



## Development of Dashboard Features on the Information System of the Institute for Research and Community Service to Support the Reporting of Community Service Data

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**Abstract:** Community service is one of the core obligations of higher education institutions aimed at applying science and technology to address societal problems. State University of Surabaya, through the Institute for Research and Community Service, has implemented an information system to manage community service activities conducted by its lecturers. However, the existing system does not yet provide detailed and comprehensive information to support effective monitoring and reporting processes. This study aims to develop a dashboard feature that presents detailed and structured community service data to improve reporting quality and support decision-making for university leaders and stakeholders. The development process followed the Waterfall method, consisting of requirement definition, system and software design, implementation and unit testing, integration and system testing, and operation and maintenance. The resulting dashboard provides various visualizations, including the percentage of community service activities, participant distribution, inter-faculty involvement, and detailed activity information. The implementation results show that the developed dashboard feature enhances the accessibility and clarity of community service data, supports monitoring and evaluation processes, and improves the effectiveness of reporting community service activities at the State University of Surabaya. This dashboard offers practical value by enabling role-based, integrated, and transparent monitoring of community service activities within a single institutional system.

**Keyword:** Dashboard, Reporting, Information Systems, Community Service.

### INTRODUCTION

As time goes by, people's demands for universities are increasing. This causes universities not only to act as providers of education and research, but also as organizers of community service, which is referred to as the Obligation of Higher Education. Every university is required to arrange the Obligation of Higher Education, as stated in Law No. 12 of 2012 Concerning Higher Education. One of the most crucial steps in achieving the objectives of the Indonesian country, which are to advance general welfare and educate the populace, as stated in the Preamble of the 1945 Constitution of the Republic of Indonesia, is

the execution of community service by colleges. Several previous studies have explored the development of information systems for research management and academic performance monitoring in higher education institutions (Secundo, 2021; Ramirez, 2023). These studies emphasize the importance of integrating data visualization dashboards to improve monitoring and evaluation processes. Nevertheless, most existing works focus on research or academic performance data, while dashboards specifically designed for community service reporting are still underexplored. Community service itself may be seen as a type of action done by the academic community in an effort to assist the community in using science and technology to solve problems that are occurring (Republic of Indonesia, 2012).

Community service is a form of the application of knowledge (Darni et al., 2021). Through the Institute for Research and Community Service, State University of Surabaya continues to work to improve the quality of the execution of community service activities to be in line with the set criteria. The scope of community service standards includes standards for the outcomes of community service, standards for community service content, standards for community service processes, standards for community service assessment, standards for implementing community service, and standards for community service, according to Article 56 of the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 3 of 2020 concerning National Standards for Higher Education (Republic of Indonesia, 2020).

Information systems are a combination of human activities, software, hardware, communications networks, and resources for collecting, changing, and disseminating information in an organization (Dachyar, 2022). Information systems have four important roles in an organization, namely participating in the implementation of tasks, linking planning, work, and control in a subsystem, coordinating subsystems, and integrating subsystems (Kadir, 2014). Recent studies highlight the increasing adoption of dashboard-based information systems in higher education institutions to support data-driven decision-making and performance monitoring (Alshurideh et al, 2021; Santos and Martinho, 2022; Gong et al, 2023). A dashboard is a tool that executives may use to track and assess the performance of their business by providing Key Performance Indicators data in the form of a visual interface that can be viewed briefly in one layer (Januarita and Dirgahayu, 2017). Dashboards enable university leaders to visualize complex institutional data efficiently and evaluate key performance indicators in real time (Rashid et al, 2021; Mhlanga and Moloi, 2022). However, the application of dashboard systems specifically for managing and reporting community service activities remains limited, particularly in the context of integrated research and community service information systems.

To optimize the management of processes and data from the implementation of community service, currently, the State University of Surabaya has an Information System for the Research and Community Service Institute that is able to manage the entire process and provide data related to the service of all State University of Surabaya lecturers. However, the information system is still not effective because there is no feature that can display detailed data on each community service activity. This causes the reporting and monitoring process to be less than optimal. Therefore, it is necessary to develop a feature that can contain detailed information about community service activities.

