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DESIGN AND IMPLEMENTATION OF A SCHOLARSHIP MANAGEMENT INFORMATION SYSTEM USING THE LARAVEL FRAMEWORK: A CASE STUDY OF DESAMIND SCHOLARSHIP PROGRAM

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ABSTRACT

This study adopts a Research and Development (R&D) approach to design and develop a Laravel-based scholarship management information system. The R&D method was employed to produce an innovative digital solution that improves the effectiveness of scholarship administration processes. The study resulted in a web-based Desamind Scholarship Information System consisting of three main components: a landing page, an admin dashboard, and a user dashboard. The system is designed to enhance efficiency, transparency, and accuracy in scholarship registration and selection processes. System validation through black-box testing showed a 100% success rate, while expert evaluation indicated a feasibility score of 97%, categorized as "Highly Feasible." Furthermore, usability testing involving 25 participants—including 5 reviewers/interviewers and 20 prospective applicants—yielded an average System Usability Scale (SUS) score of 82.8, corresponding to Grade A and classified as "Acceptable." These findings demonstrate that the developed system exhibits excellent usability, is easy to understand, and is well accepted by users across different roles.

Keywords: Information system development, Laravel framework, system usability scale, scholarship management system.

1. INTRODUCTION

Education plays a crucial role in improving human resource quality and supporting national development [1]. Beyond knowledge acquisition, it also contributes to shaping individual competencies and competitiveness in addressing global challenges [2–4]. However, access to higher education remains uneven, particularly for students from economically disadvantaged and rural backgrounds. Recent data indicate that only a small proportion of high school graduates continue to higher education, largely due to financial constraints [5,6]. In this context, scholarship programs serve as an essential mechanism to expand access and reduce educational inequality.

Despite their strategic role, the effectiveness of scholarship programs is highly dependent on the efficiency of their management systems. In practice, many scholarship providers still rely on fragmented and semi-manual processes, which lead to inefficiencies in data handling, increased risk of human error, and limited transparency in selection procedures. These challenges become more significant as the number of applicants increases, creating difficulties in data verification, document management, and timely decision-making.

Desamind Indonesia, a non-profit organization focused on youth empowerment in rural development [7], administers the Desamind Scholarship as one of its flagship programs aimed at fostering "local heroes" with global competencies [8]. As the program has reached its fifth cycle, the volume of applicants has increased substantially, intensifying the complexity of administrative processes. Currently, the scholarship system is not fully integrated: the official website functions only as an information portal, while the registration process relies on external tools such as Google Forms. This fragmented approach results in inefficiencies in managing applicant data, including challenges in sorting, validating, and evaluating submissions, which are still conducted manually and require considerable time.

To address these issues, the development of a comprehensive web-based scholarship management information system is essential. Such a system can streamline administrative workflows, enhance data accuracy, and improve transparency throughout the selection process. The Laravel framework is adopted in this study due to its robust architecture, strong security features, and efficient database management capabilities, which have been widely utilized in modern web application development [3].

Previous studies have shown that the implementation of web-based information systems in scholarship management can significantly improve efficiency and reduce data processing errors. Raya [9] reported that such systems can minimize errors in data handling, while Pujayana et al. [10] emphasized their role in enhancing transparency and accountability in the selection process. However, existing studies generally focus on generic system implementation and often lack context-specific design tailored to community-based scholarship programs. Furthermore, many studies provide limited evaluation, focusing either on technical functionality or basic system performance without incorporating comprehensive usability assessment.

This study addresses these gaps by developing an integrated scholarship management information system specifically tailored to a community-based program (Desamind Scholarship) using the Laravel framework, and by conducting a comprehensive evaluation that combines black-box testing, expert validation, and System Usability Scale (SUS) analysis. This approach not only ensures the technical reliability of the system but also evaluates its usability and acceptance across different user groups, offering a more holistic assessment compared to prior studies.

Therefore, this study aims to design and develop a Laravel-based scholarship management information system for the Desamind Scholarship program and evaluate its quality in terms of functionality and usability. Accordingly, the research question is: How can a scholarship information system be developed, and what is its quality, using the Laravel framework for the Desamind Scholarship?

