

Development of SIMLITABMAS system reporting features using the prototype method (Case Study: LPPM UNISA Yogyakarta)

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Abstract

The Institute for Research and Community Service (LPPM) at Universitas 'Aisyiyah Yogyakarta uses the Research and Community Service Management Information System (SIMLITABMAS) to manage lecturers' research and community service. However, the system has not provided recap reports of proposals by faculty, study program, and lecturer. This study adds recap report features accessible to the Super Admin to make data more concise and structured. The research method used was Prototype, consisting of requirement identification, design, development, evaluation, and implementation. The system was developed using Laravel 8, a MySQL database, and modeled with UML diagrams. The results produced recap report features for research and community service with hierarchical dropdowns, proposal lists, filters for year, faculty, and study program, and export to Excel. Black Box Testing with eight scenarios and four respondents showed a 100% success rate. The system can still be enhanced with data visualization, financial integration, and more detailed access rights management.

Keywords: SIMLITABMAS; Super Admin; Prototype; Research; Community Service.

1. Introduction

In today's digital era, the demand for fast and effective information and services in educational environments is increasingly urgent to support organizational performance improvement. Organizational resources play an important role in collecting and managing data to produce useful information for all levels of management (Aidah et al., 2024; Brawijaya & Mubarak, 2017). The Institute for Research and Community Service (LPPM) of Universitas 'Aisyiyah Yogyakarta utilizes the Research and Community Service Management Information System (SIMLITABMAS) to support the management of lecturers' activities in research and community service. However, the current system still has limitations in reporting features, making it difficult for users to obtain specific recapitulation data based on faculty, study program, and lecturer. This condition complicates the management of research, community service, and related outputs, and if conducted manually, it is prone to errors in the monitoring and evaluation process (Siska Narulita et al., 2025).

Several previous studies have developed information systems within LPPM. The study entitled "*Design of Monitoring Applications for Internal Research and Community Service in Higher Education*" produced a monitoring application to track research and community service activities (Manu & Tantrisna, 2020). Another study, "*Management System for Research and Community Service Performance Reports*", designed a system to recap research and community service outputs, providing fast and accurate reports (Sari et al., 2022). Meanwhile, the study entitled "*Performance Assessment System for Community Service*" emphasized a web-based performance evaluation system with outputs aligned with Kemenristekdikti standards (Satra & Mude, 2020). These three studies highlight the importance of information systems to support data management in LPPM but have not specifically addressed the recapitulation of research and community service proposals by faculty, study program, and lecturer. This study fills that gap by developing an integrated recapitulation feature with hierarchical dropdown views and a proposal list display equipped with filters and data export to support LPPM administration.

The prototype method has been widely used in similar research due to its interactive nature, which allows users to be involved from the early design stage through evaluation. Several studies indicate that this approach effectively accelerates design adjustments, minimizes errors, and produces systems that better meet user needs (Amelia Idris, 2024; Fahrezi & Prasetyo, 2025; Harahap et al., 2022). For this reason, this research also applies the prototype method in developing the SIMLITABMAS reporting

feature so that the design process becomes more flexible and the resulting system is more optimal according to LPPM needs.

Therefore, it is necessary to develop reporting features in SIMLITABMAS accessible to the Super Admin so that data can be presented concisely, specifically, and according to administrative needs. This feature also facilitates the evaluation process in research and community service while reducing the risk of errors from manual management. This study aims to develop a reporting feature that meets the needs of users at LPPM UNISA Yogyakarta in the SIMLITABMAS system using the Prototype method. The research is expected to address the limitations of the previous SIMLITABMAS system and support the improvement of LPPM administrative quality.

2. Method

This study employs the prototype method as it aligns with the objective of developing new features in SIMLITABMAS, particularly the recapitulation reports for research and community service. This method allows the system to be built in the form of an initial model quickly, then refined based on feedback until it meets the expected requirements (Pressman, 2010). The development stages of the prototype method are illustrated in **Figure 1**.

