and how data flows between components. This greatly supports the planning, development, and evaluation of the system to ensure operational efficiency and effectiveness [8].

The Activity Diagram describes the flow of activities from login to form submission, verification, and final result. It provides a visual model of the dynamic behavior of the system.
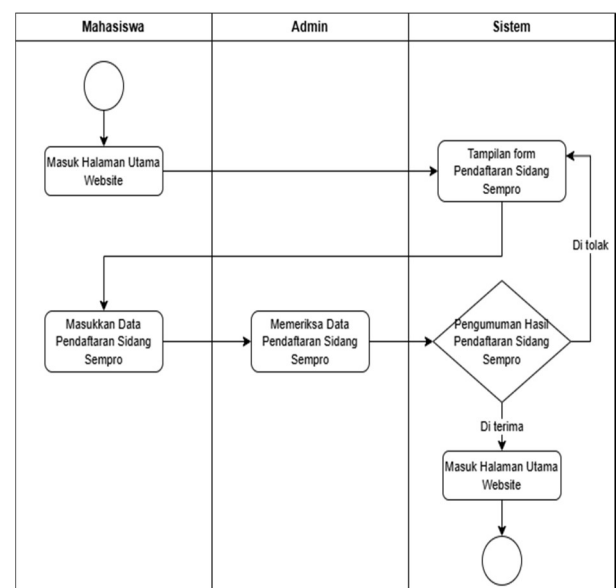

Fig 4. Activity Diagram of the Seminar Proposal Registration System

This diagram helps in understanding the workflow in a structured and efficient manner.

D. Database Design

A database is a core component of any application, functioning as a repository for structured and integrated data. It allows the application to manage, store, and retrieve information efficiently and in an organized manner. The primary purpose of a database is to provide a structure that facilitates easy access and manipulation of data, enabling information to be processed quickly and accurately[9].

In the context of an application, the database serves as the "backbone" that connects all components of the system such as features, menus, and services so that they can interact seamlessly. Without a proper database, data generated by the application cannot be managed effectively. For example, in a web-based seminar proposal registration system, the database stores student records, registration forms, and related information, allowing the data management process to be conducted in a structured and integrated way [10].

Moreover, the database plays a crucial role in ensuring data integrity and supporting informed decision-making. With a well-designed database, applications can run more efficiently and help users access the necessary information without concerns about data loss or inconsistencies [6].

The database is named db_sidang_seminar and consists of three main tables: students, admin, and registration [11].

Table 1. Structure of Students Table

Field Name	Data Type	Size	Description
nim	varchar	15	-
name	varchar	100	-
email	varchar	100	-
password	varchar	255	-

Table 2. Structure of Admin Table

Field Name	Data Type	Size	Description
id_admin	Int	11	Primary Key
name	varchar	100	-
email	varchar	100	-
password	varchar	255	-

Table 3. Structure of Registration Table

| Field Name	Data Type	Size	Description
id_registration	int	11	Primary Key
name	varchar	200	-
nim	int	15	-
faculty	varchar	200	-
program	varchar	200	-
advisor_one	varchar	200	PDF
advisor_two	varchar	200	PDF
student_id_card	varchar	200	PDF
tuition_payment_proof	varchar	200	PDF
seminar_payment_proof	varchar	200	PDF
proposal_cover_copy	varchar	200	PDF
approval_form_one	varchar	200	PDF
approval_form_two	varchar	200	PDF
seminar_application_letter	varchar	200	PDF
transcript_semesters_1_to_7	varchar	200	PDF
seminar_attendance_card	varchar	200	PDF
status	enum	3	'Pending', 'Approved', 'Rejected'
registration_date	date	-	-
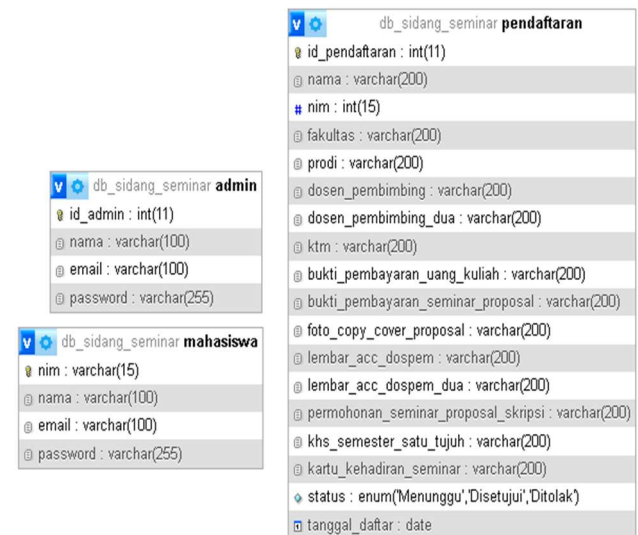
Fig 5. Database Relationship Design of the Seminar Proposal Registration System

