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Improving the Acceptability of the Research and Community Service Management System at Semarang State University: User-Centred Design Method

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Abstract
The increasing number of researchers receiving research funds at Universitas Negeri Semarang (UNNES) highlights the growing need for an efficient research and community service management system. This study aims to examine the UI/UX design of the UNNES Research and Community Service Management System using the User-Centered Design (UCD) methodology. The research focuses on applying the UCD approach to develop an intuitive and user-friendly interface for the administration of research and community service applications at UNNES. The study involves understanding user needs and behaviors through direct interaction with the system's intended users, ensuring the design meets the expectations of both researchers and administrators. After completing the UI/UX design, the System Usability Scale (SUS) was employed to assess the design's usability. The resulting UI/UX design achieved a score of 83.5, indicating high usability. This study demonstrates the effectiveness of the UCD approach in creating a user-friendly and functional system that enhances the user experience and supports the administrative needs of research and community service at UNNES.
Keywords: System; Research; Service; UCD; UI/UX

INTRODUCTION

Information technology is currently developing quite rapidly, especially in the field of information systems and applications/apps. The many new systems and applications that are now being created make it easier for humans to complete various tasks. One example of the development of technology in the field of education is the *Research and Community Service Management System*. This system collects various types of data that are managed and processed as automatically as possible with tools and methods to produce the information needed for the implementation of academic activities (Nurlifa et al., 2014). Research and community service at *Universitas Negeri Semarang* (Unnes) continue to increase every year. In 2024, 481 researchers received DPA Unnes research funds, and this number increased in 2025 to 724 researchers. The increasing number of researchers receiving research funds means that more researchers are accessing the *Research and Community Service Management System* at Unnes. Research conducted by (Rondonuwu et al., 2024) explains that there are still several obstacles experienced by Unnes researchers in operating the *Research and Community Service Management System*, one of which is the suboptimal user interface on the system (Heristyanto et al., 2022). Therefore, it is necessary to develop the User Interface (UI/UX) to provide the maximum user experience.

User-Centered Design (UCD) is a design approach with a process based on information from the product's users. In addition, UCD is explained as a design philosophy that places the user's wishes at the center of the system development process (Agus Muhyidin et al., 2020; Anisa et al., 2020; Mitre-Ortiz et al., 2023). The advantages of the UCD method are that it has a high level of efficiency and is easy to use because, in the process, the UCD method involves users in the entire design process (Ibrahim et al., 2023). The focus of UCD is understanding the needs, preferences, and characteristics of users to create a better user experience (Agus Muhyidin et al., 2020; Alshammari, 2019; Anisa et al., 2020). *User Interface* is a visual display of a product that bridges the system with users (Grande et al., 2021; Nurlifa et al., 2014). The UI display can change the shape of the color and writing that is designed as attractively as possible in a simple way (Puteri et al., 2022). In addition, the *User Interface* (UI) design plays an important role in providing a pleasant and intuitive experience for users (Yayici, 2016). With an interface specifically designed for mobile devices, users will feel more comfortable when using the application (Putra et al., 2021; Ridwansyah et al., 2022). The use of easily recognizable icons, responsive layouts, and intuitive navigation will increase work effectiveness. With the existence of an appropriate *User Interface*, it will certainly affect the level of satisfaction for researchers and community service providers (Syabana et al., 2020).

The purpose of this study is to analyze the design of the UI/UX with the *User-Centered Design* Method for managing research and community service systems at *Semarang State University*. Several previous studies that examined the development of UI/UX for research and community service management systems still produced varying findings (Anisa et al., 2020; Ibrahim et al., 2023; Mitre-Ortiz et al., 2023; Rondonuwu et al., 2024). This study carries an innovation in UI/UX design with a *User-Centered Design* approach, which is a significant advancement in the integration of user experience principles in higher education technology.

