JOURNAL OF APPLIED INFORMATION SYSTEMS AND INFROMATICS

Designing UI/UX For SDN 1 Sukamulya Ciamis Website Using the Five Planes and WEBUSE Methodologies

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Abstract— The web-based information world is currently experiencing rapid growth, encompassing interactive, dynamic, and static elements, with educational institutions being one of its prominent users. It provides swift and precise information services, contributing significantly to the fundamental development of the education sector. The school profile website from the Ministry of Education and Culture (KEMENDIKBUD) currently only provides basic profile features. Due to the lack of information and features on the website, a redesign and further development are necessary. Therefore, this research, based on interviews with relevant parties such as SDN 1 Sukamulya, calls for a redesign and development of the website. The approach taken in this redesign and development utilizes the Five Plans method. The creation of a website that aligns with user preferences, combines an attractive design, and offers an experience that meets user needs. The design and development of this website will be evaluated using the WEBUSE method. WEBUSE (Web Usability Evaluation) is a method for assessing the extent of usability based on a comprehensive usability criteria questionnaire. In the UI/UX design phase, the Five Planes method was applied, and after the design phase, the website's feasibility was assessed using the WEBUSE method. This research successfully designed a website for SDN 1 Sukamulya by applying the Five Planes method in the design process. Based on the comparison of evaluations using the WEBUSE method, the usability score of the website improved from a usability score of 0.657, falling into the "good" range (0.6 - 0.8), to a usability score of 0.829, falling into the "excellent" range (0.8 - 1). This score indicates that the website's usability level is excellent, demonstrating that the design and development efforts have successfully provided an outstanding user experience.

Keywords— Five Planes Method, Website, WEBUSE, Usability

Manuscript received 18 Jul. 2023; revised 29 August. 2023; accepted 2 Nov. 2023. Date of publication Nov. 2023.

I. INTRODUCTION

The utilization of technology to disseminate information has significantly advanced in today's world. For instance, consider school profile websites. These websites are not only used to distribute information related to a school's profile and the latest updates but are also perceived as capable of building a positive and professional image for the school that owns such a website [1]. The school profile website provided by the Ministry of Education and Culture (KEMENDIKBUD) offers only basic profile features. Due to the limited information and features available on this website, there is a need for a redesign and further development. The creation of a website that aligns with user preferences, appealing visual design, and a user experience that caters to user needs is essential [2].

Therefore, this research is based on interviews with relevant stakeholders, specifically SDN 1 Sukamulya, to justify the necessity for redesign and development. The approach taken in the design and development process employs the Five Planes method. The Five Planes method is suitable for website design and development. This method focuses on user experience, emphasizing user comfort and ease of interaction with computers or mobile devices [3].

The Five Planes method comprises five elements: strategy plane, scope plane, structure plane, skeleton plane, and surface plans [4]. The design and development of this website will undergo testing using the WEBUSE method. WEBUSE (Web Usability Evaluation) is a method for evaluating the extent of usability based on questionnaires with comprehensive usability criteria [5] [6], [7].

II. MATERIALS AND METHOD

The research stages are presented as a whole, as seen in Figure 1.

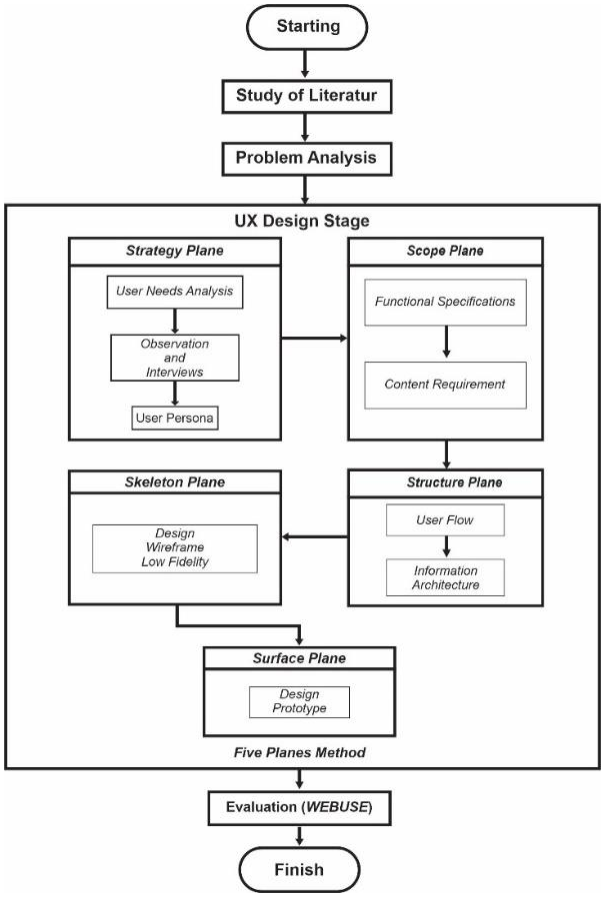


Figure 1. Research Stages

A. Study of Literature

Literature review was conducted to study from several references in the work such as articles, journals, e-books, and theses.

