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Website-Based Integrated One-Stop Service System of the Ministry of Religious Affairs Office Jayapura Regency Using Rational Unified Process

Chaelsie Ribka Lolombulan [1], Jullia Titaley[2], Eric Alfonsius[3*]
[1,2,3]Information System, Sam Ratulangi University, Indonesia
[1*]chaelsiellmbln@gmail.com, [2]julytitaley@unsrat.ac.id, [3*]ericalfonsius@unsrat.ac.id

Abstract: The public service management system at the Ministry of Religious Affairs Office, Jayapura Regency, remains reliant on manual processes, resulting in inefficiencies such as prolonged processing times, data redundancy, and challenges in tracking service requests. This study aims to design and develop a web-based Integrated One-Stop Service (IOSS) system to enhance service efficiency, accuracy, and accessibility. The Rational Unified Process (RUP) methodology was employed as the system development framework due to its structured, iterative, and flexible approach to managing the software development lifecycle. The design phase commenced with a needs analysis conducted through in-depth interviews with employees and service users to identify system requirements and existing challenges. The system design encompassed the development of an intuitive user interface prototype and a comprehensive database to support IOSS operations. System evaluation through black box and usability testing methods yielded a 100% functionality success rate and a user satisfaction score of 4.46 on a scale of 1 to 5, indicating that the system operates effectively. The findings demonstrate that the developed system significantly improves public accessibility and satisfaction with government services. This study contributes to the advancement of public service digitalization, fostering a more efficient and responsive service delivery system.
Keywords: IOSS, Website, RUP, System Testing, Public Services

1. INTRODUCING

Digitalization in the modern era is experiencing rapid growth. The advancement of technology, which is becoming increasingly widespread in society, plays a crucial role as a bridge between the workforce and the general public. One form of technology that is increasingly utilized and holds a significant role in the digitalization process is the website. [1][2]

The utilization of websites has expanded across various aspects of public life, facilitating access to information and serving as a medium for transactions. [3][4] Websites enable the efficient and up-to-date presentation of information. However, the implementation of this technology remains uneven across Indonesia, particularly in Papua, which continues to face challenges in adopting technological innovations to support modernization.

The limited adoption of technology in Papua has a direct impact on the government sector, including the Ministry of Religious Affairs Office in Jayapura Regency. In general, the ministry in this region still relies on conventional methods to provide public services. Citizens are required to visit the office in person to obtain information about available services and the necessary requirements. Additionally, administrators or officers manage these services using manual bookkeeping. Within the government

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bureaucracy, all administrative processes must go through a centralized system known as the Integrated One-Stop Service (IOSS). [5]

IOSS is a licensing and non-licensing service system in which the entire process—from application submission to document issuance—is carried out in an integrated manner within a single location. This policy aims to enhance service quality and provide broader access to the public. [6][7] However, the reliance on manual methods at the Ministry of Religious Affairs Office in Jayapura Regency impedes the intended benefits of the IOSS policy, which is designed to facilitate access to public services but instead becomes inefficient. This situation reflects the lack of digitalization and highlights the slow pace of digital transformation in the Papua region. One of the primary contributing factors to this issue is the significant digital divide.

Based on these challenges, the researcher conducted this study by referring to previous research, such as the implementation of a website-based IOSS in Marunda Village by Zakiyah. [8] The implementation of IOSS in Marunda Village is part of the decentralization of the Integrated One-Stop Service Unit in Cilincing District, aimed at simplifying access to services and reducing bureaucratic inefficiencies. However, this study does not specify the software development model employed.