Previous studies have explored various aspects of UI/UX design in research and community service systems, but gaps remain in the integration of *user-centered design* (UCD) principles. Research by (Agus Muhyidin et al., 2020). indicates that there are still significant usability challenges within the existing UI/UX of research management systems in universities, especially with increasing numbers of users accessing these systems. Their findings emphasize the importance of a responsive and user-friendly interface, but they lack a detailed exploration of how *user-centered design* principles can specifically address these issues within a university's research management system. Another study by (Alshammari, 2019) focused on UI/UX improvements for educational applications but did not address the unique needs of researchers and administrators using these systems in a real-world academic setting. While these studies acknowledge the need for better UI/UX, they fall short in applying a comprehensive UCD methodology that involves users directly in the design process to maximize user satisfaction and efficiency.

The purpose of this research is to analyze and develop the UI/UX design of the *Research and Community Service Management System* at *Universitas Negeri Semarang* using the *User-Centered Design* (UCD) method. By focusing on the needs and feedback of system users, the study aims to create an interface that enhances usability and user satisfaction. The benefits of this

research include improving the user experience of researchers and administrators, streamlining the research and community service management processes, and contributing to the broader application of UCD in higher education technology development. This study's findings offer valuable insights into how UCD can be effectively integrated into the design of academic management systems to improve efficiency and user engagement.

METHOD

In this research, research and development is related to the development of UI/UX using the User-Centered Design Method for the management of research and community service applications at Universitas Negeri Semarang (UNNES). The steps in this research methodology are described (Ekawatiningsih, 2009; Shirvanadi, 2021).

a. Analysis of the Current System

Refers to the stages carried out by collecting information such as the purpose of creating a website, target users and the philosophy of the related company with the following details:

1) Understand context of use

Researchers will find the purpose of creating the Visual Streets website, find the target users of the website which will become the benchmark for making the website, the resulting output is a clear purpose for making the website.

2) Specify user requirements

After getting the needs and identification of website users based on the negative and positive aspects that will be part of the questionnaire that has been distributed.

b. Running System Testing

The distribution of assessments based on usability testing to users who have accessed with the hope that it will make researchers know the weaknesses of the website being studied.

c. Website Redesign

Is the main stage where researchers will redesign a website display based on the evaluation obtained in the previous stage by producing the following output:

1) Design solutions. At this stage will make an initial design plan as a solution based on the initial needs of the website which is still a researcher's planning material before implementation.
2) *Evaluate against requirements*. The prototype design created in the previous stage will be evaluated before redesigning.

d. Testing on Website Redesign

Is a stage carried out on the redesign that has been carried out and will be tested by redistributing questionnaires with the same statements as in the distribution for the analysis of the current system.

e. Website Redesign Recommendations

Done after knowing the problems on the website based on the tests carried out which led to the researcher will provide recommendations for improving the appearance of the website in the form of a user interface that has passed through several previous stages.

RESULTS AND DISCUSSION

From the data collection process, data from research activities, community service, and lecturer publication data have been obtained. In the problem identification process, problems were found when observing the object of research, namely the application of research and community service at UNNES. The processing of research and community service data at UNNES is still considered ineffective. Therefore, the proposed solution to the problem in this research will be designed an information system that can accommodate the problem solving of research and community service data management, as well as lecturer publications. The design of the UNNES research and community service application from the results of the data analysis stage is shown in the following diagrams:

Use Case Diagram

Use Case Diagram is one type of diagram that aims to provide a visual representation of the processes in the system. There are four actors who will be involved in the system to be built, namely university leaders who will be able to see performance statistics and download performance reports. Reviewer, who will give an assessment. LPPM Admin, who will provide assessments, verify proposals, assign reviewers, and monitor activities. Lecturers or researchers, who can submit proposals, view proposal status, upload reports, and fill out UI/UX evaluations.