Based on these problems, this research was conducted to develop a dashboard feature on so that the process of reporting community service data at State University of Surabaya becomes more optimal. This feature is designed to make it easier for leaders and stakeholders to monitor the process of implementing community service carried out by all lecturers of State University of Surabaya. Thus, this feature is expected to help leaders and stakeholders in conducting evaluations to improve the quality of community service. In addition, this research is expected to support the achievement of the Fifth Key Performance Indicator, which is the work of lecturers that can be used and utilized by the community.

Unlike existing academic dashboards that primarily focus on research or academic performance data, this study emphasizes the integration of community service reporting within an institutional information system. The dashboard feature that will be developed consists of several main features, including detailed percentages of the number of community service activities, detailed percentages of the number of community service participants, detailed community service data, detailed percentages of the number of community service between faculties, etc. Each graphic developed will display in detail every community service activity that has been carried out, starting from the title of the community service, the reviewers, etc.

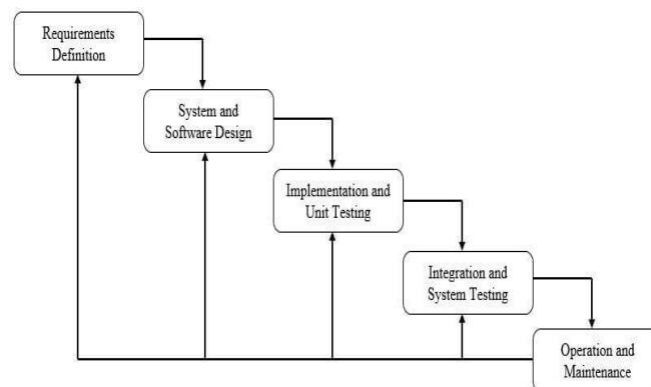
**METHOD**

**Data Collection**

In developing the research dashboard feature on the Information System of the Institute for Research and Community Service to support reporting data on community service at State University of Surabaya, researchers collect data from the system. The subjects involved in system testing were users of the Research and Community Service Institute Information System at State University of Surabaya, consisting of lecturers and reviewers. In the beta testing stage, 6 participants were involved, including 4 lecturers and 2 reviewers. These subjects were selected because they directly interact with the developed dashboard feature in the processes of reporting, monitoring, and evaluating community service activities.

**System Development Method**

The Information System of the Institute for Research and Community Service will use the Waterfall technique to construct the community service data dashboard feature. One kind of the software development life cycle is waterfall, where activities such as requirements definition, software design, implementation, testing, and others are divided into process stages after beginning with specification, development, validation, and evolution (Yudin and Rahayu, 2020).



**Figure 1. Waterfall Method**

The waterfall technique of software development is shown in Figure 1. The explanation of each stage in Table 1.

**Table 1. Step-by-Step Waterfall Techniques**

<i>Steps</i>	<i>Descriptions</i>
<i>Requirement Definition</i>	At this stage, an analysis of user needs is carried out to explore information about services and limitations on the information system. From this requirement definition process, information will be obtained about the list of needs for the community service dashboard feature.
<i>System and Software</i>	After the list of user needs for the community service dashboard feature has been identified, the next stage is to design the system architecture. From this stage, a database design and information system interface will be developed.

<i>Steps</i>	<i>Descriptions</i>
<i>Implementation and Unit Testing</i>	At this stage, the implementation of the database design and interface that was produced from the previous stage became codes that formed several modules. The modules that are successfully formed, are then tested to ensure that they can run well and in accordance with the design obtained in the previous stage.
<i>Integration and System Testing</i>	After undergoing unit testing, the components were merged into an information system. The information system is then retested to confirm that it can function properly and in accordance with user demands after being successfully integrated. There are two parts to the testing procedure. The program must initially be debugged using the Blackbox approach. The second stage involves evaluating the user group (beta tester) as part of the review with users and determining if the application's goals have been met.
<i>Operation and Maintenance</i>	At this stage, the information system from the development will then be handed over to users so that it can be operated to support business processes at the Institute for Research and Community Service. In addition, periodic maintenance and repair will also be carried out if the information system experiences errors when operated.

