Development of a Mobile-Based Thesis Examination Assessment Application Using the Mobile-D Method

Agra Sanrio[1*]

Abstract

This study aims to improve the effectiveness of thesis examination assessment management, which includes proposal examinations and comprehensive examinations, through the development of a mobile-based assessment application. The primary issue motivating this research is the irregularity of examination administration, particularly during online examinations implemented during the COVID-19 pandemic. This condition created the need for a system capable of ensuring accurate dissemination of examination schedules, accelerating the assessment process, and organizing examination data recording in a structured manner. The application was developed on the Android platform because this technology is predominantly used by students and lecturers at Universitas Bina Darma. The system development process employed the Mobile-D method, which consists of five stages: Explore, Initialize, Productionize, Stabilize, and System Test and Fix. However, this research was limited to the first four stages, up to the Stabilize stage. The development process involved designing the system architecture and modeling, verifying user requirements and converting them into user interface designs, implementing the application in accordance with user needs, integrating application components, and conducting functional testing. The final outcome of this research is a thesis examination assessment application that supports a faster, more structured, and more efficient academic evaluation process.

[1*] Universitas Bina Darma, Indonesia, Corresponding email: agrasanrio@gmail.com

Introduction

Universitas Bina Darma (UBD) is one of the higher education institutions that has implemented information technology in its operational processes. One example of this implementation is the use of Sisfo (Sistem Informasi Akademik – Academic Information System). This web-based system has been utilized to support most academic administrative processes. Through this system, lecturers, students, and all related stakeholders can conduct academic administrative activities digitally. Sisfo continues to be developed to accommodate system requirements arising from changes and developments in academic business processes.

In 2020, most countries experienced the COVID-19 pandemic, which enforced restrictions on physical interaction. This condition also affected academic activities at Universitas Bina Darma, where nearly all learning and administrative activities were conducted online. Unfortunately, not all academic administrative processes were fully facilitated by Sisfo. One example is the administration of proposal and comprehensive examinations. The assessment process, which was previously paper-based, was adapted using Google Forms or soft-copy assessment sheets. This adaptation created various problems for students, examiners, heads of study programs, and administrative staff who manage proposal and comprehensive examinations.

From the students' perspective, the primary problems included delays in grade entry into the academic information system, which caused dissatisfaction because results took a long time to appear. There was also no integrated system for checking examination schedules and examination results. Previously, students relied on WhatsApp to obtain schedule information and email to receive examination results.

From the examiners' perspective, the assessment process was considered complicated because it still relied on paper-based forms. This procedure was often ineffective, as assessment forms were sometimes incomplete, such as missing student identity data or assessment scores, because they were not system-based. In addition, examiners were required to submit the assessment forms to the Student Service Center for manual data entry so that students could access their results. This process was inefficient and time-consuming. Another issue was the lack of coordination in scheduling examiners, as there was no system that enabled the head of the study program to manage examiner schedules effectively.

Excessive paper usage for assessment forms was also identified as a significant issue, creating an urgent need to transform the assessment process into a digital format. The data indicate the necessity of converting the assessment forms into an Android-based digital format to support efficiency and environmental sustainability.

Android was selected as the application platform because most smartphones used by lecturers and students at Universitas Bina Darma operate on the Android operating system. The Mobile-D method was chosen as the system development methodology because it is considered suitable for mobile application development. The Mobile-D method consists of five stages: Explore, Initialize, Productionize, Stabilize, and System Test and Fix. However, due to certain limitations, this study was restricted to the first four stages.

Based on these conditions, this study proposes the integration of all proposal and comprehensive examination processes into a single mobile-based system to facilitate lecturers

and students in performing academic examination administration, such as checking examination schedules, entering grades, and reviewing examination results.

The developed system is a mobile application that can be accessed via Android smartphones by both students and lecturers. Students are able to check examination schedules, view examination results, review revision notes, and print revision forms. Lecturers are able to check examination schedules, view lists of students who have not yet been graded, and enter assessment results directly into the system.