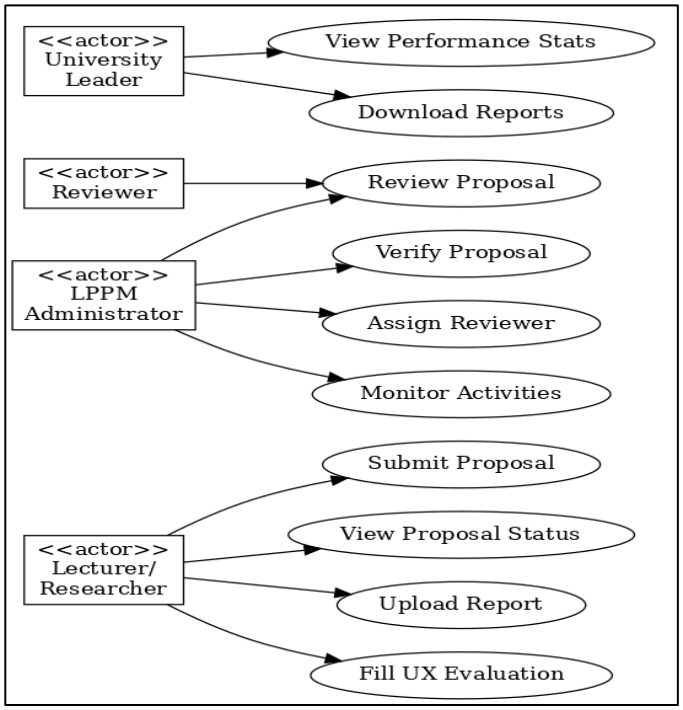

Figure 2. Use Case Diagram

Activity Diagram

The activity diagram will be divided into six parts, including:

1. Activity Diagram Login

   In the Login Activity Diagram, the initial activity is started by the actor by entering the username and password into the system, then pressing the login button. The system will validate

the user account through the database table. If the account matches or is found in the table, the system will enter the admin dashboard page, but if the user account does not match, the user will be asked to enter the username and password again in the login menu.