To address this gap, the researcher proposes an innovative approach by utilizing the Rational Unified Process (RUP) model as the foundation for system development. This research also draws upon previous studies, such as the development of the Kampung Batik Jetis website using the RUP method. In that study, the RUP model was applied to validate data accuracy, ensuring that the website achieved the intended functionality. [9]

Moreover, the application of the RUP methodology in system development can be found in the study titled "E-Learning Software Development at SMA Negeri 15 Palembang Using the Rational Unified Process Method." In this study, the RUP method was selected because it enables early error detection, provides systematic control over changes during the development process, allows for process modifications, and accelerates software development. [10]

As an initial step in digital transformation, the researcher designed an online-based IOSS system for the Ministry of Religious Affairs Office, Jayapura Regency, utilizing the RUP methodology. The proposed online system is a website-based service platform that eliminates the need for users to download an application. Users can simply search for the keyword "PTSP Kemenag Kabupaten Jayapura" on Google and access the platform via smartphones, PCs, or laptops. Through this system, users can obtain comprehensive information regarding IOSS services and requirements and submit service requests online. The RUP methodology employed in this system follows an iterative approach, incorporating evaluations at each stage to ensure optimal outcomes.

In contrast to traditional development methodologies, the Rational Unified Process (RUP) facilitates continuous refinement through iterative cycles, thereby mitigating project risks and ensuring that the final system is aligned with user requirements. This methodology also enhances software quality by integrating systematic validation and verification throughout the development lifecycle. Furthermore, the structured framework of RUP provides well-defined roles and efficient resource allocation, contributing to improved project management effectiveness. By leveraging the advantages of RUP, the development of the IOSS system achieves greater flexibility in accommodating evolving requirements, enhances risk management, and optimizes overall system efficiency and effectiveness. Consequently, this methodological approach is instrumental in delivering a robust and user-centric service platform for the Ministry of Religious Affairs Office, Jayapura Regency.[11]

This research focuses on the development of a system that enhances public access to service information, including service types and detailed requirements. Additionally, it enables transactional interactions between administrators and users. In this context, "transactional" refers to the ability of users to submit service requests and receive responses from administrators. The system also facilitates integrated service management for administrators through an online-based platform, thereby improving efficiency and accessibility.

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2. RESEARCH METHODOLOGY

The research methodology employed in this study is divided into two categories: data collection methods and system development methods. To provide a clearer representation of the process undertaken in system development, the researcher has designed a flowchart, as illustrated in Figure 1.

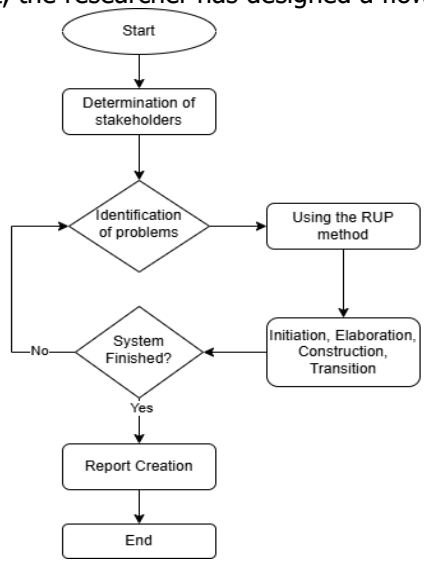

Figure 1. Flowchart

In this study, the researcher developed a research flowchart outlining the process from initiation to completion, as illustrated in Figure 1. The process begins with the identification of stakeholders or partners involved in the study, followed by problem identification and progression to the research phase. In this phase, the study adopts the Rational Unified Process (RUP) as the system development methodology. RUP is structured into four phases: inception, elaboration, construction, and transition, which will be elaborated upon in subsequent sections. Upon reaching the final stage, where the system is deemed complete, a testing phase is conducted. This testing phase determines whether the researcher may proceed to the report-writing stage or must revisit the problem identification phase to ensure the system aligns with stakeholder requirements.

2.1. Data Collection Method

The data sources utilized in this research consist of primary data, which were collected directly from the research site. Data collection involved conducting interviews with the Head of the Ministry of Religious Affairs Office, Jayapura Regency, the Head of the General Affairs Subdivision, and the Secretariat General Operator to obtain insights into the research background. The data collection techniques employed in this study include observation, interviews, and literature review.

In accordance with the aforementioned data collection techniques, the researcher formulated a set of questions as a basis for conducting interviews.

