JISTech (Journal of Islamic Science and Technology)

JISTech, 9(2), 174-181, July - December 2024

ISSN: 2528-5718

http://jurnal.uinsu.ac.id/index.php/jistech

Development Of A Web Based Final Project Monitoring Information System In The Faculty Of Science And Technology UIN Sumatera Utara

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ABSTRACT

The management of the final project at the Faculty of Science and Technology, State Islamic University of North Sumatra has not been fully supported by an application system. The head of the study program faces difficulties in preparing the final project management report, which has an impact on the less than optimal process of monitoring the final project by students and supervisors. Supervisors experience limitations in monitoring the development of their students optimally, especially because of the large number of students and the variety of problems that arise. The consultation function becomes less effective. In addition, the delivery of information related to the final project to students, lecturers, and the head of the study program is often hampered, while physical files are vulnerable to being tucked away or manipulated. Students also have to come directly to campus to take the supervisor's assignment letter, submit documents, follow the guidance, and check the seminar and trial schedule. To overcome this problem, this research aims to build a web-based final project monitoring information system at the Faculty of Science and Technology, State Islamic University of North Sumatra. The research was conducted using the Research and Development (R&D) method with a Waterfall system development approach. The result of this research is a web-based SIMTA (Final Project Monitoring Information System) developed using the Laravel framework. SIMTA is expected to facilitate the process of completing the final project, increase the effectiveness and efficiency of interaction between students, lecturers, and study programs.

Keywords: Monitoring System, Final Project, Web, Laravel
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DOI: http://dx.doi.org/10.30829/jistech.v9i2.21407
Received 22 August 2024; Received in revised form 26 October 2024; Accepted 17 December 2024

Introduction

In the era of globalization, technology has a very important role in various fields, including industry, tourism, economy, and education. Technology is a benchmark in determining the success of an agency, both companies and organizations, to be able to compete in this global era. Increasingly fierce competition among universities, both public and private, requires university organizers to improve quality, including in terms of student graduation rates. The web is one of the most exciting aspects of technology and the internet. Through the web, we can access information not only in text format, but also in audio, image, video and animation formats. The internet consists of a large collection of documents stored on web servers. Thanks to web technology, computer users can easily browse or search for information using the concept of *hyperlinks*, which allow linking between documents or other media such as video and audio. These advantages make the web one of the fastest growing services [1].

Currently, the management of the final project at the Faculty of Science and Technology, State Islamic University of North Sumatra has not fully used an application-based system. The management process is still mostly done in the form of paper printouts and is only slightly helped by the *website*. The head of the study program often faces difficulties in making final project management reports, which results in less than optimal monitoring of the final project process of students and lecturers. This condition causes supervisors and students to not be able to carry out the final project optimally. Supervisors experience limitations in monitoring student progress, while consultations often do not run effectively due to the large number of students and the variety of problems faced. In

addition, physical files are vulnerable to loss or manipulation. Students also have to come directly to campus to pick up and submit assignment letters, follow guidance, and check seminar and trial schedules. The use of an application-based system will help minimize the use of paper and improve the efficiency of managing final assignments.

Previous research by Zaenuddin and Galih Mahalisa (2019) entitled "Thesis Guidance Application Case Study of UNISKA Faculty of Information Technology for Effectiveness of Guidance Period Completion Time" shows that the thesis guidance monitoring application built for STMIK Palangkaraya is able to facilitate lecturers in guiding students without the need to meet directly. This application also allows departments and lecturers to monitor students in the process of completing the final project so as to increase the chances of timely graduation [2].

This research aims to build a web-based Final Project Monitoring Information System (SIMTA) at the Faculty of Science and Technology, State Islamic University of North Sumatra. Information systems are defined as a grouping of several organizational systems that collect, process, store, and disseminate data to facilitate decision making and internal control [3]. The process of monitoring an organization's operations to ensure conformance with a predetermined plan is known as monitoring [4]. This SIMTA was developed using the Laravel *framework*, which utilizes the *Model-View-Controller* (MVC) architecture to simplify website development [5].