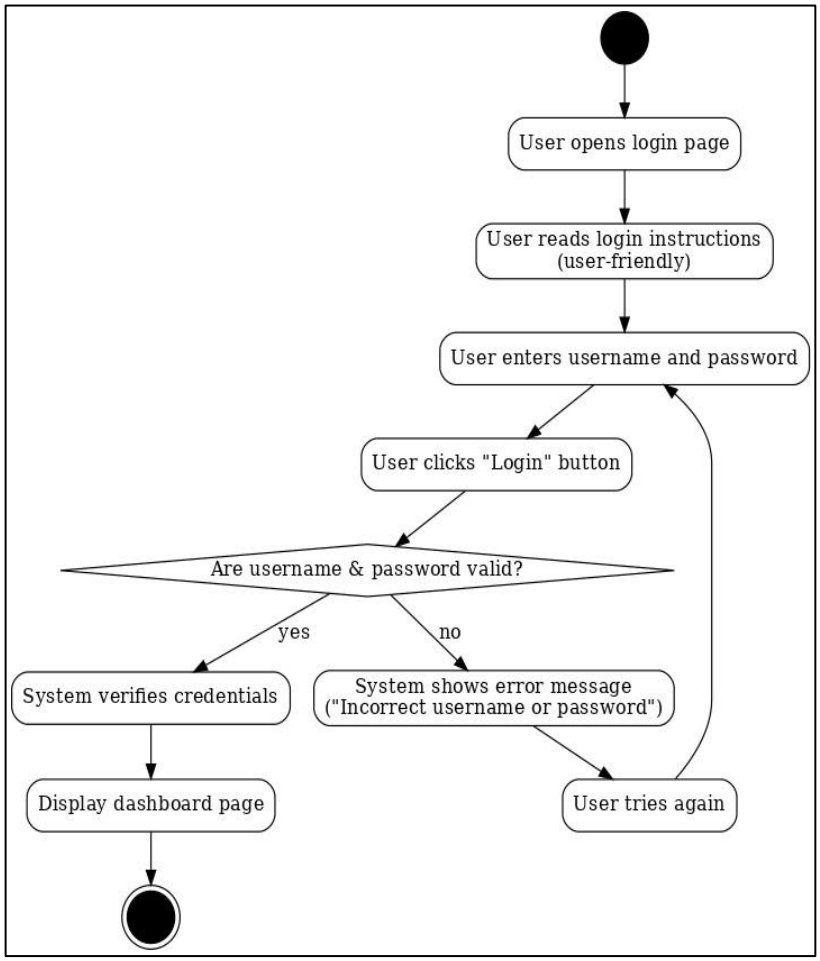

Figure 3. Activity Diagram Login

2. Activity Diagram Input Data

The Activity Diagram of Data Input begins with the user, namely LPPM who downloads a template to enter data into the system. LPPM fills in the data on the template that has been downloaded. After the data is filled in, upload the data template into the system and the data will be automatically saved to the system.

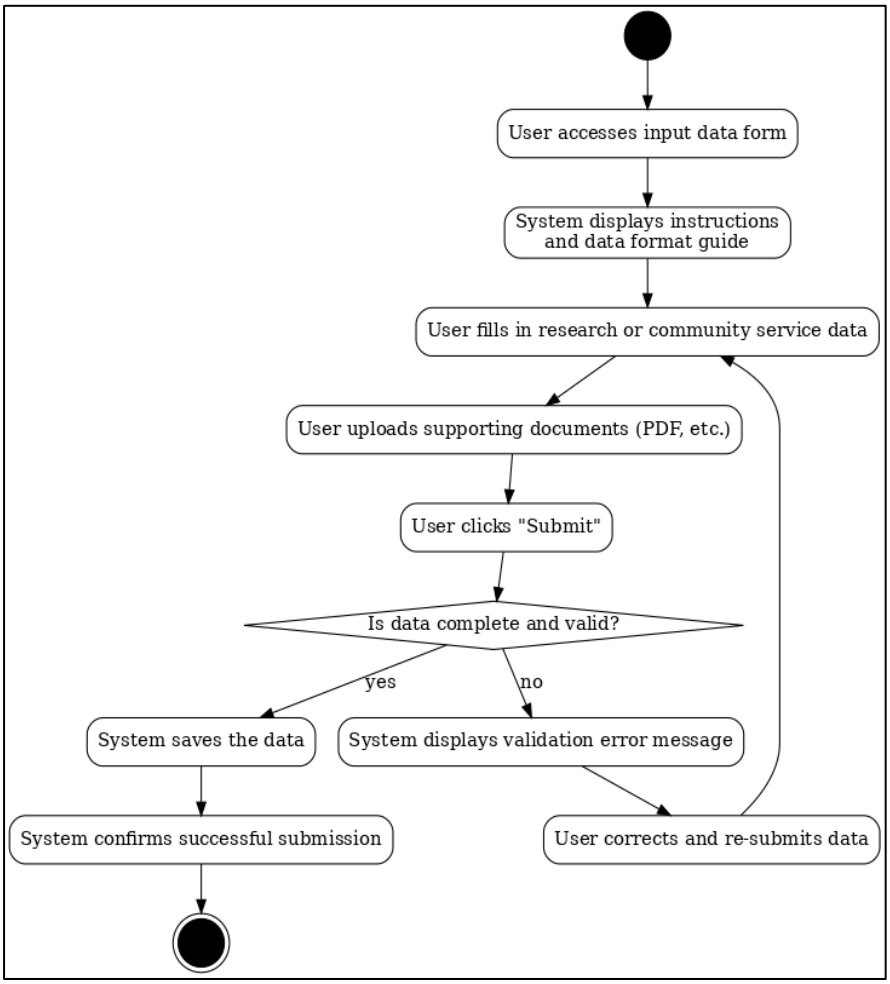

Figure 4. Activity Diagram Input Data

3. Activity Diagram Search Data

In the search data activity diagram, the user activity starts by entering the search key to find the desired data. Then the user presses the search button. If the data sought is found, the system will display the data on the admin dashboard page or in the search menu.