Table 1. List of Questions

No.	Questions
1.	How does the workflow of services operate at the Ministry of Religious Affairs Office?
2.	What are the common challenges faced by this service system?
3.	What kind of innovation is expected to be developed and implemented?
4.	What are your hopes regarding these innovations?
5.	What features would you like to see in order for these hopes to be achieved?
6.	Do you believe that with these innovations, the challenges experienced by the community can be minimized?

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2.2. System Development Method

The system development method employed in this research follows the Agile approach, utilizing the Rational Unified Process (RUP) development model. RUP is a software development framework that emphasizes object-oriented analysis and design, implementing the Unified Modeling Language (UML) in a structured and sequential manner. [12][13]

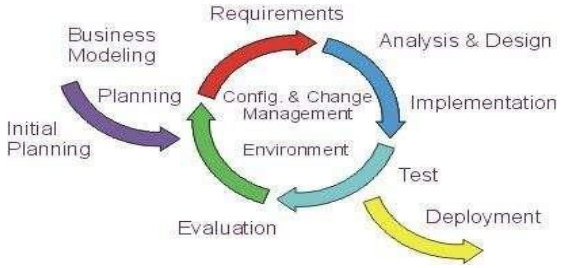

Figure 2. Rational Unified Process Method Cycle

Figure 2. The Rational Unified Process (RUP) development methodology consists of four phases: Inception, Elaboration, Construction, and Transition. In the Inception phase, the project scope is defined by identifying stakeholders, establishing the project vision, and gathering initial requirements through interviews or workshops. The Elaboration phase focuses on refining system architecture using UML diagrams, validating requirements, and mitigating key risks. During the Construction phase, the system is developed iteratively, incorporating planning, design, implementation, testing, and documentation. Finally, the Transition phase involves system deployment, final testing, user training, and evaluation based on user feedback to ensure stability and functionality.

2.3. System Development Tools

The system development tools used in this research consist of two models: the process model and the data model. In the process model, the tool employed is the Unified Modeling Language (UML), which includes use case diagrams, activity diagrams, and sequence diagrams. Meanwhile, in the data model, the modeling technique utilized is the class diagram. [14]

2.4. Testing Method

This testing method aims to identify and rectify potential errors or deficiencies in the system before full implementation. The testing methods employed in this research include usability testing and black box testing.

Usability testing focuses on evaluating the user experience in interacting with the system. End users are asked to operate the system and provide feedback regarding ease of use, interface design, and overall user comfort. The results of this testing serve as a basis for improvements to enhance system usability and user-friendliness. [15][16]

Black box testing is a software testing approach that evaluates the system's functionality without considering its internal structure or code. This method serves as a complementary approach capable of identifying error classes that may not be detected through white box testing. [17][18]

3. RESULT AND DISCUSSIONS

3.1. Analysis Results

Based on the methodology employed, the first stage of the process is inception. At this stage, the primary activities include problem identification, analysis of the existing system at the Integrated One-Stop Service (IOSS) of the Ministry of Religious Affairs Office, Jayapura Regency, and identification of the requirements for the service system to be developed. Referring to the predefined list of interview questions, the researcher compiles and summarizes responses as the basis for identification and analysis in this initial stage. The summarized responses serve as the analytical findings in this research.

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Table 2. List of Answers (Summary of Resource Person Answers)

No.	Answers
1.	The workflow of services is still entirely manual; the community must come directly to the office to process or simply inquire about available services at the Ministry of Religious Affairs Office. The official SOP for service workflows at the office will be attached.
2.	Due to this manual system, many people cannot access it because their residences are quite far from the office location
3.	An online system, so that people can access services online without having to come to the office
4.	This system could serve as a foundation for making Kemenag a digitally friendly area and generating other innovations in keeping up with modern developments.
5.	Service order features—features that are transactional in nature would be desirable additions.
6.	It should be possible, considering that internet is no longer new in Jayapura Regency anymore.

Figure 3. IOSS Service Flow

Figure 3. illustrates the service flow of PTSP, which is still conventional. Applicants, in this case, the public, are required to visit the office in person and follow the stages depicted in the diagram above.