## RESULTS AND DISCUSSION

The results of this study are presented in the form of the developed dashboard feature integrated into the Research and Community Service Institute Information System at State University of Surabaya. The dashboard was designed based on the requirements identified during the analysis phase and aims to support the reporting, monitoring, and evaluation of community service activities conducted by lecturers.

The implemented dashboard provides data visualizations tailored to user roles, including community service executors and reviewers. For users acting as executors, the system displays graphical summaries of research and community service proposals submitted over the last five years, as well as a breakdown of proposal involvement as team leaders and members. These visualizations enable users to monitor their participation trends and activity distribution over time.

For users with reviewer access rights, additional dashboard components are provided. These include visualizations of the number of proposal reviews conducted at various stages, such as desk evaluation, proposal presentation, monitoring and evaluation, and final report assessment. All visualizations are generated dynamically based on data stored in the system database and are updated automatically to reflect the most recent records.

The results demonstrate that the dashboard feature successfully presents structured and role-based community service data in a clear and accessible format. Each visualization accurately reflects the stored data and supports users in obtaining an overview of community service activities without requiring manual data processing.

### Requirement Analysis

Requirement analysis is a stage that is carried out to obtain information about user needs for the information system to be developed. At this stage, the process carried out is to identify problems that are happening to users so that these users need an information system. In addition, at the requirements analysis stage, it is also necessary to identify the users of the information system to be developed and the features needed in the information system. The following is a brief discussion of the processes in the requirements analysis. The result is shown in Table 2.

**Table 2. Result for Requirement Analysis**

<i>Steps</i>	<i>Results</i>
Identify the problem	From the problem identification process that has been carried out, the result is that a feature is needed that can automate and facilitate Lecturer Community Service Data Reporting at the State University of Surabaya on the Information System for Research

Steps	Results
User Identification	<p>and Community Service Institute. The reporting results will be used as a reference for measuring the achievements of State University of Surabaya in implementing research and community service policies.</p> <p>From the user identification process that has been carried out, the result is that the Dashboard Feature on the Information System for Research and Community Service Institute will be used by the State University of Surabaya academic community and reviewers who will review the Community Service activities proposed by the Lecturer on State University of Surabaya.</p>
Identify system needs	<p>From the user identification process that has been carried out, the result is that the Dashboard Feature on the Information System for Research and Community Service Institute will be used by the State University of Surabaya academic community and reviewers who will review the Community Service activities proposed by the Lecturer on State University of Surabaya.</p>

### System Design

At the system design stage, the dashboard feature design process was carried out on the State University of Surabaya system based on the information and analysis results obtained at the requirements analysis stage. The processes carried out at the system design stage include designing databases, business process flows, and information system interfaces. The results obtained from the system design stage are the Flow map (Business Process), *Use Case Diagram*, and *Dashboard Database Design*.

### Implementation

Implementations that have been carried out in developing the Information System Dashboard Feature for the Institute for Research and Community Service include developing a dashboard to display data on the pages of reviewers and academics who carry out community service. To use this feature, users must first log in to the SSO website by accessing this address <https://sso.unesa.ac.id> and entering their username and password. After the SSO home page appears, users can enter the system in the Academic menu by pressing the system icon. In this way, the user will be directed to the system home page. To access the Dashboard Feature, Users can select the Dashboard Menu in the menu list on the left side of the web page.

On the dashboard page, there are several graphs that will be displayed according to the user's access rights, both as a reviewer and as an executor of community service. If the User has access rights as a Community Service executor, then the dashboard page will display several dashboards, including:

### Dashboard Number of Proposed Services and Research

This dashboard will display a graph showing the total number of research and service proposals in the last 5 years at system shown in Figure 2.