B. Problem Analysis

This stage will describe the issues based on the results of usability testing on the previous SDN 1 Sukamulya's website. By implementing WEBUSE method, there is some point that could be issues by looking at the usability quality classified as good or bad.

C. Five Planes Method

Several related studies on website design have been conducted in previous research using various methods, such as the research titled "Designing the User Interface of Digital Financial Personal Assistant" [8]. This study aims to understand the user experience in using the website by defining user needs as the initial step and reference in designing a personal finance management application. The results of this study, by applying the Five Planes Method, successfully implemented the functionality features and content requirements in the interface of the personal finance management application that can connect to banks and e-money [9], [10].

Another study related to the use of the Five Planes Method and Usability Testing is titled "Designing the User Experience of a Website Profile Using the Five Planes Method (Case Study: BP3K Mundul Subdistrict)." The purpose of this research is to simplify users in operating the BP3K website, with a design that considers UX aspects using the Five Planes Method. The results of the study using the Five Planes Method proved that the low-fidelity prototype could be understood and accepted by users, with usability testing on respondents receiving very good scores, with 86.22% of questions that could be answered and 13.77% of questions that could not be answered [11] [12], [13].

A study related to the use of the Five Planes Method and Eight Golden Rules is titled "Designing the User Experience and User Interface of a B2B Textile e-commerce Using the Five Planes Framework." The purpose of this research is to create an e-commerce platform to facilitate the purchase of textile products and improve connectivity between industries with different characteristics from the supply chain to the details of the products sold. The application of the Five Planes Method in this research successfully implemented the strategic level in the interface of the website development that fulfills the product's objectives. Furthermore, the application of the Eight Golden Rules successfully designed a user-friendly User Interface, with this study presenting designs for the system aspect only [14].

This method has sequentially 5 development stage in it. There is Strategy Plane, Scope Plane, Structure Plane, Skeleton Plane, and Surface Plane. On the strategy plane, the goal is to formulate product objective and identify user need. To achieve this a focus group discussion was held [15]. Some techniques can be used to acquire the data. For Example: (1) interviews, (2) surveys, and (3) focus groups. The result is combination between product objectives as a representation and user need as a user expectation [16]. After the strategies have been preserved in the strategy plane, the scope plane will discuss the main features and some functions of the system using use case diagram [17].

The next is structure plane, represented in interaction design and information architecture such as flowchart which contain transformation of the functional and content requirement [18], [19]. After that, the Skeleton Plane is output from structure plane transformed into interaction design and information design. The last phase is Surface Plane, both sides will be interpreted in concrete sensory design [20]. Overall, the user experience development process is all processes that ensure the user understand of all action they have done and taken [21] [9], [10].

D. WEBUSE Method

A study related to the use of the WEBUSE and WEBQUAL methods is titled "Usability Evaluation and Recommendations for Improving the User Interface of the Student Selection (SELMA) Website at Brawijaya University" [22]. WEBUSE Method contain 24 questions that grouped into 4 questionnaire categories, such as content-organization-readability, navigation-links, user interface design, and performance-effectiveness [23], [24].

This research aims to improve the usability and service quality of the website by providing recommendations for improving the design of the website's interface. The evaluation results using the WEBUSE questionnaire concluded that out of 24 statement indicators, 11 statements were at a moderate usability level and needed improvement. Similarly, using WEBQUAL 4.0, the conclusion was that out of 17 question

indicators, 10 questions were in quadrants I, III, and IV, indicating the need for improvement [6], [10].

III. MATERIALS AND METHOD

A. Current Web Analytics

The results of usability testing using the WEBUSE method on the previous website have identified several questionnaire points that have become issues due to their usability being moderate or below good. These questionnaire points can be seen in Table 1 as follows.