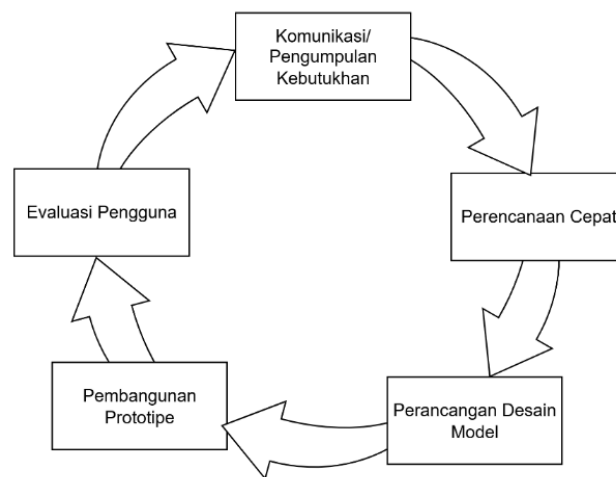


Figure 1. Prototype stages

2.1. Communication

The communication stage was carried out through literature studies and interviews with the leaders and managers of SIMLITABMAS UNISA. As a result, the need was identified for a reporting feature to recap research and community service proposals, supported by hierarchical dropdowns, year, faculty, and study program filters, as well as Excel export. This feature is specifically intended for the Super Admin to ensure faster and more structured data management.

2.2. Quick Plan

The quick plan stage was carried out by designing the initial framework of the system as a prototype guideline, including the identification of the system architecture and the selection of development technologies using PHP, Laravel 8, and MySQL that are compatible with the current SIMLITABMAS.

2.3. Modelling Quick Design

This stage focuses on visual representation in the form of model designs, namely UML and wireframes.

2.3.1. Use Case Diagram

A use case represents the interaction between the user and the system, thereby facilitating understanding and communication between software developers and clients or users (Fitria et al., 2020). The use case diagram is shown in **Figure 2**.

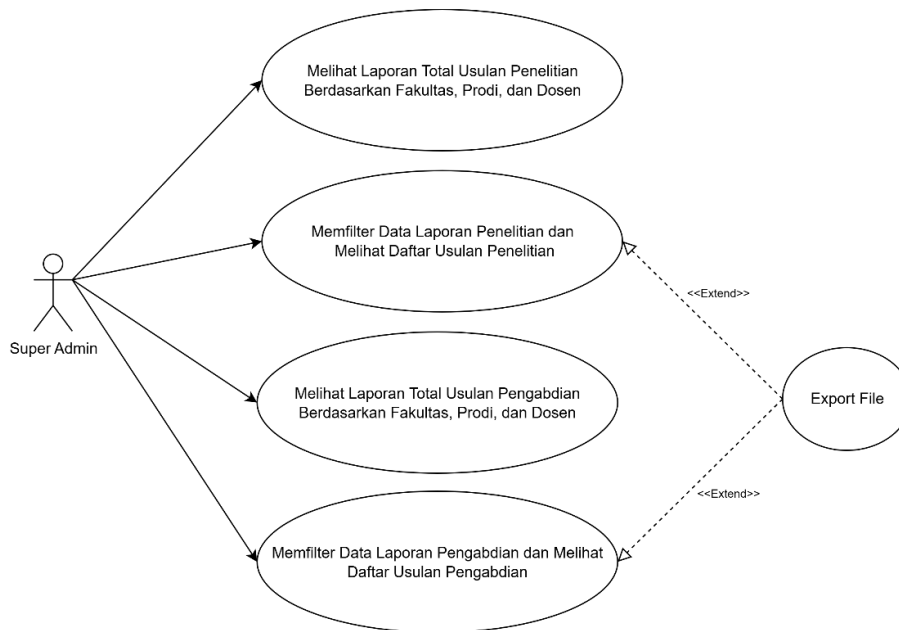


Figure 2. Use case diagram

2.3.2. Activity Diagram

a. Activity diagram for research (Dropdown)

This diagram illustrates the process of the Super Admin viewing research recapitulation based on faculty, study program, and lecturer through a hierarchical dropdown to make the data more structured.

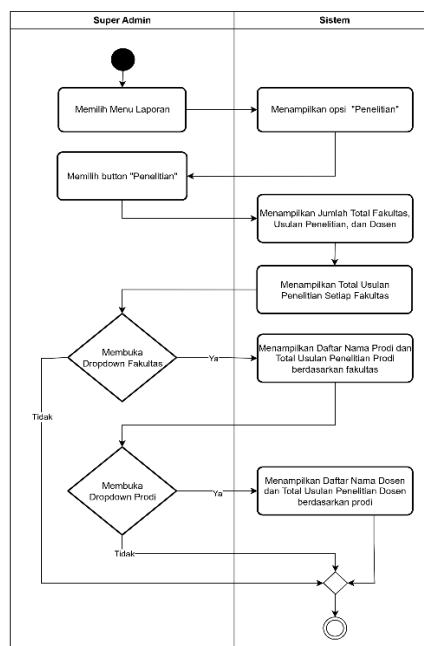


Figure 3. Activity diagram for research (dropdown)

b. Activity diagram for research (Filter & Export)

This diagram explains the flow of Super Admin filtering research data by year, faculty, and study program, then exporting the list of proposals to Excel format.