Figure 2. Dashboard Number of Proposed Services and Research

### Dashboard Number of Proposals as Chairman and Members

This dashboard is a detailed version of the previous dashboard. This dashboard will display a graph showing the number of research and service proposals in the last 5 years as chairman and a member shown in Figure 3.

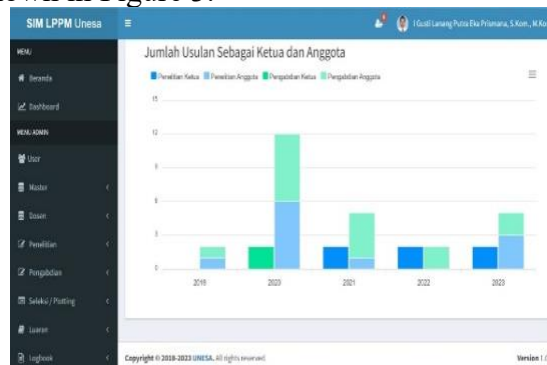


Figure 3. Dashboard Number of Proposals as Chairman and Members

Meanwhile, if the user also has access rights as a reviewer, then apart from the dashboard above, the dashboard page will also display several other dashboards, including:

### Dashboard Number of Review Desks for Evaluation of Research and Service (Reviewers)

On this dashboard, a graph will be displayed showing the amount of research and community service proposal data that has been reviewed at the evaluation desk stage in the last 5 years through the system shown in Figure 4.



Figure 4. Dashboard Number of Review Desks for Evaluation of Research and Service (Reviewers)

### Dashboard Number of Reviews on Research and Service Exposure (Reviewers)

On this dashboard, a graph will be displayed showing the amount of research and community service proposal data that has been reviewed at the presentation stage in the last 5 years through the system shown in Figure 5.



Figure 5. Dashboard Number of Reviews on Research and Service Exposure (Reviewers)

### Dashboard Number of Research and Community Service Monitoring and Evaluation Reviews (Reviewers)

On this dashboard, a graph will be displayed showing the amount of research and community service proposal data that has been reviewed at the monitoring and evaluation stage in the last 5 years through the system shown in figure 6.



Figure 6. Dashboard Number of Research and Community Service Monitoring and Evaluation Reviews (Reviewers)

### Dashboard Number of reviews of final research and service reports (Reviewers)

This dashboard will display a graph showing the amount of research and community service proposal data that has been reviewed at the final report stage in the last 5 years through the system shown in figure 7.



Figure 7. Dashboard Number of reviews of final research and service reports (Reviewers)

### Testing

Testing was conducted to ensure that the developed dashboard feature met the specified user requirements and functioned correctly within the Research and Community Service Institute Information System. The testing process focused on validating system functionality, data accuracy, and user access control based on predefined roles.

Functional testing was performed using the black-box testing approach to verify that each dashboard component displayed data correctly according to the community service records stored in the system database. The results indicate that all dashboard visualizations were generated accurately and corresponded to the authorized user roles, including community service executors and reviewers.

After unit testing, the developed modules were integrated into the information system and evaluated through system testing. This stage consisted of two testing approaches. First, black-box testing was performed to ensure that each dashboard function operated correctly and displayed appropriate data. Second, beta testing was conducted with 6 users, consisting

of 4 lecturers and 2 reviewers, as representatives of the main system users. Their involvement was intended to assess the usability, relevance, and operational suitability of the developed dashboard feature in supporting community service reporting and monitoring.

### **Maintenance**

After the dashboard feature was deployed and handed over to users for operational use, a maintenance phase was conducted to ensure system reliability and sustainability. Maintenance activities were performed to support continuous system operation and to accommodate potential changes in data volume and user requirements.

From the system perspective, maintenance involved bug fixing, performance optimization, and periodic updates to ensure that the dashboard accurately reflected the most recent community service data stored in the database. From the infrastructure perspective, maintenance focused on monitoring database capacity and system resources to maintain data availability and system performance as data growth increased.