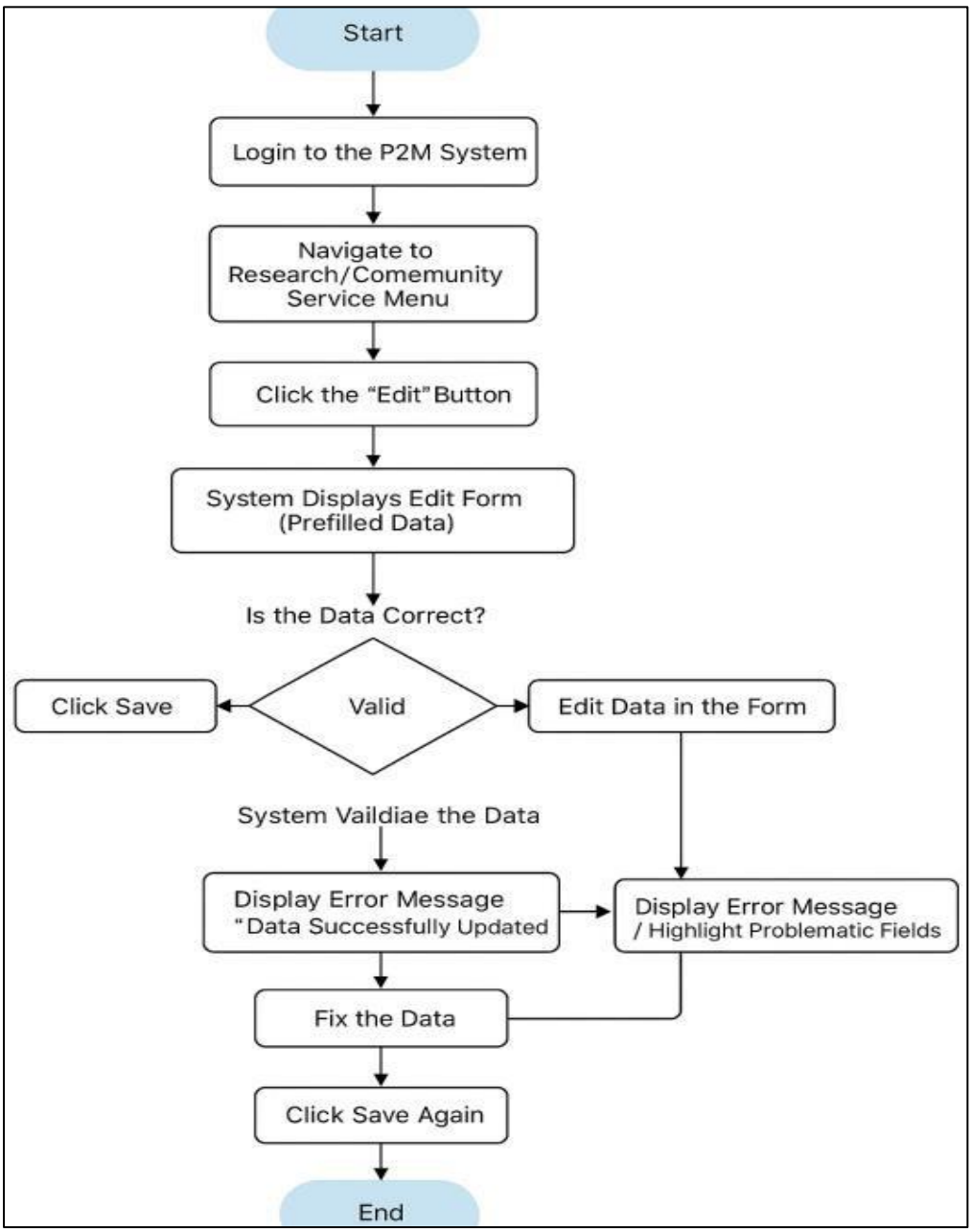

Figure 5. Activity Diagram Search Data

4. Activity Diagram Edit Data

Activity Diagram Edit Data shows user activity (LPPM) when updating or editing data. Starting with entering the search key in the system, then the user presses the search button. If the data in question is found, the system will display the search results on the admin dashboard page, but if the data is not found, the system will direct the user to re-enter the search keywords.