2. METHODOLOGY

This study uses the Waterfall development model (Figure 1), which is a plan-driven software development model that is carried out sequentially starting from requirements analysis, design, implementation, testing, and maintenance [11].

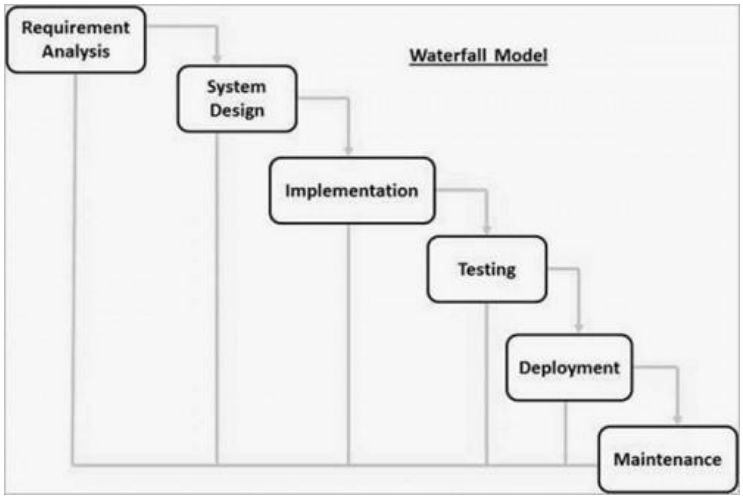

Figure 1. Waterfall Model (Source: Hanafi, 2023)

The requirements analysis phase ensures that functional and system requirements are met. Design is used to create wireframes, use cases, and activity diagrams. During the implementation phase, development is carried out using the Laravel framework due to its ability to simplify routing, database, and security management. Key features such as the landing page, admin dashboard, and user dashboard are developed based on the design results established in the previous phase. After implementation is complete, the system is tested to ensure that all functionality operates according to predetermined specifications. Testing is conducted by media experts or relevant stakeholders to verify that all interface functionality and system workflows meet user needs.

Primary data was obtained from observations and interviews with Desamind scholarship administrators, while secondary data was obtained from literature sources. The data analysis technique applied in this study was quantitative descriptive analysis, focusing on the analysis of questionnaire results from users and expert validators. This technique aims to measure the feasibility and effectiveness of the developed system. In the data analysis process, a Likert scale was used with the assessment criteria [12]. User trials used the SUS Questionnaire with 10 questions. Analysis of the average SUS scores was conducted by referring to the assessment categories used to determine the level of usability and product suitability, as recommended by Ardhana [13]. Table 1 presents the percentile levels of SUS scores based on the values obtained.

Table 1. SUS Score Percentile Levels

Grade	Description
A	Score ≥ 80.3
B	74 ≤ Score < 80.3
C	68 ≤ Score < 74
D	51 ≤ Score < 68
E	Score < 51

Source: own research

Furthermore, SUS scores are interpreted based on the acceptability range to determine the extent to which the system is accepted by users. This acceptance range is presented in Table 2.

Table 2. SUS Acceptability Ranges

SUS Score	Score Interpretation
0 – 50,9	Not Acceptable
51 – 70,9	Marginal
71 - 100	Acceptable

Source: own research

3. RESULTS AND DISCUSSION

3.1 Need Analysis

The needs analysis phase aims to identify the problems faced by the Desamind Scholarship organizers and participants, while also determining the functional and non-functional requirements that the system must meet. To support the development process, a set of hardware and software is required that meets the technical requirements of this information system. A laptop is used as the primary tool for the development process, interface design, and system testing. Meanwhile, software such as XAMPP, Canva, StarUML, and Visual Studio Code are used to support all development stages, from local server provisioning, interface design, system modeling, and program code implementation. Details of the hardware and software requirements used in this study are presented in Table 3.

Table 3. Hardware and Software Requirements

Category	Tool	Function
Hardware	Client testing device	Used for the student information system's testing, interface design, and development processes.
Software	XAMPP	Provides database management using MySQL and phpMyAdmin, in addition to local server environment (Apache, PHP).
	Canva	Utilized for the design of the user interface (UI), which includes supporting visual components and webpage layouts
	StarUML	Helps create system design diagrams including Entity Relationship Diagrams (ERD), use case diagrams, and activity diagrams.
	Visual Studio Code	Web-based information system programming utilizing the Laravel framework is written and developed using Visual Studio programming.