The results of the problem identification analysis from the summary of stakeholder answers, the researcher made a schematic design of the flow from the problems obtained. A more modern innovation system using a website-based IOSS service system. The scheme compiled is as follows :

a. Users can enter the website page based on keywords
b. Users can see information at the Ministry of Religious Affairs Office, Jayapura Regency, especially a number of services offered
c. Users can create an account to see the detailed requirements needed in the services offered
d. Users can make a service request if the required service is available
e. Service requests made by users (in this case, the public) will appear on the user dashboard
f. The features on the user dashboard are to see detailed requirements, submit service requests, see the history of submissions along with the details of the submission, see operator responses, and see verification of submissions from the operator.

3.2. Implementation

Based on the results of the analysis and the process of developing ideas and construction from the researcher, the following is the implementation of these results. This implementation stage is the user interface form of the website display.

Figure 4. is the implementation of the design which is then adjusted to the needs of the stakeholders. The picture is the initial display of the IOSS of the Ministry of Religious Affairs Office, Jayapura Regency website, which has a number of information related to the Ministry of Religious Affairs. All users can access the information system.

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Figure 4. Initial Website Display

Figure 4. represents the implementation of the design, which has been adjusted to meet the stakeholders' requirements. The figure displays the initial interface of the PTSP Kemenag Kab. Jayapura website, which contains various information related to the Ministry of Religious Affairs. This information system is accessible to all users.

The display has several buttons that run according to their function. There is also a 'login/register' menu that will take users to access services along with information on requirements and service request features.

b. The second part, the user section, is divided into 3 (three) sub-sections, namely Figure 5. with a description of the user dashboard page, Figure 6. with a description of the user viewing services, and Figure 7. with a description of the user submitting a service request.

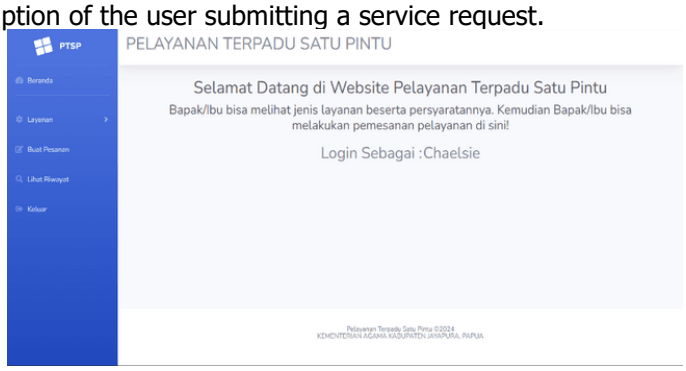

Figure 5. User Dashboard Page

Figure 5. is the implementation of the design for the user dashboard page. When the user successfully 'login/register', the user will be greeted with this simple display. Further interactive development will run according to stakeholders along with the use and optimization of the website.

Figure 6. User Service Viewing Page

Figure 6. is the implementation of the design when the user wants to see available services. These services can also be seen on the website information system page which is the website homepage.

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However, in this feature, users can directly click on one of the desired services and a number of requirements for the existing services will appear.

Figure 7. Service Request Submission Page

Figure 7. is the implementation of the design of the service request form that will be filled out by the user. When the user has finished seeing the required requirements and wants to make a service request, the user can switch to the next feature which is located at the bottom of the service feature. In this feature, users are welcome to fill out the form as specified and can directly send the request.

c. In the third part, the login page, is divided into 2 (two) sub-sections, namely Figure 8. with a description of the admin login page and Figure 9. with a description of the user login page.

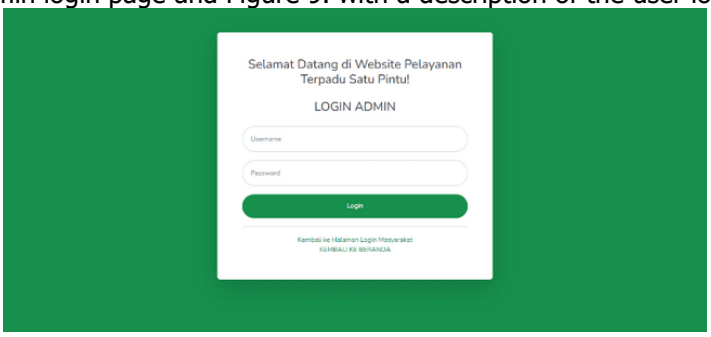

Figure 8. Admin Login Page

Figure 8. is the implementation of the design of the admin login menu. In this section, according to the previous design, the admin or operator has been prepared with a username and password.