It is hoped that this information system will be able to solve the problems of managing final assignments at the Faculty of Science and Technology, State Islamic University of North Sumatra and increase the effectiveness of monitoring student final assignments. This research is also expected to be an evaluation material to increase the graduation rate of students at the State Islamic University of North Sumatra.

Research Methodology

This research uses the *Research and Development* (R&D) method. This method was chosen because the purpose of this research method is to produce a product in the form of an application that can assist in managing completed assignments [6]. The author applies the R&D method to create a final project monitoring information system by using stages or processes taken from the R&D approach in research. The stages or steps of data collection with the R&D method are as follows:

a. Potential on the Problem
   At this stage, the author conducts pre-research at the Faculty of Science and Technology, State Islamic University of North Sumatra to identify potential and existing problems.
b. Data Collection
   Data collection will be done in three stages, as follows:
   1. Observation
      At this stage, the author made observations about the submission of the final project title until the munaqosyah trial. From these observations, the author took data about the process of submitting a title (from selection to acceptance of the final project title), selecting a supervisor, guiding Chapters 1-3, proposal seminars (selecting examiners), minutes (revisions), guiding Chapters 4-6, submitting comprehensive exams, to the last munaqosyah trial exam. The purpose of the author taking this data is to analyze the data in strengthening research and needs in system development.
   2. Interview
      At this stage, the author interviewed each head of the study program at the Faculty of Science and Technology, State Islamic University of North Sumatra Medan to get the right criteria data that will be used for the system to be developed and used as sample data.
   3. Literature Study
      At this stage, to obtain appropriate and relevant material, the author will research and search for sources related to the research, both scientific publications, journals, research reports, regulations, and other sources related to the problem or subject matter of the research discussed.
c. Product Design
   At this stage, the author designs a product that will become a system through the application of the *Waterfall* system development method. To ensure proper and accurate system development, the author will build a web-based monitoring information system and use the *Waterfall* method during system development. The *Waterfall* method is a methodical, step-by-step process, which begins with the identification of system requirements and moves through the stages of analysis, design, implementation, testing or verification, and maintenance [7].

   The Waterfall stage of research and building this system is as follows:

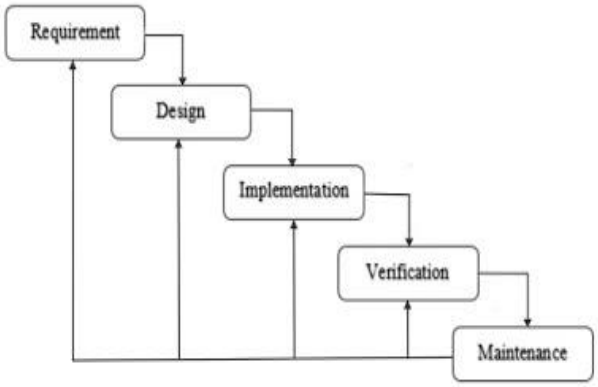

Figure 1. Stages of the *Waterfall* Method

The following stages of the *Waterfall* method are used in this study to design the system:

a. *Requirement* Analysis
   At this stage, the author will conduct interviews with each head of study program at the Faculty of Science and Technology, State Islamic University of North Sumatra. The required *fields* will be filled in by the system built using data from the interview results.
b. Design (Design on System)
   At this stage, the *fields* found during system analysis are formatted into tables using data. To complete the system design stage, an ERD (*Entity Relationship Diagram*) is created that describes the relationship between database tables, system flow using UML, and the design of the system architecture framework to be built.
c. Implementation
   The system will be coded by the author using MySQL database and PHP programming language in accordance with the system design.
d. Testing
   This stage will involve testing known as *blackbox* testing on users of the finished system without requiring them to know the coding structure of the system.
e. Maintenance
   After testing, users will be able to utilize the system when it has been modified to meet their needs.