Source: own research

3.2. Design

The database design in this study was constructed using an Entity Relationship Diagram (ERD) (Figure 2) with Crow's Foot notation to visualize the relationships between the main entities used in the system. The core entities are users, scholarships, applicants, administration, interviews, and members, along with one-to-many and one-to-one relationships that support the registration process through to recipient determination.

The interface design is represented in the form of a wireframe that emphasizes the page structure, element layout, and navigation flow according to two main roles: User and Admin. The use case diagram shows the interaction of the two main roles with the system, namely User and Admin (Figure 3). The activity diagram (Figure 4) illustrates the main flow of the scholarship registration process from the beginning to the determination of the results. The process begins when the User creates an account and logs in to the system, then selects the

desired scholarship program, fills out the administration form, and uploads supporting documents.

Figure 2. ERD of the Desamind Scholarship Information System

Source: own research

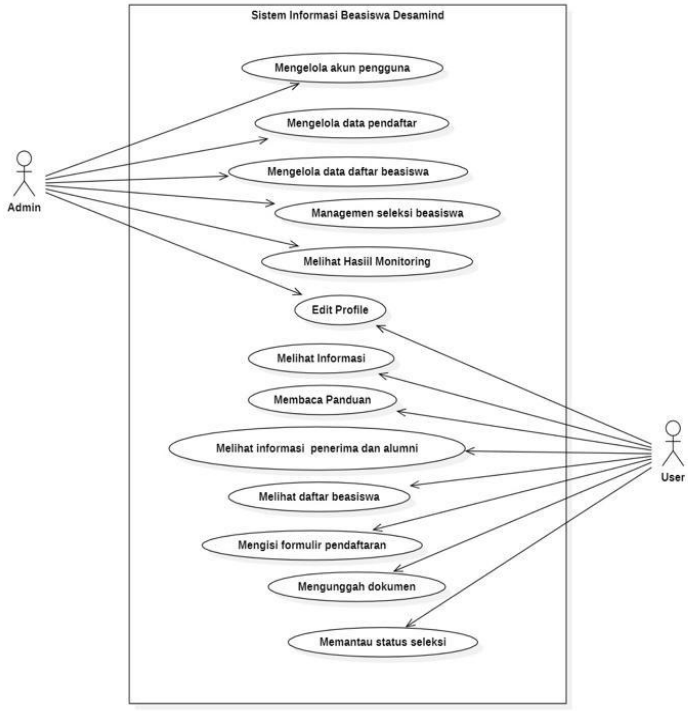

Figure 3. Use Case Diagram of the Desamind Scholarship Information System

Source: own research

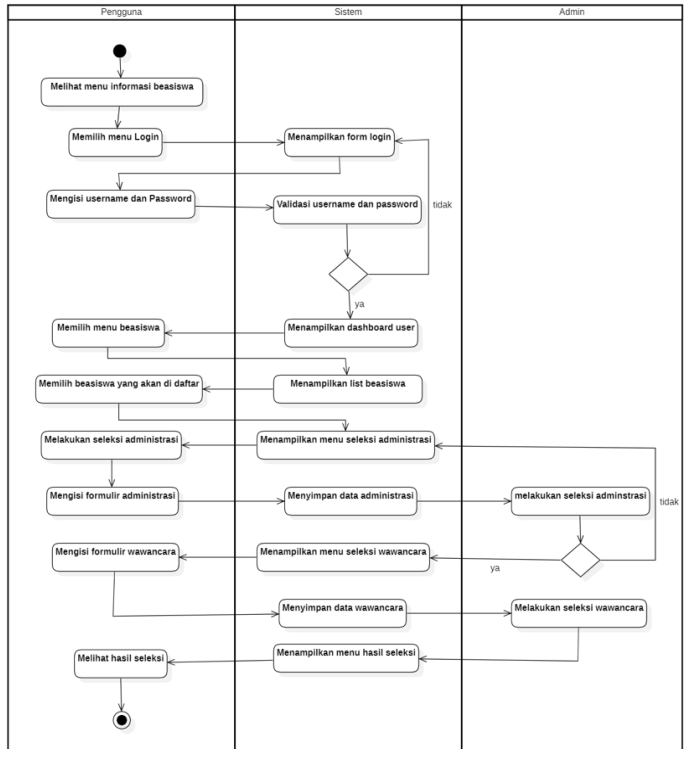

Figure 4. Activity Diagram of the Desamind Scholarship Information System

Source: own research

3.3. Implementation

The implementation phase is the process of translating the system design results into a executable web application. All components, from the database structure and process flow to the user interface, are developed based on the results of the previous analysis and design. The Laravel framework is used because of its Model–View–Controller (MVC) architecture, which separates data management, process control, and interface display, thus simplifying system development, testing, and maintenance. The system interface is shown in Figure 5.

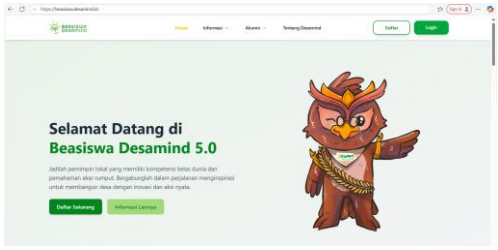

Figure 5. Homepage Interface

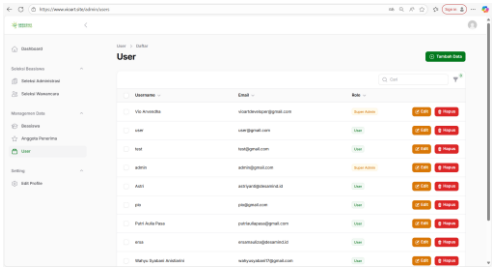

Figure 6. Admin Dashboard – User Management Interface

Source: own research

3.4 Testing

The testing phase was conducted after the entire implementation process was completed to ensure that the developed scholarship information system ran according to functional and non-functional requirements. Testing was conducted using the black-box testing method, in which testers verified each main function without viewing the program code structure. The primary focus of the testing included the accuracy of the input and output processes, the reliability of the authentication features, and the conformity of the selection flow with Desamind scholarship procedures.