III.   RESULTS AND DISCUSSION

The seminar proposal registration system consists of two user levels: website admin and student. Upon accessing the system, users are directed to the login page [12].
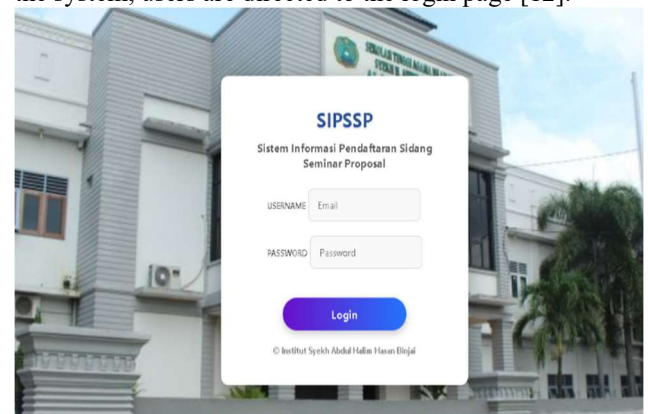

Fig 6. Login Page of the Seminar Proposal Registration System

Each user role has specific functions and access rights, which are explained as follows:

1. Admin Login

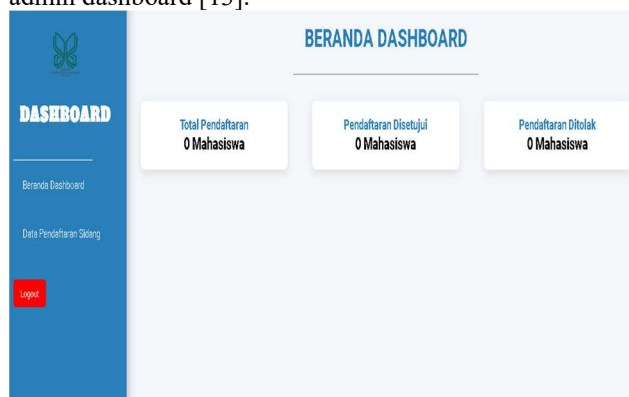When logging in as an admin, the user is directed to the admin dashboard [13].
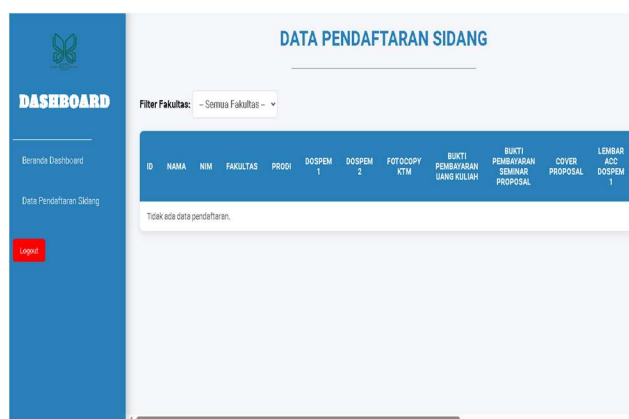

Fig 7. Admin Dashboard Page

Fig 8. Admin Registration Data Page (Empty State)
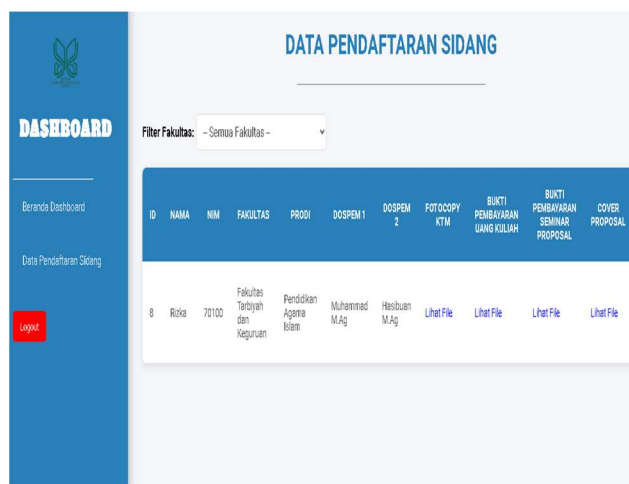