Table 1. Initial Evaluation Issues

Var	Issues	Recommendations
COR.1	This website lacks the information and content I need and is not up to date.	Identify the information and content needed by users so that it can provide more relevant, useful, and up-to-date information.
COR.3	The content on this website is not well-organized.	Group the content into categories according to its relevance.
COR.4	Improve the readability of the website's content.	Use easily readable and clear fonts and ensure an adequate font size for comfortable reading.
NL.4	*Maintain and update the links on the website regularly.*	Link the related pages correctly and ensure they match the intended destinations.
UID.1	The user interface design of this website is not visually appealing.	Choosing appropriate colors, typography, and icons to capture user's interest and designing a layout that is easy for users to understand.

The results of the initial evaluation of the school profile website provided by KEMENDIKBUD using the WEBUSE questionnaire revealed a 5-point rating scale. Scale 1 is for "Strongly Disagree (SD)," valued at 0; scale 2 is for "Disagree (D)," valued at 0.25; scale 3 is for "Neutral (N)," valued at 0.5; scale 4 is for "Agree (A)," valued at 0.75; and scale 5 is for "Strongly Agree (SA)," valued at 1. The average values in the table per attribute are obtained from the calculation of the average of 20 respondents. The results of the initial evaluation of the website provided by KEMENDIKBUD can be seen in Figure 2.

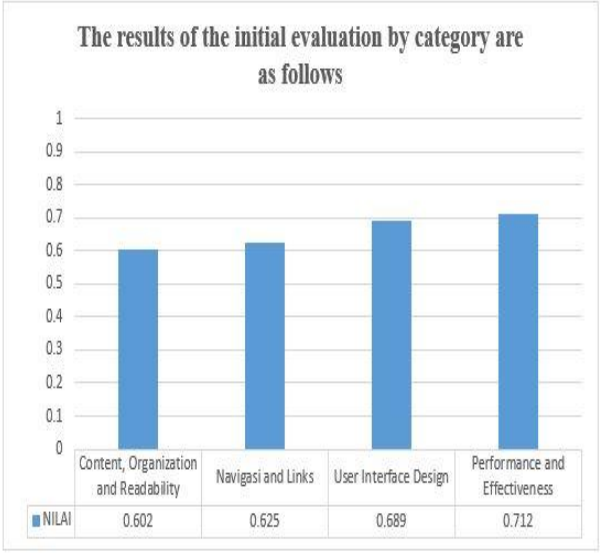


Figure 2. The results of the initial evaluation by category are as follows.

After completing the questionnaire stage, the results obtained will then be compared with the results of the final evaluation to be conducted in this study to determine the success of the UX design that has been created.

B. UX Design Stage

In this stage, the Five Planes Method is employed. There are five steps in this method, including:

1. Strategy Plane

   In the strategy plane, direct observations were conducted at the relevant institution, specifically SDN 1 Sukamulya, to analyze and find out what the users need (user needs). The interview results will provide information such as the objectives of creating the website from the stakeholders (Product Objective) and the goals or final outcomes to be achieved from user interactions with the website (User Goal).

   Below are the results of the interview with the principal of SDN 1 Sukamulya, which can be seen in Table 2.

Table 2. Interview results

User Need	Product Objectives	User Goal
a. A simple and informative interface. b. Provides easy and comprehensive access to school information, including the school's history, vision and mission, and contact information. c. Offers the latest news about school activities. A concise, straightforward, and user-friendly design.	a. Enhancing School Visibility. b. Providing Comprehensive Information. c. Guidance on Student Enrollment Procedures.	a. Desiring a Clear User Flow. b. Easy Access to Existing Features. c. Avoiding Unnecessary Content and Elements. d. Clear Information Architecture.

2. Scope Plane

In the functional specification stage, a description of the features within the SDN 1 Sukamulya profile website was created. The description of each feature provides a brief explanation of how each feature works from the user's perspective. The features to be included in this website are Home, Profile, Vision Mission, Articles, Alumni, Teachers, Extracurricular, Gallery, and Admission (PPDB). Functional specifications and the functions of the SDN 1 Sukamulya profile website can be seen in Table 3.

Table 3 Functional Specifications

No	Functional	Specifications
1	Beranda	Display the homepage of the website.
2	Profile	Display the profile of SDN 1 Sukamulya.
4	Visi Misi	Display the vision and mission of SDN 1 Sukamulya.
5	Artikel	Display content, articles, and news from SDN 1 Sukamulya.
6	Alumni	Display information and profiles of SDN 1 Sukamulya alumni..
7	Guru	Display information and profiles of teachers or instructors..
8	Ekstrakulikuler	Display information about extracurricular activities at SDN 1 Sukamulya.
9	*Gallery*	Display a collection of documentation in the form of photos from activities organized by SDN 1 Sukamulya
10	PPDB	Display requirements for student enrollment.