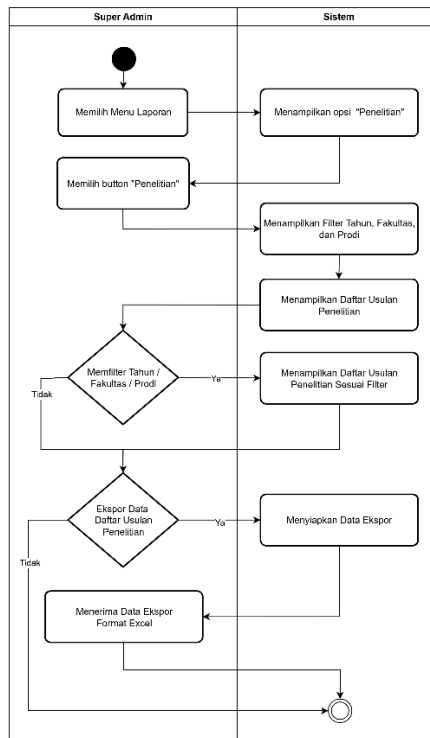


Figure 4. Activity diagram for research (filter & export)

c. Community service activity diagram (Dropdown)

This diagram shows the steps for a Super Admin to open the community service summary with a dropdown hierarchy of faculty, study program, and lecturer to view proposal details.

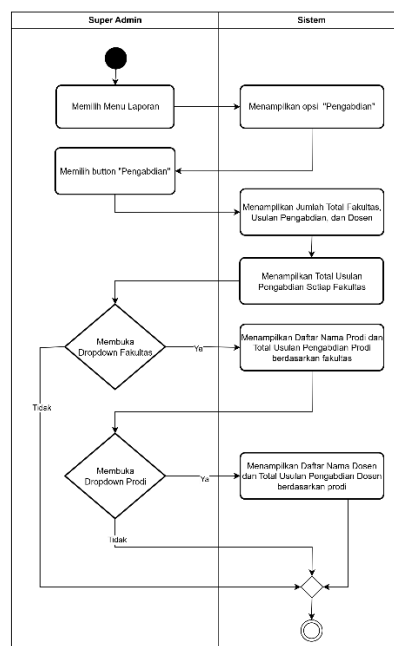


Figure 5. Community service activity diagram (dropdown)

d. Community service activity diagram (filter & export)

This diagram shows the Super Admin process of filtering service data according to certain criteria and exporting it to Excel for further processing.

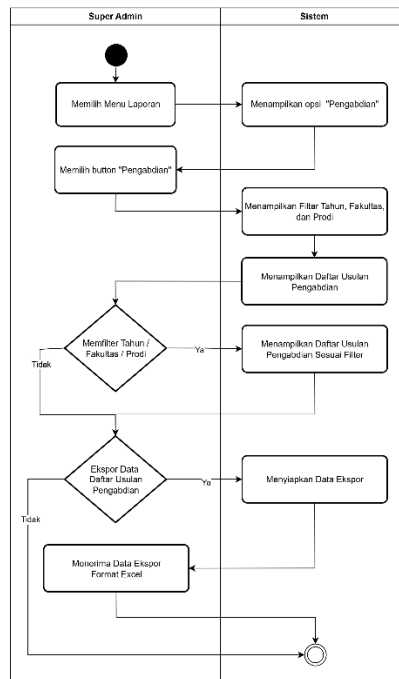


Figure 6. Community service diagram (filter & export)

2.3.3. Sequence diagram

a. Research sequence diagram (dropdown)

This diagram illustrates the Super Admin access flow to open a research report, display total data per faculty, and then browse study program details down to lecturers via a dropdown.