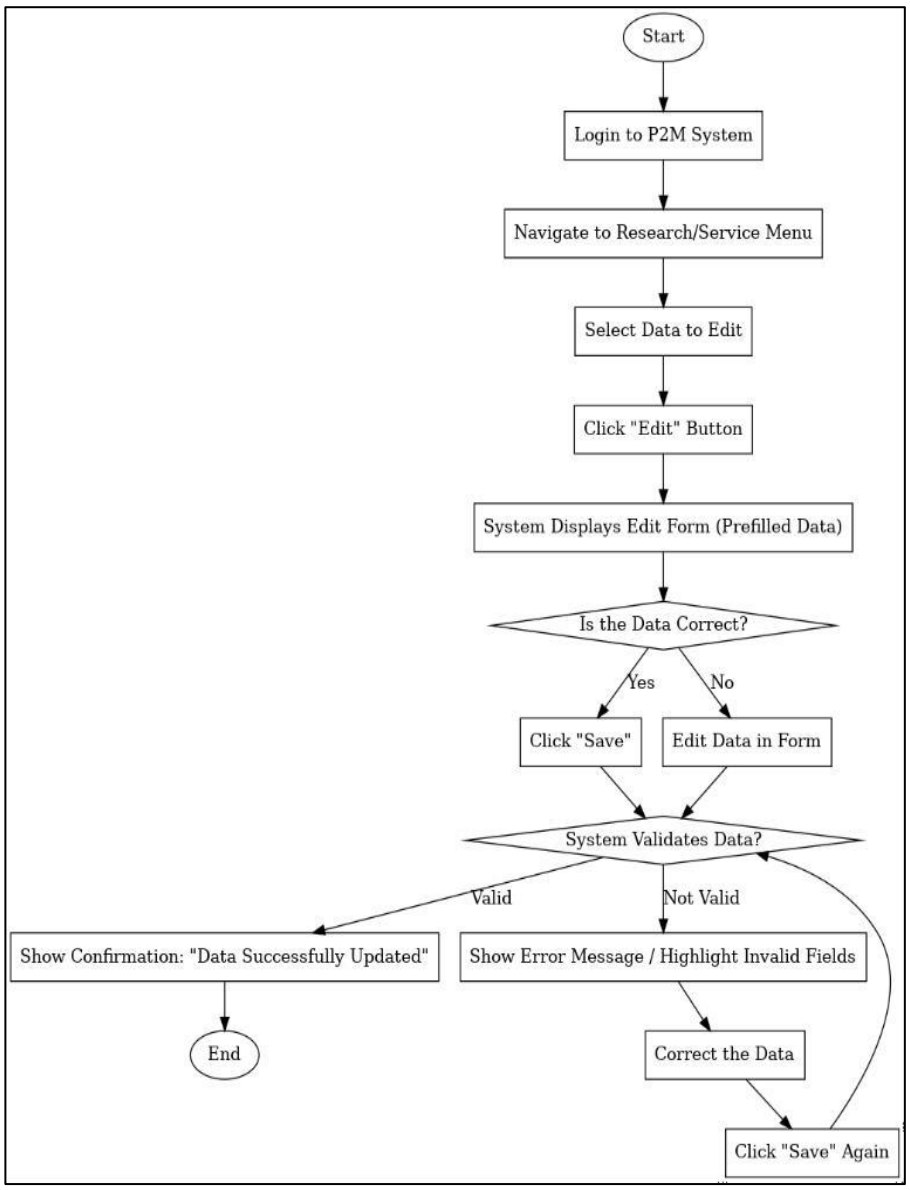

Figure 6. Activity Diagram Edit Data

5. Activity Diagram Delete Data

Similar to the activity on editing data, in the Activity Diagram of deleting data, the initial process starts with entering the search key by the user. Then the user presses the search button. If the data in question is found, the system will display the data in question on the admin dashboard page, but if the data in question is not found, the user will be asked to repeat entering the search keywords on the system.