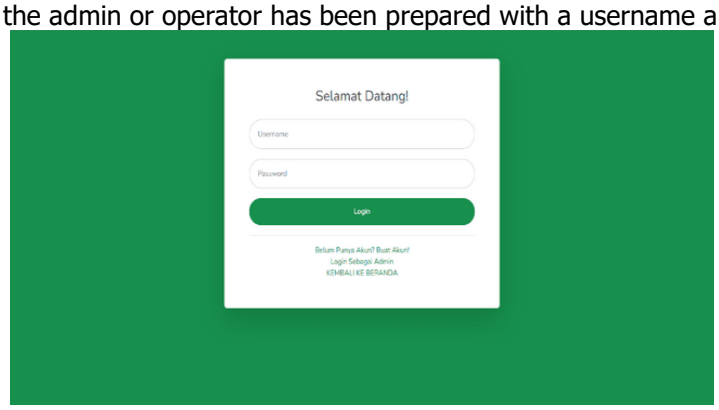

Figure 9. User Login Page

Figure 9. is the implementation of the design of the user login menu. In this section, there are 2 features, namely login and signup. Users can directly login using a username and password that has been registered in the login menu, and can register in the signup menu if there is no username and password yet.

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d. In the fourth part, the admin page after going through system development, is divided into 5 (five) sub-sections that show their respective features. Figure 10. with a description of the admin dashboard page, Figure 11. with a description of the admin adding data, Figure 12. with a description of the admin updating data, Figure 13. with a description of the admin deleting data and Figure 14. with a description of the admin seeing the history of service requests.

Figure 10. Admin Dashboard Page

Figure 10. is the implementation of the design of the admin dashboard display. According to the initial design, the only difference between the admin and user dashboard display is the welcome message and the navigation menu.

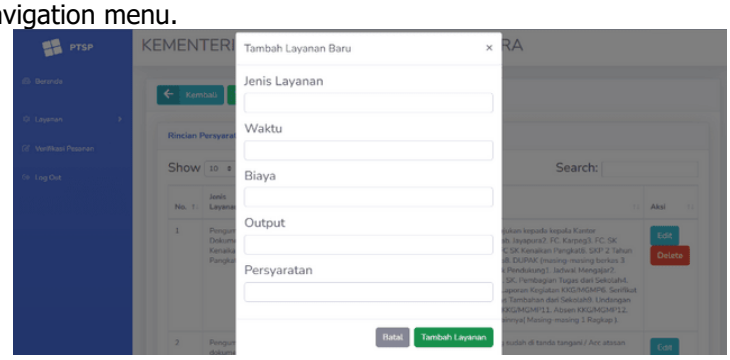

Figure 11. Admin Adding Data

Figure 11. is the implementation of the design of the admin adding data. The admin can create or add data according to the services offered by the Ministry of Religious Affairs Office, Jayapura Regency.

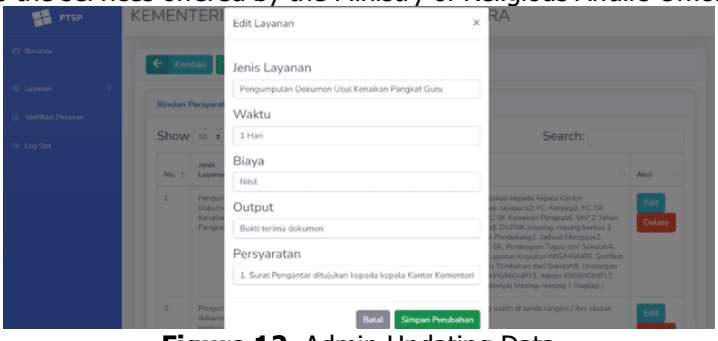

Figure 12. Admin Updating Data

Figure 12. is the implementation of the design of the admin updating data. In this feature, the admin can update data and information on the services that have been created to remain up-to-date for public viewing.