Methodology

Research Method

This study employed an applied research method. Applied research aims to provide practical solutions to specific problems and focuses on the practical implementation of research results rather than the development of new theories (Maryati & Suryawati, 2001). In this study, an analysis was conducted on the existing proposal and comprehensive examination processes at Universitas Bina Darma, starting from student registration for examinations until students received their examination results. The analysis referred to the current operational procedures to ensure that the system development was aligned with actual academic practices.

Data Collection Techniques
Interview Method
Unstructured interviews were conducted with system stakeholders, including lecturers, students, and heads of study programs at Universitas Bina Darma. The interviews resulted in the collection of information related to:
1. Procedures for conducting proposal and comprehensive examinations,
2. Procedures for assessing proposal and comprehensive examinations, and
3. Obstacles encountered in the assessment process.

Documentation Method

Documentation was conducted by collecting data from Universitas Bina Darma Palembang related to proposal and comprehensive examination administration. The data included examination administration forms and assessment forms that were still in use. These documents were obtained from the campus administrative office and were used to support system analysis and development.

System Development Method

Mobile-D Method
1. Explore
   This stage involved planning and compiling the research framework as well as establishing the foundation of mobile software development. This process included system architecture design in the form of system modeling using use case diagrams, class diagrams, and activity diagrams. The modeling process was carried out using the Astah tool for UML design.

2. Initialize

   This stage focused on preparing and verifying potential problems that could affect the success of system development. User requirements were verified and converted into user interface designs for the thesis examination assessment application. Interface designs were developed using Figma based on the results of the requirements analysis.

3. Productionize

   This stage involved implementing the interface and system design into an Android-based thesis examination assessment application according to the defined functional requirements. The coding process was carried out using Visual Studio Code, the Dart programming language, the Flutter framework, and PostgreSQL as the database management system.

4. Stabilize

   This stage involved integrating all subcomponents of the application, including interfaces and functional modules, into a unified and stable thesis examination assessment application.

Analysis of User and System Requirements

Requirements analysis was conducted to identify both functional and non-functional system requirements.

Functional Requirements

1. The system is able to manage student thesis examination scores.
2. The system is able to display student examination schedules.
3. The system is able to display student assessment forms.
4. The system is able to display student examination result scores.

Non-Functional Requirements

1. The system is able to display examination scores entered by lecturers to students.
2. The system is able to provide examination-related information to both lecturers and students.
3. The system is accessible via mobile devices.

System Design
Determination of System Users
The users involved in the system were identified based on the process analysis as follows:

1. Examiner Lecturer

   - Viewing examination schedules of students who have not yet been examined.
   - Filling in student assessment forms.
   - Entering student revision notes.
   - Viewing examination results of examined students.

2. Supervisor Lecturer

   - Viewing examination schedules of supervised students.
   - Checking examination results of supervised students.

3. Head of Study Program
   - Viewing student examination results.
   - Validating student examination grades for integration into the academic information system.
   - Updating examiner assignments in the event of lecturer replacement or unavailability.
4. Dean
   - Viewing examination data, including results and examiner assignments.
5. Student
   - Viewing examination schedules, including date, room, and examiners.
   - Viewing examination results.
   - Viewing revision notes.
   - Printing revision sheets.