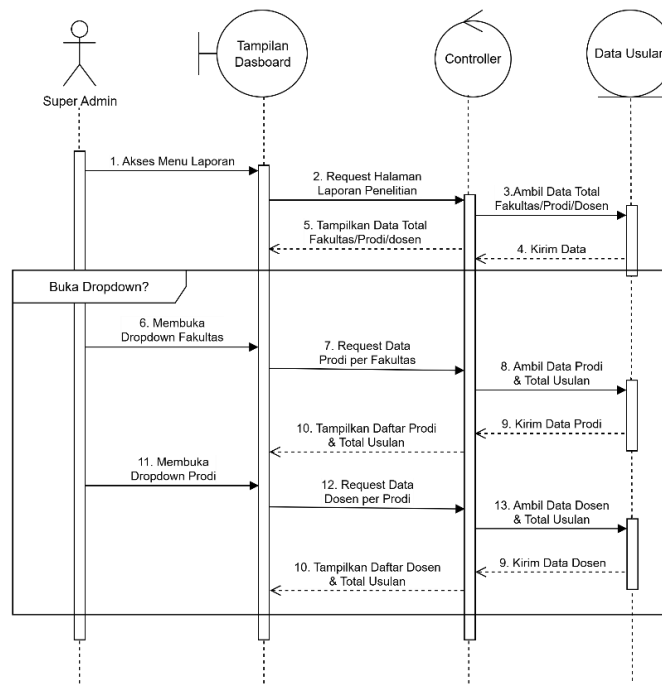


Figure 7. Research sequence diagram (dropdown)

b. Research sequence diagram (filter & ekspor)

This diagram shows the process of the Super Admin filtering research reports based on year, faculty, and study program, and then exporting the results into Excel format.

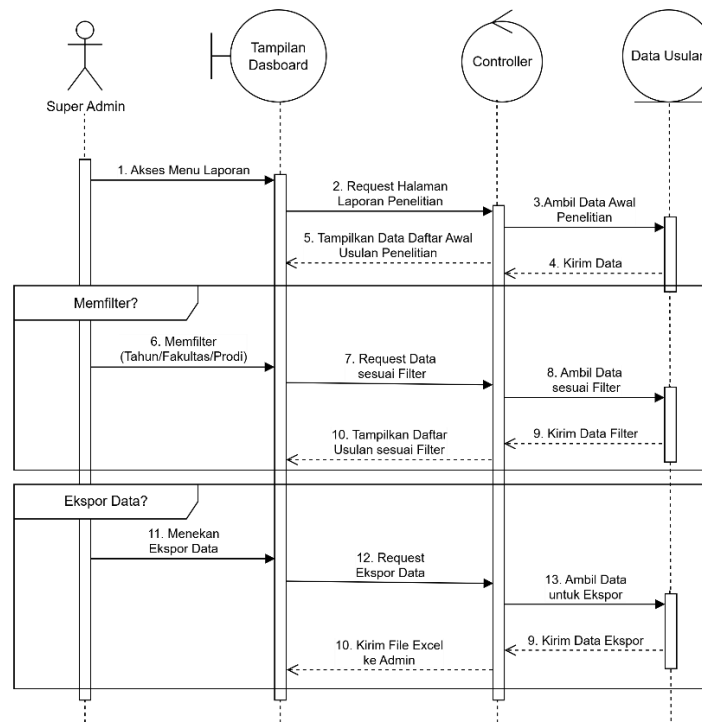


Figure 8. Research sequence diagram (filter & export)

c. Sequence diagram for community service (dropdown)

This diagram illustrates the steps of the Super Admin accessing community service reports, displaying totals per faculty, and then navigating into study program and lecturer details through a dropdown.

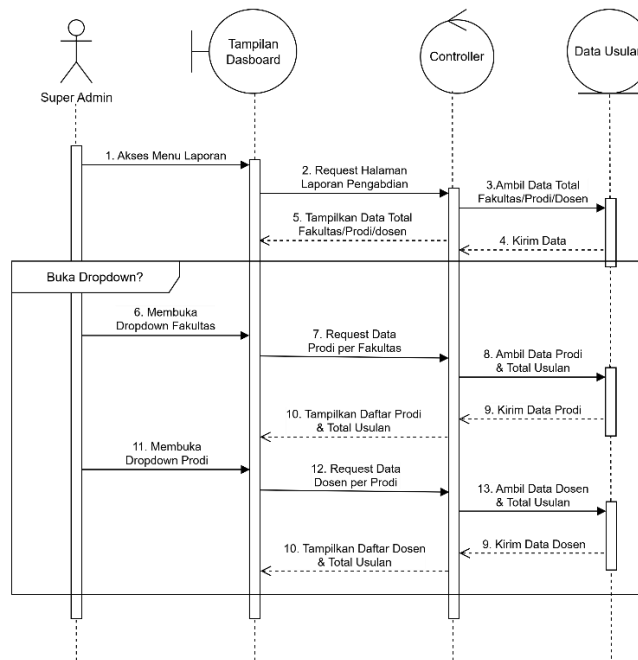


Figure 9. Sequence diagram for community service (dropdown)

d. Sequence diagram for community service (filter & export)