Results and Discussion

From the observation data that has been obtained by the author, the following is the workflow in the process of monitoring the final project, announcing the results of the proposal seminar, announcing the results of the trial, to the completion of the final project. The process that occurs is: starting from the student preparing a *draft* title *of* at least 3, then the study program checks the *draft* title. If the title is not accepted, then the student again prepares a *draft* title of at least 3. If the title is accepted, the supervisor will be determined. Students, lecturers, and study programs get a supervisor decision letter from the study program. Furthermore, students prepare a thesis proposal Chapter 1 to Chapter 3, and lecturers guide student proposals from Chapter 1 to Chapter 3. If the proposal is not accepted, then students return to guide the proposal Chapter 1, Chapter 2, or Chapter 3. If the thesis proposal is accepted, then students can submit a proposal seminar by completing the files determined by the study program.

If the attached files are complete, the student, lecturer, and study program will get a decision letter for the examiner who will test the proposal seminar. After the examining lecturer gets a proposal seminar invitation letter, students can conduct a proposal seminar at the time set by the study program. If the student does not pass the proposal seminar testing, then the student will return to drafting the proposal. If the student passes the proposal seminar, the study program will issue a grade. This process is continued with a comprehensive examination until the munaqosyah trial.

From the current system analysis data obtained from these observations and observations, several problems were identified, including the following:

a. The current system is still manual so that during guidance there are often obstacles such as the unavailability of lecturers when they want to do guidance and waste of paper to print the final project.
b. In the current system, it still uses a guidance control card in the form of a *print out*. This card is easily torn, lost, or left behind, even though the guidance card is one of the requirements in filing a proposal seminar.

In the proposed system there are three *login* levels. Among them are students, lecturers, and study programs. Where the study program can see all activities carried out by students and lecturers in the process of completing the final project. Students are asked to register first in order to log in to the system while the lecturer data will be inputted manually by the study program. Lecturers, students, and study programs can exit the system by pressing the logout button.

a. System Design

1. *Use Case Diagram*

Use case diagrams are graphs designed to show how the various components involved in application development are interconnected. The interactions that occur between users (actors) and the system are depicted in *use case diagrams*. When describing the context of a system, this diagram can be a useful tool to clarify the power of the system. [8]. The tasks and privileges of system users are outlined in the *use case* diagram. [9]. *The use case diagram* is shown in the figure below.

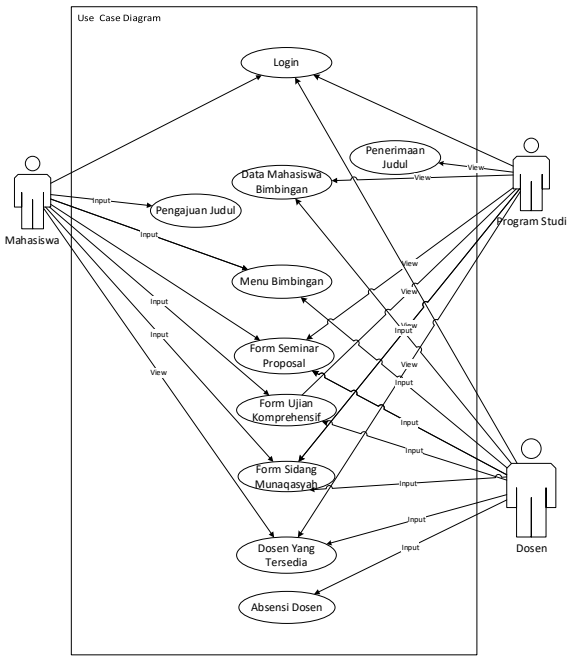

Figure 2. *Use Case Diagram*

2. *Activity Diagram*

Activity diagrams show the various actions that make up a system, their beginnings, and any decisions that may be taken until the action ends. [10]. The *activity diagram* is shown in the figure below.

a) Title Submission

Students are asked to *log in*. Then enter the main menu. Then students choose the title submission menu, then the title submission menu is displayed. Then students are asked to input the title of the thesis to be submitted. If the proposed thesis title is accepted, it will be displayed on the main menu. If the thesis title is not accepted, it will return to the title input *form*.