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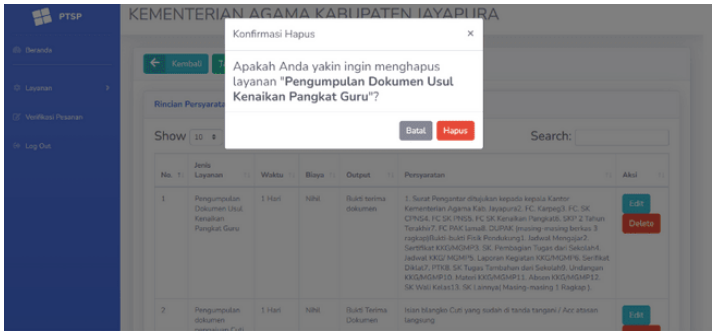

Figure 13. Admin Deleting Data

Figure 13. is the implementation of the design of the admin deleting data. In this feature, the admin can delete services or information that are no longer relevant.

Figure 14. Admin Viewing Service Request History

Figure 14. is the implementation of the design of the admin viewing the service request history. In this feature, the admin can monitor and manage service requests from the public who have submitted them through the website.

3.3 System Testing Results

1. Black Box Testing

Login/Signup of Black Box Testing

Black Box testing of login/signup level options can be seen in Table 3.

Table 3. Black Box Testing Login/SignUp Level Selection

No	Testing Process	Numbers of Buttons	Testing time	Results	Test value
1.	Click the Level login/signup button	2	First Test (first button)	Success	1
2.			Second Test (first button)	Success	1
3.			Third Test (first button)	Success	1
4			First Test (second button)	Success	1
5.			Second Test (second button)	Success	1
6.			Third Test (second button)	Success	1

The testing of the login/signup buttons located in the web body and navigation bar aims to verify their functionality in directing users to the login form page, either for users or administrators. As shown in Table 3, the system operates correctly for both buttons and meets the expected outcomes after conducting three trial tests.

Admin Login of Black Box Testing

The admin login black box test can be seen in Table 4.

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Table 4. Admin Login of Black Box Testing

No	Testing Process	Numbers of Buttons	Testing time	Results	Test value
1.	Login form and click the login button if the username and password are valid	1	First Test	Success	1
2.			Second Test	Success	1
3.			Third Test	Success	1
4.	Login form and click the login button if the username and password are invalid	1	First Test	Success	1
5.			Second Test	Success	1
6.			Third Test	Success	1

The testing of the admin login button is conducted through the two buttons mentioned previously. Table 4 presents two test points for this functionality. The expected outcome for the first test is that when a valid username and password are entered, the system directs the user to the admin dashboard. In the second test, if authentication fails due to an invalid username or password, the system should redirect the administrator back to the login page. The results from three trial tests indicate that the system functions as expected, successfully meeting the defined criteria.

Login and Signup User of Black Box Testing
User login Black Box testing can be seen in Table 5.

Table 5. Black Box Testing User Login and Signup

No	Testing Process	Numbers of Buttons	Testing time	Results	Test value
1.	Login form and click the login button if the username and valid password	1	First Test	Success	1
2.			Second Test	Success	1
3.			Third Test	Success	1
4.	Login form and click the login button if the username and invalid password	1	First Test	Success	1
5.			Second Test	Success	1
6.			Third Test	Success	1
7.	Signup form, fill in the data and click register if the data is verified	1	First Test	Success	1
8.			Second Test	Success	1
9.			Third Test	Success	1
10.	Signup form, fill in the data and click register if the data is not verified	1	First Test	Success	1
11.			Second Test	Success	1
12.			Third Test	Success	1

The testing of the user login/signup form buttons is conducted through two login buttons located in the web body and navigation bar. Table 5 presents four test points for these buttons. The expected outcome for the first test is that the system directs users to and grants access to the user dashboard. In the second test, if authentication fails, the system should redirect users back to the login page. The third test ensures that users are properly directed to the login page, while the fourth test verifies that in case of a failed verification, users are redirected to the signup page. The results from three trial tests indicate that all functions operated successfully as expected.