3. Structure Plane

This stage is the third element that defines how the user functions in using the product from the beginning to achieve a specific goal (user flow).

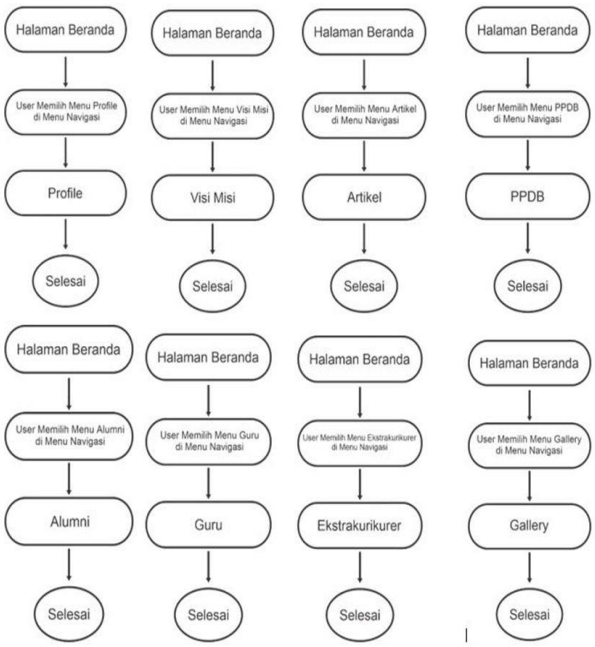


Figure 3. User Flow

4. Skeleton Plane

In this stage, the basic framework or low-fidelity wireframe of the SDN 1 Sukamulya website is designed using Figma. This serves as a guide to outline the layout and fundamental structure of the planned website interface. Two views are created: a mobile view and a desktop view.