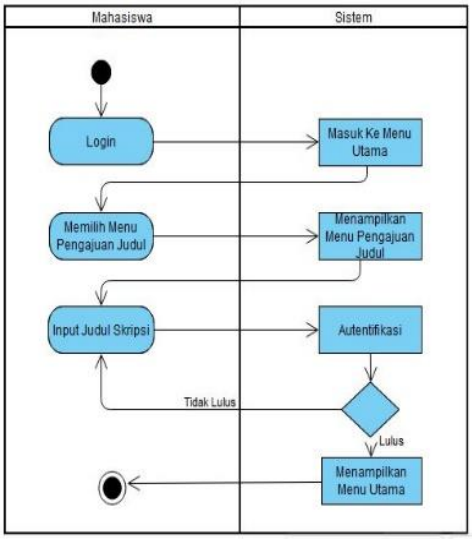

Figure 3. *Activity Diagram of* Title Submission

b) Guidance

In the *activity diagram of the* guidance menu, students are asked to *log in*. Then enter the main menu. Then students can select the guidance student data menu. After that the guidance student data menu will appear.

Students can see the guidance menu data.

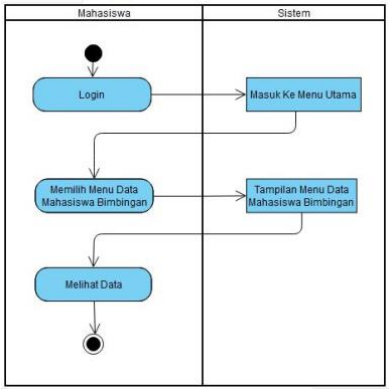

Figure 4. Guidance *Activity Diagram*

c) Sempro *Form*
In the *activity diagram of the* proposal seminar, students are asked to *log in* first before they can access the system. After that, enter the main menu. Then students can choose the proposal seminar *form* menu, then the proposal seminar *form* will appear. In this menu, students can input proposal seminar files. After inputting, the proposal seminar data will appear and students can view the data.

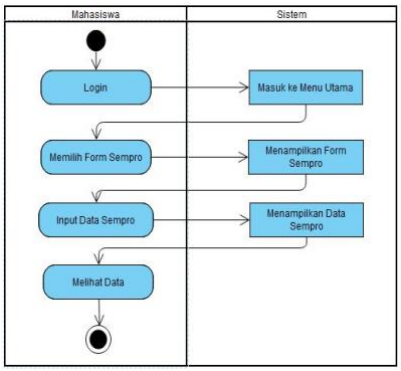

Figure 5. *Activity Diagram of* Sempro *Form*

d) Session *Form*
In the *activity diagram of* the trial *form*, students are asked to *log in* first before they can access the system. Then the system will display the main menu. After that, students can choose the trial menu. Once selected, the system will display the trial *form*. Then students can input files for trial requirements. Then the trial *form* will be displayed and students can view the data.

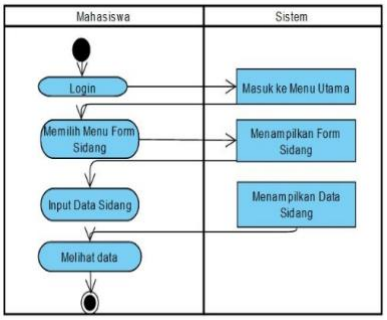

Figure 6. *Activity Diagram of* Session Form

b. System Implementation

1. Title Submission Page
In this menu, students can submit a title by clicking the New Submission button. The existing title submission status is **Processed / Accepted / Rejected**. Students can only make a new submission if they have never made a submission, or have already made one but the status of the old title submission is REJECTED. Students cannot submit again if they have already submitted and the status is ACCEPTED, besides that students also cannot submit if the submission status is being PROCESSED. Submission will be automatically REFUSED if the proposed title has been submitted before. Students can change/delete submission data only if the status is

PROCESSED. If the status is ACCEPTED or REFUSED, the submission data cannot be changed or deleted.