This diagram explains the flow of filtering community service reports according to specific criteria and exporting the report results into an Excel file for documentation.

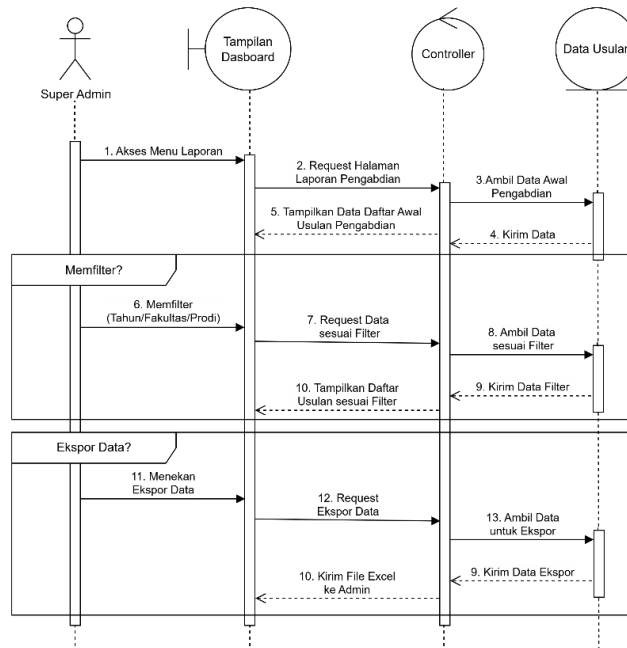


Figure 10. Sequence diagram for community service (filter & export)

2.3.4. Entity relationship diagram

The Entity Relationship Diagram (ERD) is a graphical notation diagram used in database design that shows the relationships between different data entities (Afiifah et al., 2022). The ERD is shown in Figure 11.

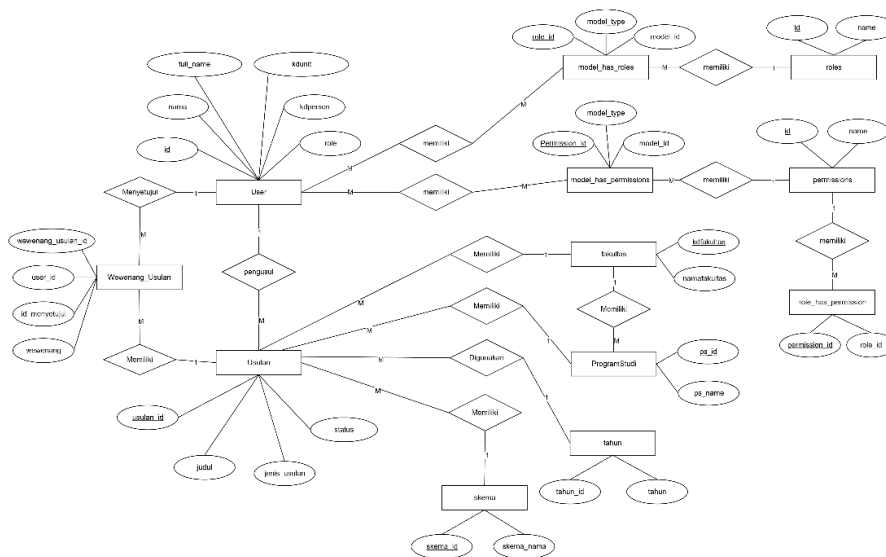


Figure 11. Entity relationship diagram

2.3.5. Wireframe

Wireframes are widely used in the early stages of web design to plan and structure web page layouts, enabling designers to create an initial interactive web interface. The wireframes for Research and Community Service Reports are shown in **Figures 12.** and **13.**