Testing was conducted on two types of users: admin and user. The admin side of the testing covered scholarship data management, administrative selection, interview selection, and recipient account management. Meanwhile, the user side of the testing covered the registration process, login, scholarship application, uploading selection files, monitoring results, and profile settings. Each scenario was tested using a test case approach designed in the black-box table previously.

The test results showed that all system functions functioned as expected. All menus displayed data correctly, action buttons functioned as intended, and input validation prevented data entry errors. Thus, this testing phase proved that the system was suitable for use and ready for implementation in a real-world environment. In addition to functional testing, a feasibility assessment was carried out by media experts; the detailed results of this assessment are presented in Table 4.

Table 4. Results of Media Expert Evaluation

No.	Assessment Criteria	Score		Total Score	Maximum Score
		Media Expert 1	Media Expert 2		
A.	Usability Aspects				
1.	The website is easy to operate.	5	5	10	10
2.	Interaction with the website is clear and easy to understand.	5	5	10	10
3.	Navigation is straightforward.	5	5	10	10
4.	The site is user-friendly.	5	5	10	10
5.	The interface is attractive.	5	5	10	10
6.	Finding the needed information is simple.	5	5	10	10
7.	The way information is presented on the website meets user needs.	5	5	10	10
B.	Information Quality Aspects				
8.	The site provides accurate information.	4	5	9	10
9.	The information is reliable.	5	5	10	10
10.	It offers up-to-date information.	5	4	9	10
11.	The information is relevant.	5	5	10	10
12.	Information is presented in an easy-to-understand way.	5	5	10	10
13.	The site gives complete and clear information.	4	4	8	10
C.	Interaction Quality Aspects				
14.	Overall, the website does not experience errors.	5	5	10	10
15.	It has a good reputation	5	5	10	10
16.	The site offers interactive features to simplify registration and scholarship selection processes.	5	5	10	10
D.	Effectiveness Aspects				
17.	Interacting with the website is easy.	5	5	10	10
18.	Accessing the website does not take a long time.	4	5	9	10
19.	The information provided is useful for users.	4	5	9	10
20.	The website works well on smartphones, tablets, and more.	5	5	10	10
Total Score		96	98	194	200