This maintenance process is essential to ensure that the dashboard feature remains functional, accurate, and capable of supporting long-term reporting and monitoring needs within the Institute for Research and Community Service.

### **Discussion**

The implementation of the dashboard feature in this study addresses a key limitation of the previous system, which primarily functioned as a data repository and did not provide integrated visual support for monitoring and reporting community service activities. In contrast to manual or table-based reporting, the developed dashboard transforms raw institutional records into structured visual summaries that are easier to interpret and compare across time, user roles, and evaluation stages (Sorour, 2024; Correa-Peralta, Vinueza-Martínez and Castillo-Heredia, 2025). This supports more efficient data-driven decision-making, as dashboards are widely recognized for enabling stakeholders to monitor complex institutional information more effectively and in a more actionable format (Alshurideh *et al.*, 2021; Santos and Martinho, 2022; Ramírez-Correa *et al.*, 2023).

From an information management perspective, the importance of this dashboard lies not only in data display but also in its ability to improve the quality of information available for planning, monitoring, and control. Information systems theory emphasizes that effective organizational decisions depend on timely, accurate, relevant, and accessible information (Evenstein Sigalov *et al.*, 2026; AL-maitah, 2025). In this study, visualizations such as proposal distribution, lecturer participation, and reviewer activity across evaluation stages help reduce the effort needed to extract insights from raw data. This is consistent with prior studies showing that dashboard-based systems in higher education enhance the interpretation of institutional performance data and support managerial responsiveness through clearer visualization of key indicators (Santos and Martinho, 2022; Ramírez-Correa *et al.*, 2023).

The role-based design further strengthens the practical usefulness of the system (AlZoubi *et al.*, 2024). Lecturers are provided with summaries of their participation in community service proposals, while reviewers and institutional managers can directly observe the status and volume of review activities across multiple stages. This differentiation is important because it aligns information presentation with the needs of specific decision makers. As noted in previous dashboard studies, the value of dashboards in higher education increases when they are designed to present relevant information to different stakeholders rather than displaying the same undifferentiated data to all users (Alshurideh *et al.*, 2021; Santos and Martinho, 2022). Therefore, the dashboard developed in this study contributes not only to operational efficiency but also to institutional transparency and accountability in managing community service data.

However, the current dashboard still focuses on descriptive visualization (Correa-Peralta, Vinueza-Martínez and Castillo-Heredia, 2025; Evenstein Sigalov *et al.*, 2026). It has not yet incorporated advanced analytical functions such as prediction, benchmarking, or automated recommendations. In addition, the evaluation stage in this study was limited to functional and user-based testing, so future work should include more rigorous usability and performance assessments to further validate the system's impact in institutional decision-making contexts.

## CONCLUSION

This study has successfully developed and implemented a dashboard feature integrated into the Research and Community Service Institute Information System at State University of Surabaya. The developed dashboard provides structured, role-based visualizations that support reporting, monitoring, and evaluation of community service activities conducted by lecturers.

The results demonstrate that the dashboard improves the accessibility and clarity of community service data for both executors and reviewers. By presenting summarized and visualized information, the system facilitates more efficient monitoring processes and supports institutional stakeholders in evaluating the implementation of community service programs. Compared to conventional reporting methods, the dashboard-based approach reduces manual data processing and enhances data interpretation.

Despite these contributions, the current implementation is limited to descriptive data visualization and functional evaluation. Quantitative usability assessment and advanced analytical capabilities, such as trend analysis or decision support features, have not yet been explored. Future research may focus on incorporating these advanced features and conducting comprehensive system performance and usability evaluations to further enhance the effectiveness of dashboard-based reporting systems in higher education institutions.

This study is limited to the development and implementation of a dashboard feature within a single university context. Future research may include quantitative performance evaluation, usability testing, and the application of advanced data analytics to enhance decision support capabilities.

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