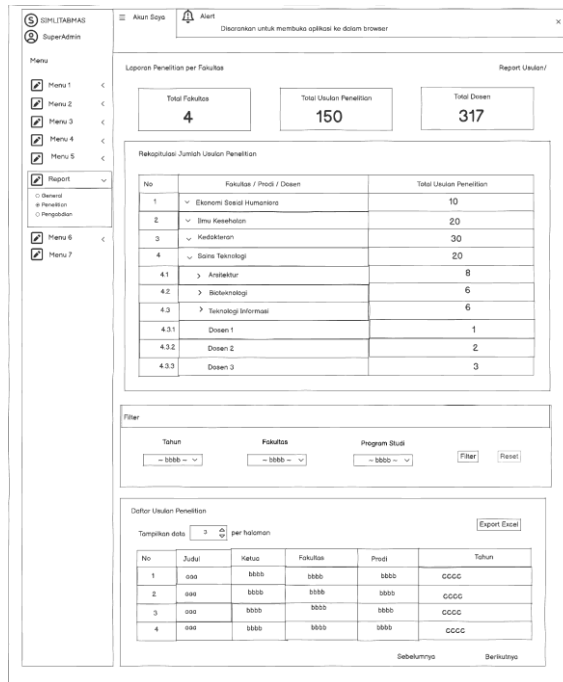


Figure 12. Wireframe of research report

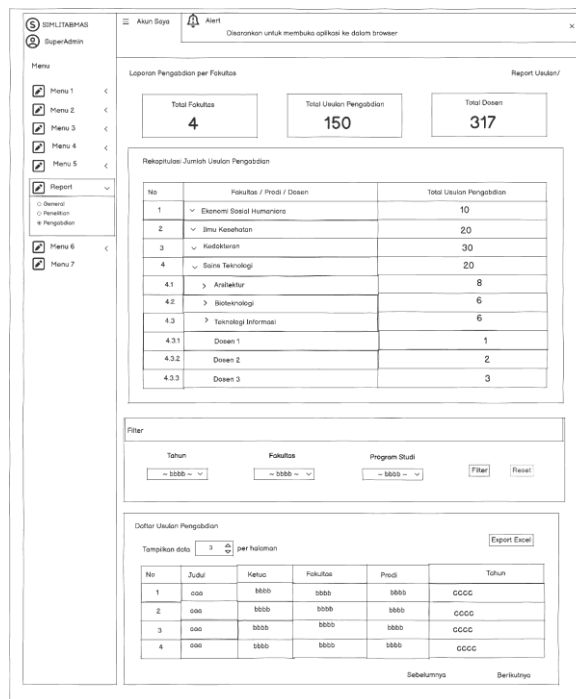


Figure 13. Wireframe of community service report

3. Results and Discussion

3.1. Construction of prototype

The web-based SIMLITABMAS system developed focuses on presenting research and community service reports through the Super Admin role. At the implementation stage, the reporting menu, which previously only contained Report/General, was expanded with the addition of Research and Community

Service Reports. Thus, the system not only displays a general summary of proposals but also provides detailed reports by faculty, study program, and lecturer.

3.1.1. Research report

The research report displays the recapitulation of submitted research proposals based on faculty, study program, and lecturer. At the top, the system shows the total number of faculties, total research proposals, and total lecturers recorded in the system. The recap data is presented in a dropdown table that can be expanded for each faculty, allowing users to view the details of research proposals per study program down to the lecturer level. This dropdown mechanism makes it easier for users to navigate data step by step without displaying all information at once, ensuring that data is more structured and easier to understand. The Research Report display is shown in **Figure 14**.