Admin Page of Black Box Testing
a) Black Box Testing Admin Page of Manage Data
Black Box admin data management testing can be seen in Table 6.

Table 6. Black Box Testing Admin Page Manage Data

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No	Testing Process	Numbers of Buttons	Testing time	Results	Test value
1.	Click the add service data menu	1	First Test	Success	1
2.			Second Test	Success	1
3.			Third Test	Success	1
4.	Input service data	1	First Test	Success	1
5.			Second Test	Success	1
6.			Third Test	Success	1
7.	Update service data	1	First Test	Success	1
8.			Second Test	Success	1
9.			Third Test	Success	1
10.	Delete service data	1	First Test	Success	1
11.			Second Test	Success	1
12.			Third Test	Success	1
13.	Search service data	1	First Test	Success	1
14.			Second Test	Success	1
15.			Third Test	Success	1
16.	Cancel Button	3	First Test (first button)	Success	1
17.			Second Test (first button)	Success	1
18.			Third Test (first button)	Success	1
19.			First Test (second button)	Success	1
20.			Second Test (second button)	Success	1
21.			Third Test (second button)	Success	1
22.			First Test (Third button)	Success	1
23.			Second Test (Third button)	Success	1
24.			Third Test (Third button)	Success	1

The testing of CRUD and search data functionalities, which are accessible only through the service details and requirements features on the admin dashboard, is outlined in Table 6, comprising six test points. The expected outcome for the first test is that the system directs the admin to a new service addition page. In the second test, upon successfully adding service data, the system processes and updates the services menu accordingly. The third test ensures that any updates made by the admin are properly processed. The fourth test verifies the successful deletion of service information. The fifth test confirms that the system correctly processes and displays searched service information. Finally, the sixth test ensures that after completing tasks or searches related to service details or requirements within the admin dashboard, the system redirects back to the main services view. The results from three trial tests indicate that all functions operated successfully as expected.

Black Box Testing of User Pages

Black Box Testing of User Pages Creating Service Submissions

Black Box testing of user pages for submitting service applications can be seen in Table 7.

Table 7. Black Box Testing of User Pages Creating Service Submissions

No	Testing Process	Numbers of Buttons	Testing time	Results	Test value
1.	Click the 'Service' menu	2	First Test (first button)	Success	1
2.			Second Test (first button)	Success	1
3.			Third Test (first button)	Success	1
4.			First Test (second button)	Success	1
5.			Second Test (second button)	Success	1
6.			Third Test (second button)	Success	1

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7.			First Test	Success	1
8.	Click a service	1	Second Test	Success	1
9.			Third Test	Success	1
10.			First Test	Success	1
11.	Click the 'Make Order' menu	1	Second Test	Success	1
12.			Third Test	Success	1
13.			First Test	Success	1
14.	Apply for service	1	Second Test	Success	1
15.			Third Test	Success	1

The testing of the service request button, located on the user dashboard, is outlined in Table 7, which includes four test points for the service request feature. In the first point, two submenus are tested: one displaying work units and the other displaying service details, with the expected result that both function correctly. The second point verifies that if the first test is successful, a submenu for service requirements will open, allowing users to select a service and view its associated requirements. In the third point, after reviewing the requirements, users should be able to submit a request using the "Create Request" button, which is expected to process the request and display a form for entering request data. The fourth point tests the submission functionality, ensuring that once users complete the form, the system successfully submits the data and stores it in the database.

The results from three trial tests confirm that all functions performed as expected. Based on these test results, the following section explains the method for calculating the success percentage in designing and developing the Integrated Online Service System (IOSS) at the Ministry of Religious Affairs Office, Jayapura Regency.