Results

Determination of System Functions and Use Case Diagram

System functions were identified based on the functional requirements. The main system use cases include:

Within the system scope: Login, View Examination Schedule, View Examination Results, View Revision Notes, Print Revision Sheet, View Students Not Yet Examined, View Students Already Examined, Edit Assessment Form, Edit Revision Notes, Check Grades, Logout

Outside the system scope: Validate Grades (Head of Study Program), Update Examiner Schedule (Head of Study Program), View Examination Data (Dean).
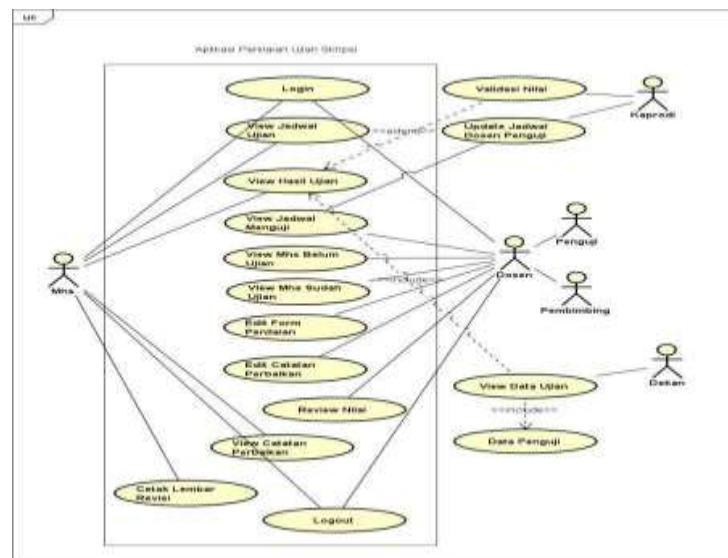

Figure 1. Use Case Diagram

Activity Diagrams

Activity diagrams were developed to describe the control flow of the system processes related to thesis examination assessment, grade review, and examination result verification.
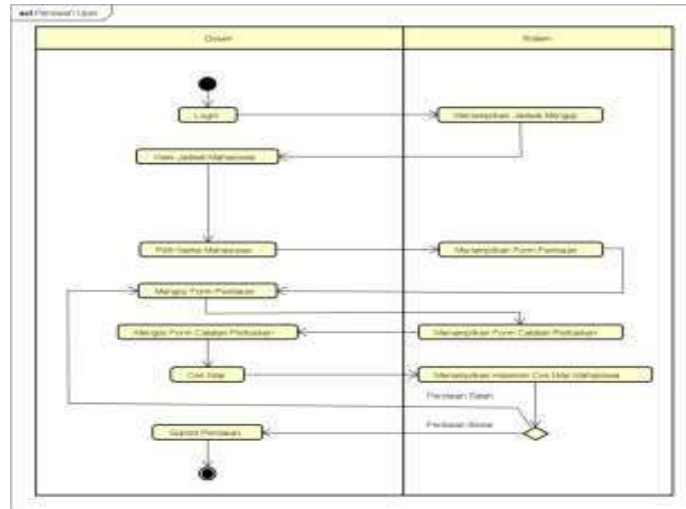