Figure 7. Title Submission Implementation

2. Guidance Page
Menu to conduct guidance to each supervisor.

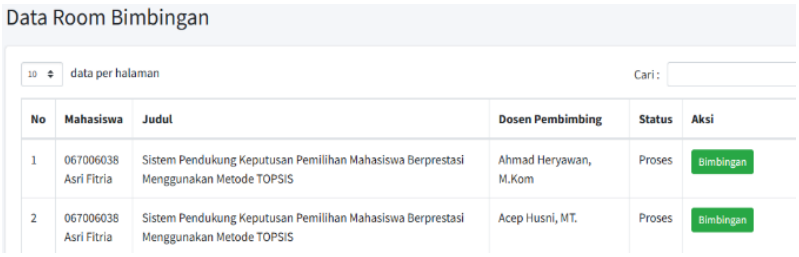

Figure 8. Guidance Menu Implementation

The existing status is PROCESS / COMPLETED. During the PROGRESS status, students can still send messages in the guidance *room* by clicking the Send Message button.

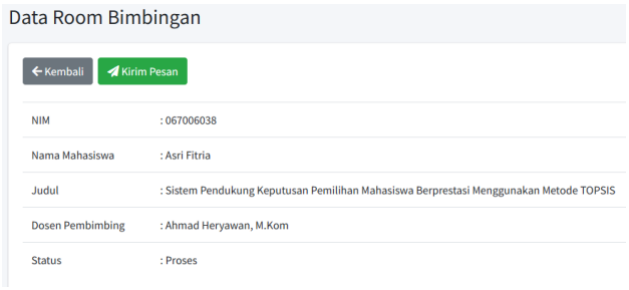

Figure 9. Guidance Menu Data

If the status is DONE, the Send Message button will not appear. Students can send messages and *upload* files.

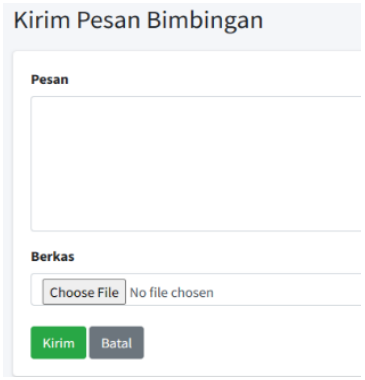

Figure 10. Guidance *Chat Room*

On this menu students and lecturers can send messages to each other and also send files.

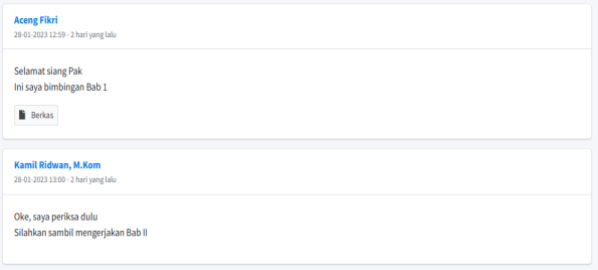

Figure 11. Guidance Message Display

3. Sempro Page
On this menu students can submit a proposal seminar.

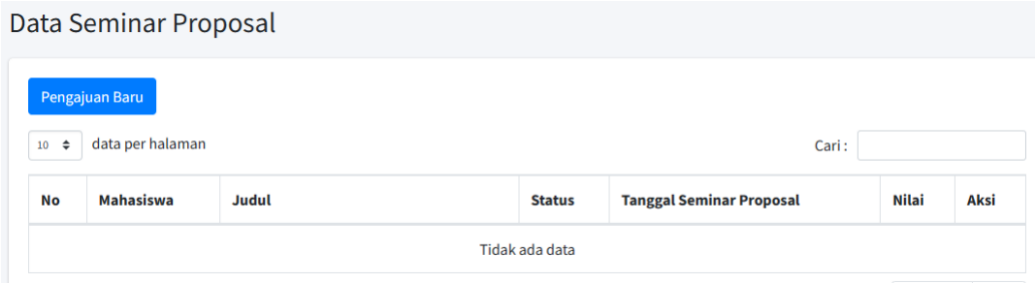

Figure 12: Implementation of Sempro *Form*

Students can submit a Proposal Seminar if their title submission has been accepted and has entered the Guidance Student data, if the student has not submitted a title, the Proposal Seminar Submission button will not appear. The existing status is processed / accepted / rejected / completed.