Source: own research

Likert Scale Calculation:

$$\% \text{ Feasibility} = \frac{\sum \ Score}{\sum \ Max\ Score} \ x\ 100\%$$

$$\% \text{ Feasibility} = \frac{194}{200} \ x\ 100\%$$

$$= 97\%$$

Table 5. Percentage of Feasibility Assessment Results

Achievement Percentage	Interpretation
81% - 100%	Highly Feasible
61% - 80%	Feasible
41% - 60%	Moderately Feasible
21% - 40%	Less Feasible
0% - 20%	Not Feasible

Source: own research

Based on Table 4 and the interpretation guidelines in Table 5, the total media expert test score reached 194 out of 200, or 97%, making it categorized as Highly Feasible. High performance was consistently evident in aspects of usability, interaction quality, and effectiveness, indicating clear navigation, informative interface elements, and functional registration and selection support features. However, items with scores below the maximum, such as the completeness of detailed information, page load time, and freshness of information, indicate room for improvement through the addition of detailed guide content, performance optimization, and scheduling regular content updates. Overall, the system is ready to proceed to the user testing phase.

The system usability testing involved 25 respondents, consisting of 5 reviewers and interviewers, and 20 prospective scholarship applicants. Respondents 1 to 5 in Table 6 are reviewers and interviewers who play a role in document review, administrative assessment, scheduling, and conducting interviews. Meanwhile, respondents 6 to 25 are prospective scholarship applicants who use the system to register, enter data, upload documents, monitor selection status, and view final selection results. All respondents used the system according to their respective roles to ensure that the testing reflected actual usage conditions. After completing the system usage sequence, respondents were asked to complete a ten-item System Usability Scale (SUS) questionnaire.

The SUS score was calculated according to the guidelines outlined by Suria [14] subtracting 1 from the scores for odd-numbered items and 5 from the scores for even-numbered items. The sum of each respondent's scores was then multiplied by 2.5 to obtain the final SUS score. A summary of the SUS score calculations for all respondents is presented in Table 7.

Table 6. SUS Score Summary of System Users

No	Respondents	Assessment Items										Total	Score (Total x 2.5)
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
1	Ke-1	4	2	4	2	4	2	4	2	3	2	29	72,5
2	Ke-2	4	2	4	2	5	3	4	3	4	3	28	70
3	Ke-3	5	1	4	1	4	1	5	1	4	1	37	92,5
4	Ke-4	4	1	4	2	4	3	4	1	5	2	32	80
5	Ke-5	5	1	5	2	4	3	5	2	4	3	32	80
6	Ke-6	5	2	5	2	4	2	4	2	4	2	32	80
7	Ke-7	5	1	5	2	5	1	5	1	5	1	39	97,5
8	Ke-8	4	3	5	1	4	1	5	2	5	1	35	87,5
9	Ke-9	3	1	5	2	5	1	5	1	4	2	35	87,5

No	Respondents	Assessment Items										Total	Score (Total x 2.5)
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
10	Ke-10	4	2	4	2	5	3	4	2	5	2	31	77,5
11	Ke-11	5	2	5	1	5	2	5	1	2	5	31	77,5
12	Ke-12	4	2	4	2	3	3	4	2	3	3	26	65
13	Ke-13	5	1	5	1	5	2	5	2	4	5	33	82,5
14	Ke-14	4	2	4	2	4	2	5	2	3	2	30	75
15	Ke-15	5	1	5	1	5	2	4	1	5	1	38	95
16	Ke-16	4	1	5	4	4	2	4	2	4	2	30	75
17	Ke-17	4	2	5	3	4	3	4	2	4	3	28	70
18	Ke-18	5	1	5	1	4	2	4	1	5	1	37	92,5
19	Ke-19	5	2	5	1	5	2	5	1	4	1	37	92,5
20	Ke-20	5	2	5	1	4	2	4	2	2	2	31	77,5
21	Ke-21	5	2	5	1	4	1	4	2	4	1	35	87,5
22	Ke-22	5	1	5	1	5	1	4	1	4	1	38	95
23	Ke-23	4	2	3	1	4	2	4	2	4	1	31	77,5
24	Ke-24	5	1	5	1	4	3	4	1	5	1	36	90
25	Ke-25	5	2	5	1	5	2	5	1	4	1	37	92,5
Total Score													2070