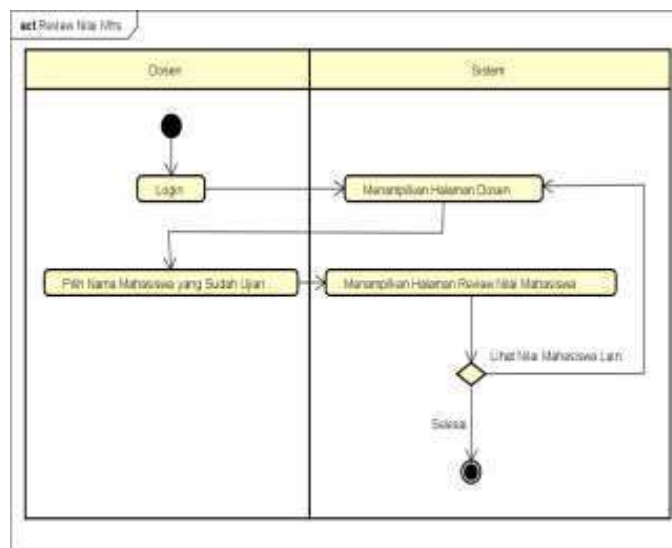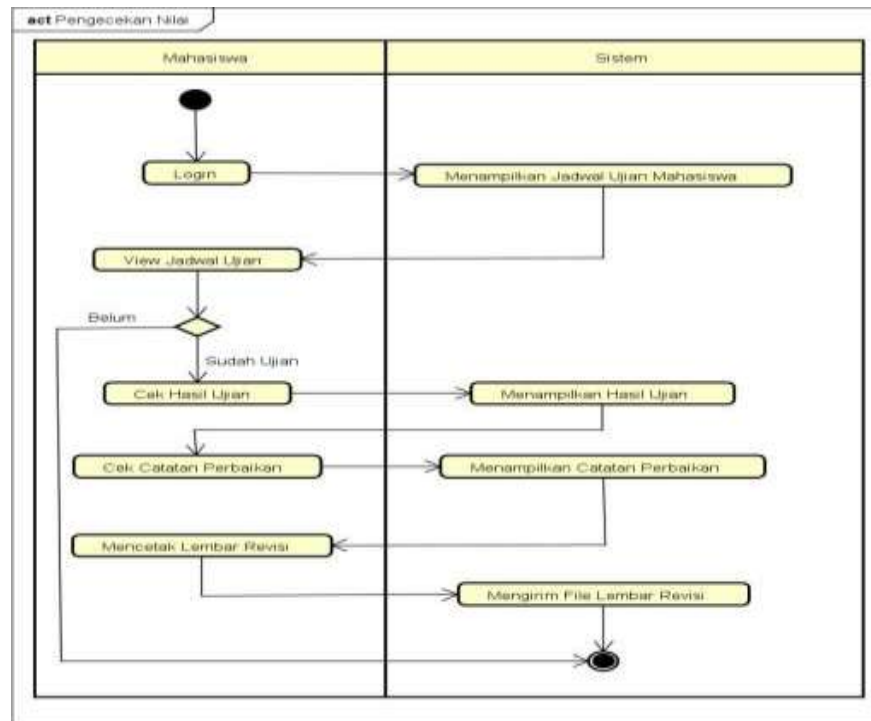Figure 2. Exam Assessment Activity Diagram

Figure 3. Activity Diagram Review Values

UjianFigure 4. Activity Diagram for Checking Exam Results

User Interface Design

The user interface was designed to illustrate the appearance and functionality of the system. The main designed interfaces include: Login page, Student home page, Lecturer home page, Grade review page, Presentation assessment form, Material assessment form, Revision notes page, Student grade verification page, and Student examination results page.

Discussion

The developed mobile-based thesis examination assessment application successfully integrates proposal and comprehensive examination administration into a single digital system. This integration enables a more efficient academic assessment process by allowing examiners to enter grades directly into the system, thereby eliminating manual paper-based data transfer and significantly reducing administrative delays.

The application also resolves communication issues related to examination schedules and results. Students no longer depend on external messaging platforms to access examination information, as all notifications and data are available directly within the application. The reduction in paper usage further supports environmentally sustainable academic administration.

The implementation of the Mobile-D method facilitated a structured and iterative development process. Each development stage ensured that user requirements were

systematically translated into functional software features. The use of the Flutter framework and PostgreSQL database also enhanced application scalability, usability, and performance in a mobile environment.

Conclusion and Recommendations

Based on the results of this study, the following conclusions can be drawn:
1. The mobile-based Thesis Examination Assessment Application facilitates the assessment process and examination result verification for students.
2. The application successfully integrates the academic assessment process and examination administration into a single system.
3. The application effectively reduces previously inefficient paper-based assessment procedures.

Overall, the application supports a faster, more structured, and more efficient academic evaluation process at Universitas Bina Darma.

Disclosure Statement

No potential conflict of interest was reported by the authors.

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Biographical Notes

AGRA SANRIO is a graduate of the Undergraduate Program in Information Systems, Universitas Bina Darma, Palembang, Indonesia. His research interests include mobile application development, academic information systems, and digital transformation in higher education.