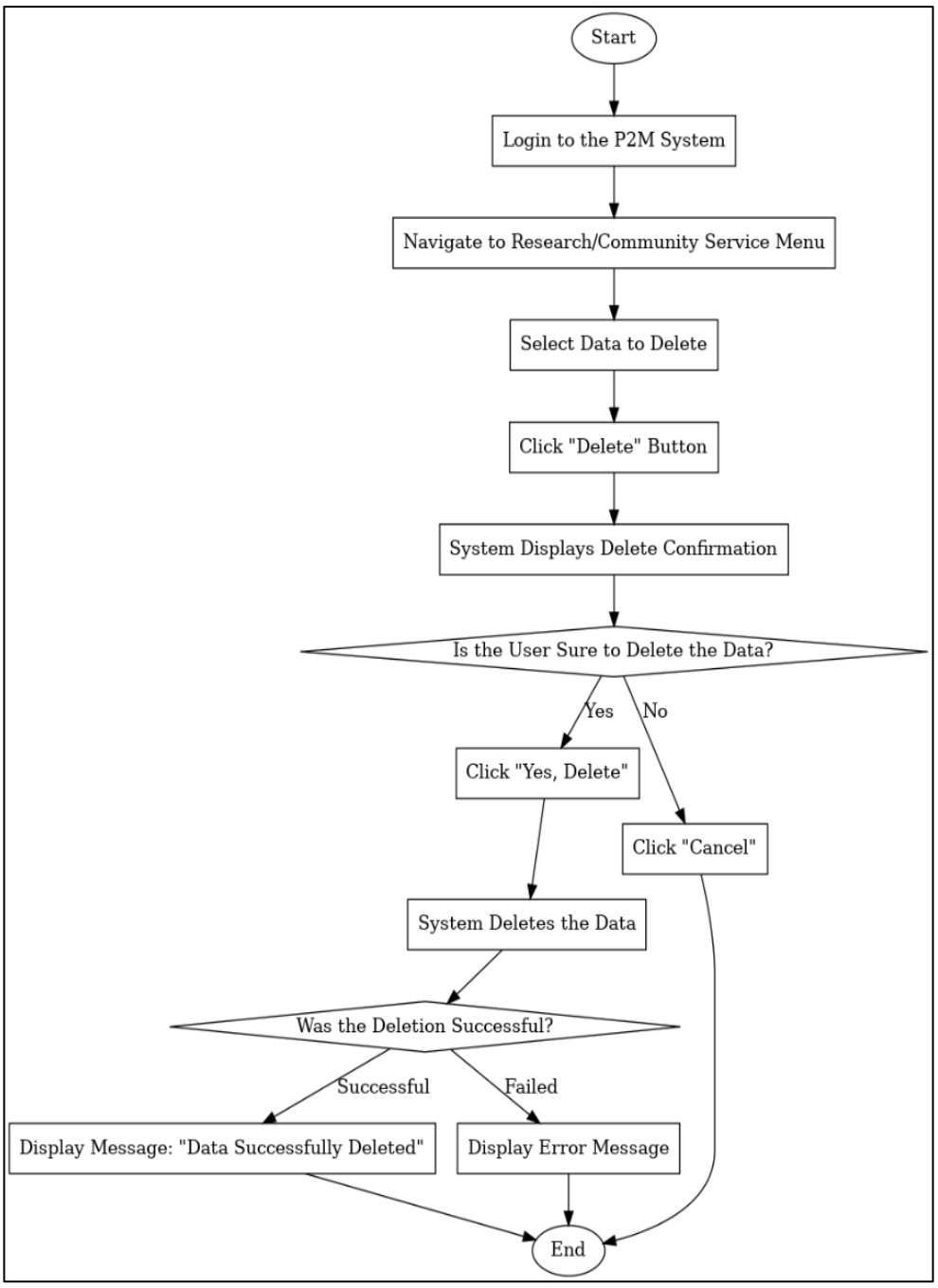

Figure 7. Activity Diagram Delete Data

6. Activity Diagram Print Report

The activity of printing reports begins with the user (LPPM or lecturer) determining the type of report and the period to be printed. Then the user presses the print button. The system will print or export the report as desired by the user.

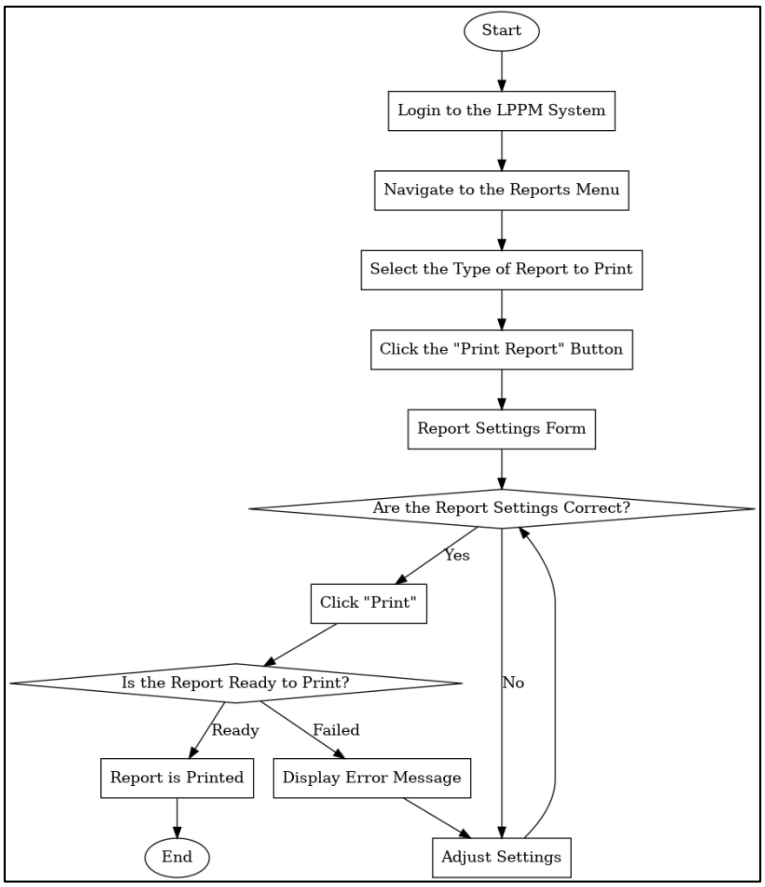

Figure 8. Activity Diagram Print Report

After planning, the next step is to evaluate the design that has been made. At this stage the author uses the System Usability Scale (SUS) method to determine the level of satisfaction of potential users. Based on the questionnaire that has been distributed to 20 respondents, it shows that testing has been carried out using the System Usability Scale (SUS) questionnaire on the UI / UX design that has been made and gets a score of 83.5 which means that the score is in the EXCELLENT category with grade scale B.

CONCLUSION

From the research that has been carried out, it can be concluded that the UI/UX design of the *UNNES* research and community service application has been successfully developed by applying the *UCD* approach. Testing has been carried out using the *System Usability Scale* (SUS) on the UI/UX design that has been created, and it received a score of 83.5, which means that the score falls into the *EXCELLENT* category with a grade scale of B. Based on this data, the application that has been developed is assessed as acceptable and feasible for use by the community.

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