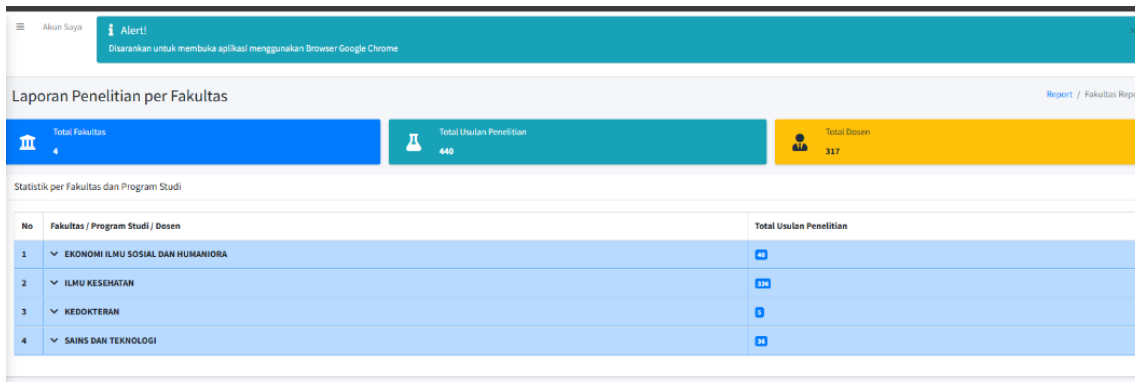


Figure 14. Research report display

3.1.2. Community service report

The community service report follows a similar concept to the research report but focuses on community service proposals. The system presents the total number of faculties, total community service proposals, and the number of lecturers involved. The data is displayed in a hierarchical table with dropdown features for each faculty, which can be expanded to the study program and lecturer levels. This feature allows users to monitor the number of community service proposals concisely at the faculty level while also accessing more detailed information at the study program and lecturer levels. The Community Service Report display is shown in **Figure 15**.

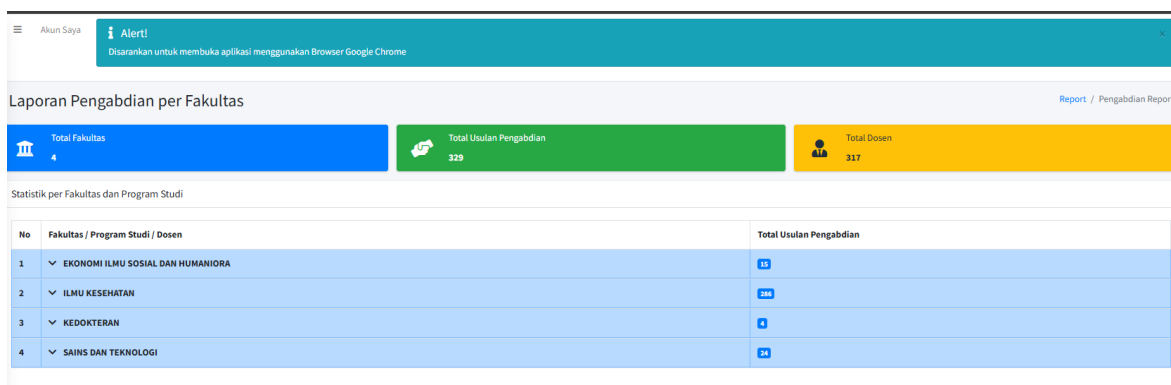


Figure 15. Community service report display

3.1.3. Proposal data filter and export

The system is also equipped with a data filter feature that allows users to filter reports by year, faculty, and study program. Once the filter is applied, the list of research or community service proposals will be updated according to the selected criteria. In addition, an export feature to Excel (.xlsx) format is provided, enabling users to save, process, and distribute data for administrative or reporting

needs. The presence of this filter and export feature provides greater flexibility for users in accessing and utilizing data stored in the system. The Data Export display is shown in **Figure 16**.

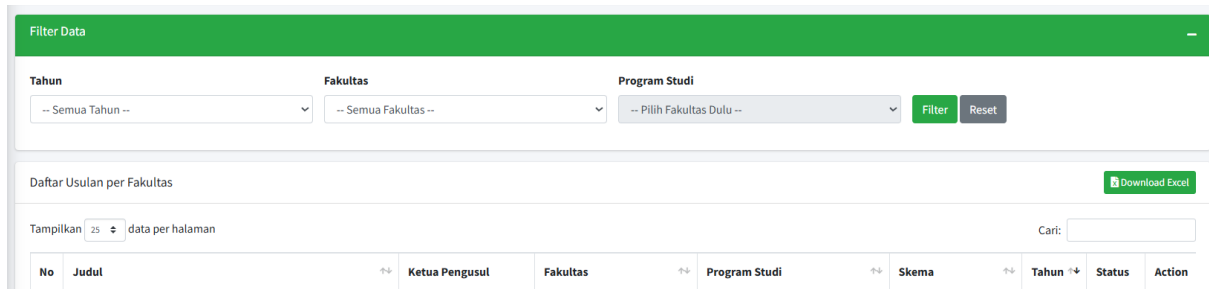


Figure 16. Proposal data filter and export display

3.2. Delivery and Feedback Prototype

The evaluation stage was carried out using black box testing. Black box testing is a software testing method that focuses on functionality, particularly application inputs and outputs. In this test, only the interface and usability are evaluated without examining the internal design of the code or program. Black box testing in this study was measured using the Guttman Scale, which provides only two response options, such as yes/no or success/failure (Eka Susilawati, 2024; Janata et al., 2022). The equation can be defined with the following provisions:

$$\text{Percentage of success} = \frac{\text{Jumlah Jawaban Berhasil}}{\text{Jumlah Nilai Maksimal}} \times 100\%$$

The assessment percentage is shown in **Table 1**.