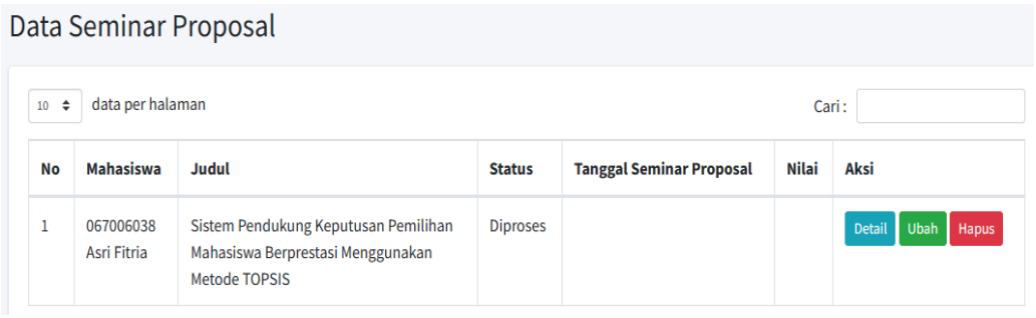

Figure 13. Seminar data

The seminar submission file can still be changed/deleted if the status is PROCESSED. If the status is ACCEPTED, the student will get a Proposal Seminar Date and can find out who the examiner is in the Details button. If the status is REFUSED, then the student can re-submit and the New Submission button will appear again. If the status is FINISHED, then the proposal seminar process is complete and students can see the score given by the lecturer.

4. Session Page
On this menu students can submit a trial.

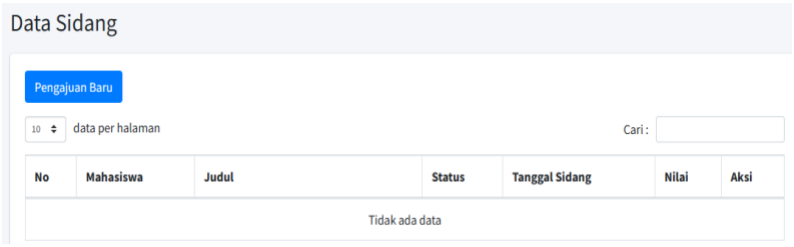

Figure 14: Implementation of the Session *Form*

Students can submit a trial if the Proposal Seminar process has been completed and has received a seminar grade, if the student has not received a seminar grade, the Session Submission button will not appear. The existing status is processed / accepted / rejected / completed.

Figure 15. Session Data

The trial submission file can still be changed/deleted if the status is PROCESSED. If the status is ACCEPTED, then the student will get a trial date and can find out who the Examiner is in the Details button. If the status is DENIED, then the student can re-submit and the New Submission button will appear again. If the status is FINISHED, then the trial process is complete and students can see the value given by the Lecturer.

Conclusion

The conclusion that can be drawn from this research is that the web-based SIMTA (Final Project Monitoring Information System) is an innovative solution to overcome various obstacles in managing the final project at the Faculty of Science and Technology, North Sumatra State Islamic University. With SIMTA, the process of completing the final project between students, lecturers, and study programs becomes more effective and efficient. SIMTA facilitates various needs in the final project monitoring process, including thesis proposal guidance, proposal seminar submission, comprehensive testing, and munaqosyah trial. The monitoring process, which was previously done manually, can now be done digitally without having to meet face to face. Students and supervisors can utilize the features available in the system, such as uploading documents, managing guidance schedules, and providing notifications related to seminar or trial schedules. In addition, this system also reduces dependence on physical documents such as guidance cards, which have been vulnerable to damage, loss, or manipulation. With SIMTA, study programs can also more easily monitor and manage the flow of final assignments, starting from submitting titles, determining supervisors, to final evaluations. This system not only saves the use of paper, but also helps create a more modern, organized, and environmentally friendly educational ecosystem. It is hoped that the implementation of SIMTA can improve the efficiency of final project management and the overall quality of student graduation.

Acknowledgments

Thank you to all leaders and heads of study programs in the Faculty of Science and Technology, State Islamic University of North Sumatra, Medan, who have given the author permission to conduct research and provide data for this study, as well as to the supervisor of this research, thank you for your guidance, direction, and suggestions that are very helpful throughout the research process.

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