Total successful trials (6 + 6 + 12 + 24 + 15) / Total overall trials (6 + 6 + 12 + 24 + 15) x100% = (63/63) x100% =100%. These results indicate that systems operate according to methods used.

2. Usability Testing

This testing aims to evaluate the usefulness, ease of use, and user satisfaction in utilizing the Integrated One-Stop Service (PTSP) website at the Ministry of Religious Affairs Office, Jayapura Regency. The website is designed to streamline the process of submitting service requests for users while enabling administrators to efficiently respond to these requests.

Data collection was conducted through a questionnaire completed by respondents after they received an explanation of the website's main features and interface.

Table 8. Samples of Respondents

No	Status	Total
1.	General public	79
2.	Ministry of Religion office employee	21

Table 9. Usability Testing Variables

Variable	Question
Learnability	1. Is the menu and navigation on this website easy to understand? (Q1) 2. Do you feel that the steps to apply for services are simple enough? (Q2) 3. Is the information you need available and easily accessible? (Q3)
Efficiency	4. How efficient is the time required to complete a service request? (Q4) 5. Are the features on this website suitable for your needs? (Q5) 6. Were you able to access all tasks without any technical obstacles? (Q6)

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Satisfaction	6. How do you rate the interface design of this website (design, color, layout)? (Q7) 8. How satisfied are you with this system overall? (Q8) 9. Would you recommend this system to others? (Q9) 10. Are you willing to use this system again for future service needs? (Q10)

Average Calculation of Question

Average formula of question

$$Average\ of\ question = \frac{Total\ score\ of\ all\ respondets\ of\ question}{Number\ of\ respondents}$$

Table 10. Average of Question

Kode	Nilai
Q1	4.57
Q2	4.51
Q3	4.51
Q4	4.25
Q5	4.34
Q6	4.39
Q7	4.49
Q8	4.52
Q9	4.60
Q10	4.51
Total Score	44.69

Interpretation of Results

Based on the evaluation results from the questionnaire assessing three usability aspects—learnability, efficiency, and satisfaction—of the Integrated One-Stop Service (IOSS) website at the Ministry of Religious Affairs Office, Jayapura Regency, the following interpretation is provided. The overall score from 10 questions is 44.69, with an average score of 4.469, which falls into the "good" category. A breakdown of each assessment aspect is as follows:

a. Learnability Aspect: This aspect received an average score of 4.53. The highest average was recorded in question one (Q1), which serves as an indicator of ease in accessing menus and navigating the website. This indicates that users can efficiently access menus and navigate to specific features.
b. Efficiency Aspect: This aspect received an average score of 4.32. The highest average was observed in question six (Q6), which serves as an indicator of the system's success in enabling users to efficiently access features during service requests.
c. Satisfaction Aspect: This aspect received an average score of 4.53. The highest average was found in question nine (Q9), which serves as an indicator of user satisfaction, including their willingness to recommend the website to others.

4. CONCLUSION

This study concludes that the Integrated One-Stop Service System of the Ministry of Religious Affairs Office, Jayapura Regency successfully facilitates public access to comprehensive service information and enables online service requests. The system enhances service efficiency and transparency, contributing to improved public satisfaction.

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Furthermore, the system optimizes workflow efficiency by simplifying service management for operators, allowing them to modify, add, or delete service requirement data with ease. This functionality minimizes potential data management errors and enhances overall operational effectiveness.

The implementation of the Rational Unified Process (RUP) ensures an iterative and communicative development approach, allowing the system to continuously evolve and adapt to stakeholders' needs. This adaptability contributes to long-term service quality improvements.

Despite its successful implementation, the system has certain limitations, particularly the absence of automation features and Artificial Intelligence (AI) integration to enhance service management. AI-driven solutions could improve operational efficiency through automated document verification, intelligent service recommendations, and real-time user assistance.

Future development should focus on AI-driven automation, including AI-based chatbots for real-time user interactions, service recommendation systems, and data analytics to optimize efficiency and effectiveness. Additionally, the development of a mobile application could further enhance accessibility, ensuring broader and more convenient service reach for the community.

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Eric Alfonsius: *Corresponding Author