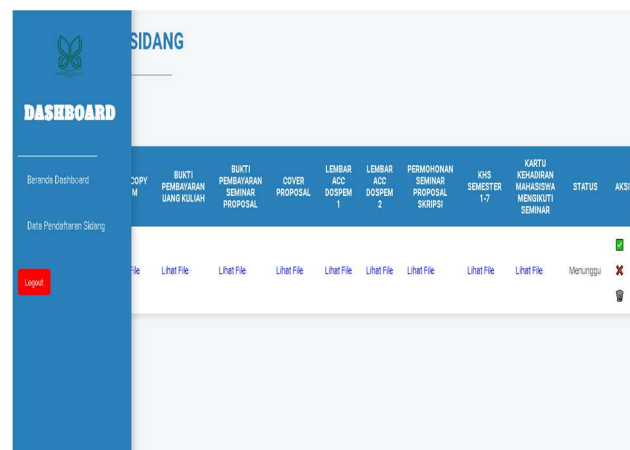**Fig 9. Admin Registration Data Page (With Data)**

Fig 10. Admin Action Buttons (Approved, Reject, Delete)

The dashboard consists of two main menus: Home and Registration Data. The Home page displays an overview of registered data, while the Registration Data menu allows the admin to view detailed registration entries, filter data by faculty, and perform actions such as approving, rejecting, or deleting submissions [14].

2. Student Login

The interface for student users slightly differs from the admin view.
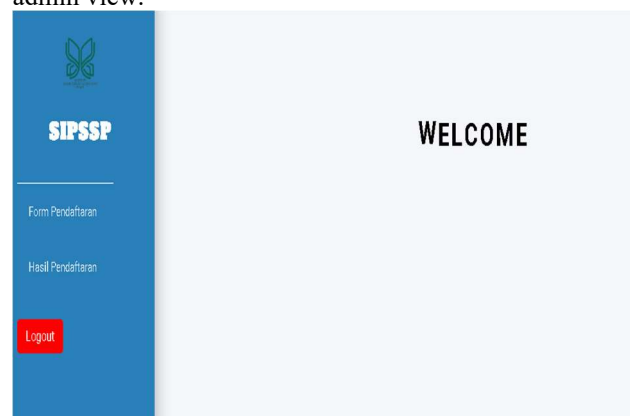
Fig 11. Student Dasboard Page
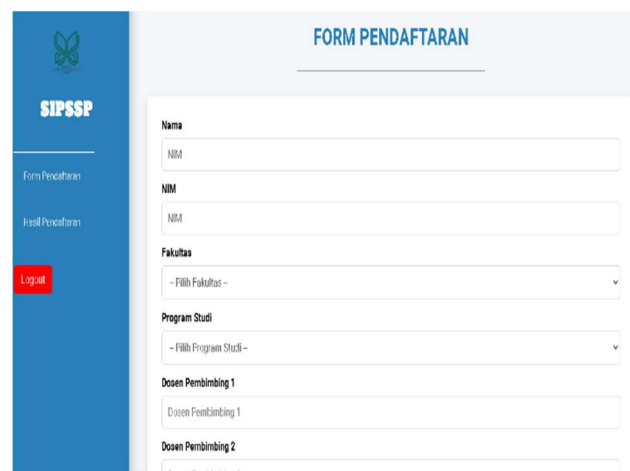
Fig 12. Seminar Proposal Registration Form (Student)
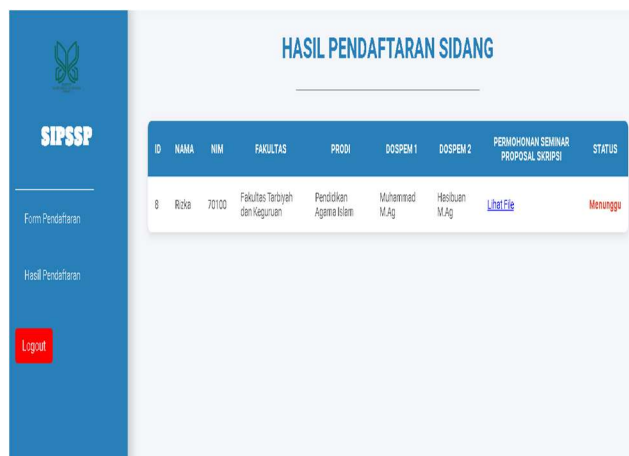
Fig 13. Registration Result Page (Student)

Student users are provided with two main menus: the Registration Form and the Registration Results. Students can input the required data through the form, and afterward, view the results of their submission—whether it is approved, rejected, or deleted by the admin [15].