Table 1. Assessment percentage

| No | Percentage | Assessment |
|----|------------|------------|
| 1 | 0% – 25% | Very Poor |
| 2 | 26% – 50% | Poor |
| 3 | 51% – 75% | Good |
| 4 | 76% – 100% | Very Good |

The testing was conducted with eight test scenarios and involved four respondents from several administrative staff members of the university, as shown in **Table 2** and **Table 3**.

Table 2. Black box testing scenarios

| No | Feature Tested | Input / Scenario | Expected Output | Actual Output |
|----|----------------------|---|--|--|
| 1 | Academic Year Filter | Select one academic year | The system only displays research/community service proposals for that year | The system only displays research/community service proposals for that year |
| 2 | Faculty Filter | Select one faculty from the dropdown | The system displays proposal recaps according to the selected faculty | The system displays proposal recaps according to the selected faculty |
| 3 | Study Program Filter | Select faculty, then choose a study program from the dropdown | The system displays proposal recaps according to the selected faculty and study program | The system displays proposal recaps according to the selected faculty and study program |
| 4 | Faculty Recap | Select a faculty without choosing a study program | The system displays the total number of research/community service proposals per faculty | The system displays the total number of research/community service proposals per faculty |

| No | Feature Tested | Input / Scenario | Expected Output | Actual Output |
|----|---------------------|---|---|---|
| 5 | Study Program Recap | Select a specific faculty and study program | The system displays the total number of proposals per study program within the selected faculty | The system displays the total number of proposals per study program within the selected faculty |
| 6 | Lecturer Recap | Select faculty & study program then display lecturers | The system displays lecturers' names along with the number of proposals submitted | The system displays lecturers' names along with the number of proposals submitted |
| 7 | Excel Export Report | Select faculty/study program/year then click "Export Excel" | The system generates an Excel file according to the selected filter | The system generates an Excel file according to the selected filter |
| 8 | Data Consistency | Compare recap totals with detail totals | The recap total must equal the total in the detail table | Jumlah total pada recap sama dengan jumlah detail pada tabel |

Table 3. Testing Results

| No | Parameter | Respondents | | | | Result |
|----|----------------------|-------------|---------|---------|---------|--------|
| | | 1 | 2 | 3 | 4 | |
| 1. | Academic Year Filter | Success | Success | Success | Success | 100% |
| 2. | Faculty Filter | Success | Success | Success | Success | 100% |
| 3. | Study Program Filter | Success | Success | Success | Success | 100% |
| 4. | Faculty Recap | Success | Success | Success | Success | 100% |
| 5. | Study Program Recap | Success | Success | Success | Success | 100% |
| 6. | Lecturer Recap | Success | Success | Success | Success | 100% |
| 7. | Excel Export Report | Success | Success | Success | Success | 100% |
| 8. | Data Consistency | Success | Success | Success | Success | 100% |

The calculation was performed using the formula:

$$\begin{aligned} \text{Persentase Keberhasilan} &= \frac{\text{Number of Successful Test Cases}}{\text{Number of Test Cases} \times \text{Number of Respondents}} \times 100\% \\ &= \frac{32}{8 \times 4} \times 100\% = 100\% \end{aligned}$$

The results show that all test scenarios were successfully executed with a **100% success rate**, which indicates a **Very Good** assessment.

4. Conclusion

This study successfully developed a reporting feature for research and community service in SIMLITABMAS, enabling recapitulation of proposal counts by faculty, study program, and lecturer. The feature includes dropdowns, year and faculty filters, and Excel export, providing structured and accessible data. Black box testing confirmed that all scenarios functioned as expected with a 100% success rate, indicating a Very Good assessment. The system effectively supports the administration of LPPM UNISA Yogyakarta. Future improvements may include graphical analytics, integration with financial systems, and more detailed access rights to make the system more comprehensive for managing research and community service in higher education.

Saying thank you

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