Source: own research

The calculation of the average SUS score uses the following formula:

$$\text{SUS} = \frac{\sum_{i=1}^{n} \left(\sum_{i=1,3,5,7,9} (x-1) + \sum_{i=2,4,6,8,10} (5-x) \right) x\ 2{,}5}{n}$$

According to the calculation results, the total SUS score is 2070 from 25 respondents. Thus, the average SUS score is:

$$SUS = \frac{2070}{25} = 82{,}8$$

Figure 7 shows the SUS score on the user acceptability grade scale. The average score of 82.8 is in Grade A and is considered Acceptable.

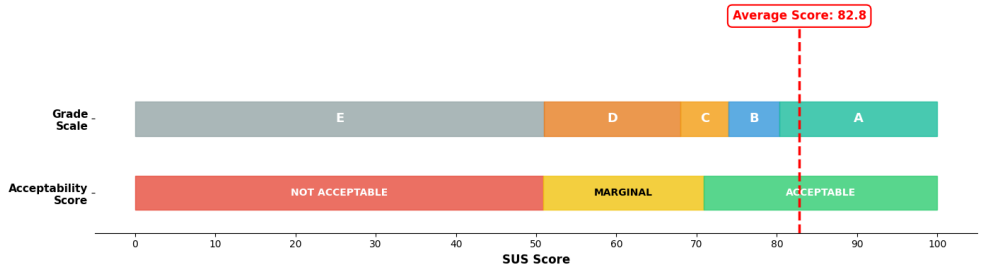

Figure 7. SUS Score Interpretation of the Desamind Scholarship Information System

Source: own research

The SUS score of 82.8 (Grade A) indicates high usability, suggesting that the system meets key usability dimensions, including effectiveness, efficiency, and user satisfaction. This level of performance supports its practical applicability in streamlining scholarship

management processes, particularly in reducing administrative workload and improving process transparency. However, SUS primarily captures perceived usability and does not address system scalability or decision-making robustness. Therefore, further studies are required to evaluate system performance in larger-scale deployments and more complex selection environments.

Based on the results, the Desamind scholarship information system demonstrates an excellent level of usability and is well accepted by users with different roles. This finding is consistent with recent studies conducted in the last five years, which highlight usability as a key factor in the success of web-based information systems, particularly in educational and administrative services. Previous research on academic information systems and web-based learning platforms shows that systems with high usability significantly improve user satisfaction and the effectiveness of system usage [15, 16]. In addition, recent studies also confirm that the System Usability Scale (SUS) remains one of the most widely used and reliable instruments for evaluating user experience because it can effectively measure learnability, efficiency, and user acceptance of a system [15, 17].

Furthermore, the results of this study support previous findings that web-based systems developed to support academic processes, learning activities, and administrative services are considered feasible and acceptable when they achieve a high level of usability. Several recent studies on e-learning systems, academic information systems, and digital service platforms show that high usability scores contribute directly to user acceptance and the effectiveness of the processes supported by the system [16,18,19]. Therefore, the results of this study not only indicate that the Desamind scholarship information system is feasible to use but also strengthen previous research findings that usability plays a crucial role in the successful implementation of web-based information systems in the field of education and social services.

4. CONCLUSION

This study developed a Laravel-based web scholarship management information system for the Desamind Scholarship program, consisting of a landing page, admin dashboard, and user dashboard. The system effectively improves efficiency, transparency, and accuracy in the registration and selection process. Validation results indicate strong performance, with 100% success in black-box testing, a 97% feasibility score from experts, and a System Usability Scale (SUS) score of 82.8 (Grade A), demonstrating high usability and user acceptance. However, this study is limited by a relatively small sample size and its focus on a single case study, as well as the absence of advanced features such as intelligent decision support. Future research should explore large-scale implementation across multiple scholarship programs and integrate artificial intelligence (AI) to support automated screening and decision-making. Additional feature development, such as analytics dashboards and system integration, is also recommended to enhance scalability and functionality.

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