Testing is an essential phase in the software development lifecycle to ensure the system operates as expected and meets user requirements. In this project, black box testing was conducted to validate the functional aspects of the seminar proposal registration system without examining its internal code structure. The black box testing focuses on the input-output behavior of the system, verifying that the system processes inputs correctly and generates the expected outputs. The following table summarizes the black box test cases, including test inputs, expected outcomes, and actual results:

1. Testing on the Login Form

Table 4. Black Box Testing Table on Login Form

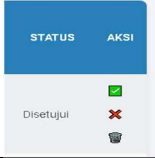| Field	Description
No	1
Test Scenario	Did not input data
Test Case	
Expected Result	The system will notify that the data is empty
Test Result	
Note	Successful
No	2
Test Scenario	Input data but one is incorrect
Test Case	
Expected Result	The system will reject the login
Test Result	
Note	Successful
No	3
Test Scenario	Input correct email and password
Test Case	
Expected Result	The system will grant login access and redirect to the main page
Test Result	
Note	Successful

2. Testing on the Registration Form

Table 5. Black Box Testing Table on Registration Form
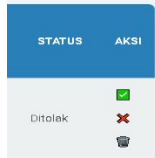
Field	Description
No	1
Test Scenario	Did not input data into the registration form
Test Case	
Expected Result	The system will notify that the data is empty
Test Result	
Note	Successful
No	2

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Test Scenario	Input data but not completely
Test Case	
Expected Result	The system will notify which data fields are still empty
Test Result	
Note	Successful
No	3
Test Scenario	Input complete and correct data
Test Case	
Expected Result	The system will accept the data
Test Result	
Note	Successful

3. Testing on the Admin Dashboard Form

Table 6. Black Box Testing Table on Admin Dashboard Form

Field	Description
No	1
Test Scenario	Click the checkmark button
Test Case	
Expected Result	The system will change the data status to "Approved"
Test Result	
Note	Successful
No	2
Test Scenario	Click the cross button

Test Case	
Expected Result	The system will change the data status to "Rejected"
Test Result	
Note	Successful
No	3
Test Scenario	Click the trash bin button
Test Case	
Expected Result	The system will delete the data
Test Result	
Note	Successful

4. Testing the Data Filtering by Each Faculty

Table 7. Black Box Testing Table on Data Filter by Each Faculty

Field	Description
No	1
Test Scenario	Filter data by Faculty of Sharia and Law
Test Case	
Expected Result	The system will display registration data from the Faculty of Sharia and Law
Test Result	
Note	Successful
No	2
Test Scenario	Filter data by Faculty of Education and Teaching

Test Case	
Expected Result	The system will display registration data from the Faculty of Education and Teaching
Test Result	
Note	Successful
No	3
Test Scenario	Filter data by Faculty of Economics and Islamic Business
Test Case	
Expected Result	The system will display registration data from the Faculty of Economics and Islamic Business
Test Result	
Note	Successful

IV. CONCLUSION

This study concludes that the design and implementation of a web-based seminar proposal registration system can significantly streamline and improve the administrative process at Institut Syekh Abdul Halim Hasan Binjai. The system enables students to register online, submit required documents digitally, and monitor the status of their submissions, thereby minimizing manual interaction and reducing processing time.

To ensure the system's functionality and reliability, black box testing was conducted across several main features, including login, registration, admin dashboard operations, and data filtering by faculty. The results showed that all functionalities performed as expected. For instance, the login form correctly responded to both valid and invalid inputs, the registration form validated incomplete data accurately, and the admin dashboard successfully updated or deleted records. Furthermore, the data filtering feature appropriately displayed data based on selected faculties.

The system provides an efficient, accessible, and user-friendly platform that benefits both students and administrative staff. It improves data accuracy, simplifies validation procedures, and supports better transparency in registration handling. The use of a web-based system also aligns with the institution's goal of digital transformation in academic services.

Future development of this system may include the integration of notification features, mobile responsiveness, or synchronization with the campus academic system to further enhance usability and operational efficiency.

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Berbasis Website," *J. Teknol. Inf. J. Keilmuan dan Apl. Bid. Tek. Inform.*, vol. 15, no. 1, pp. 53–59, 2021, doi: 10.47111/jti.v15i1.1958.

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