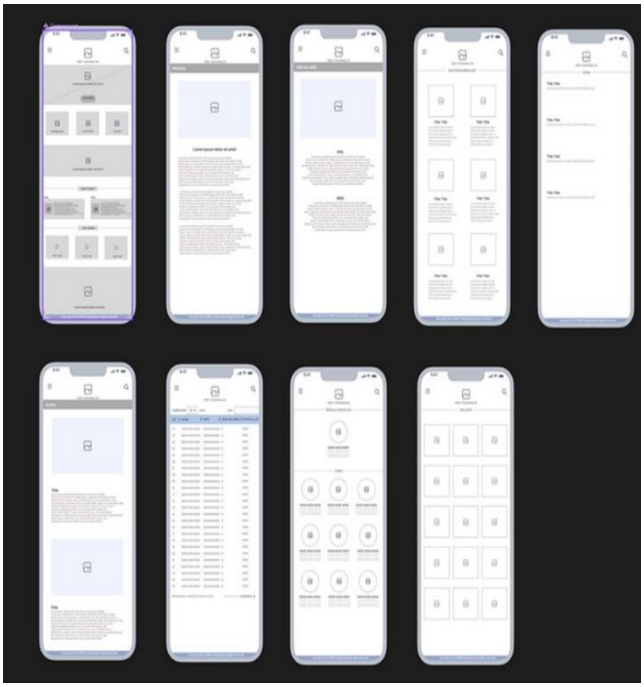


Figure 4. Low-fidelity Mobile

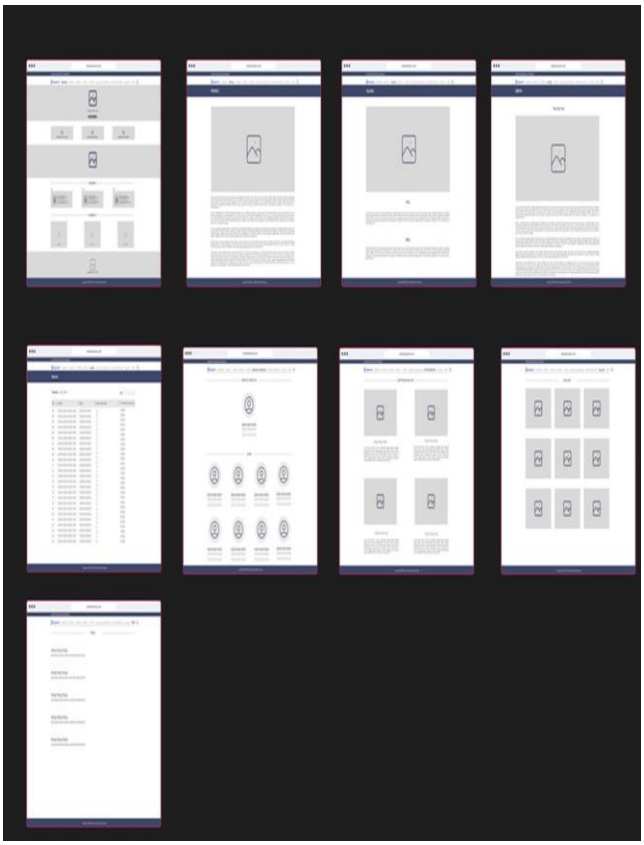


Figure 5. Low-fidelity Desktop

5. Surface Plane

In the Surface Plane stage, high-fidelity or visual design of the website is created using WordPress, following the design outcomes from the Skeleton Plane stage. Two views are produced: a mobile view and a desktop view.

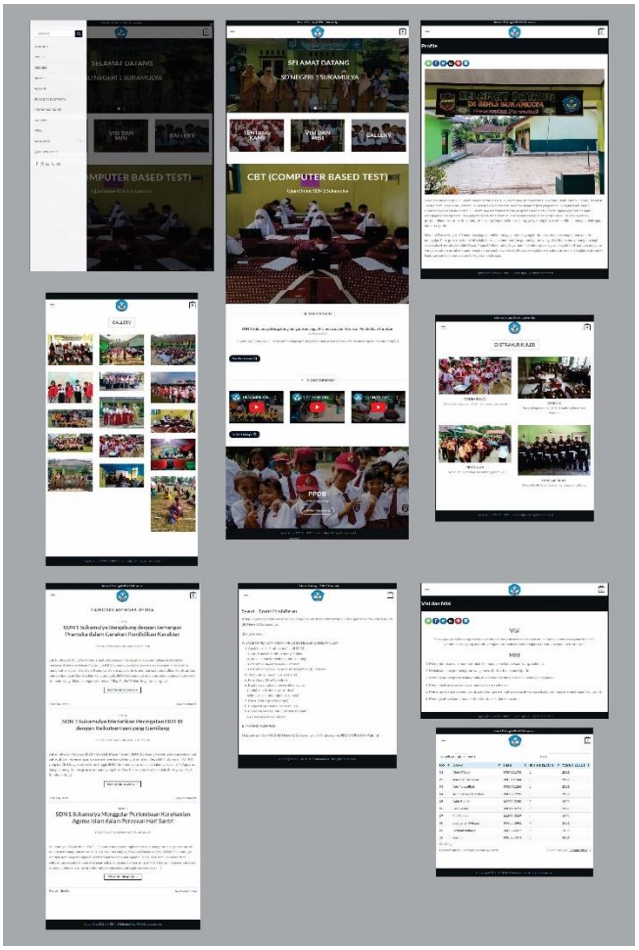


Figure 6. High-fidelity Mobile

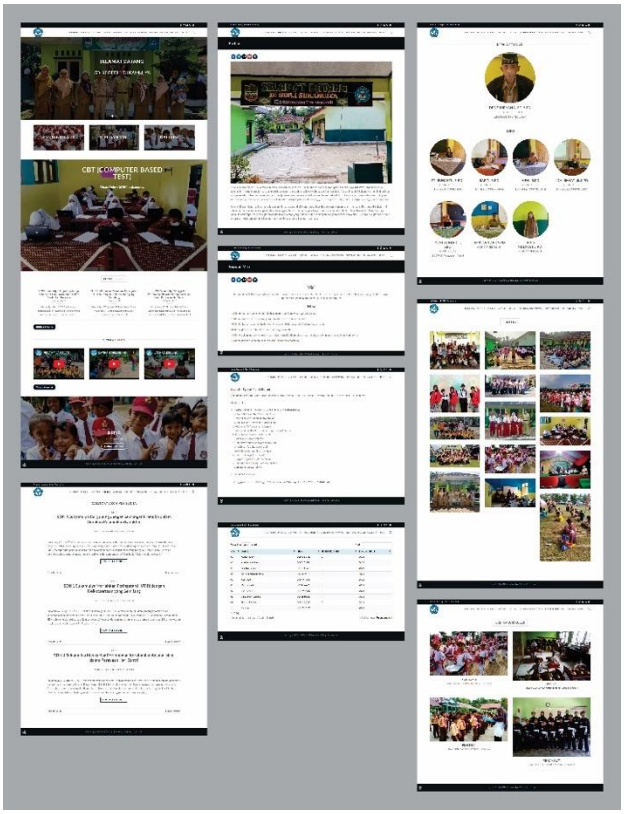
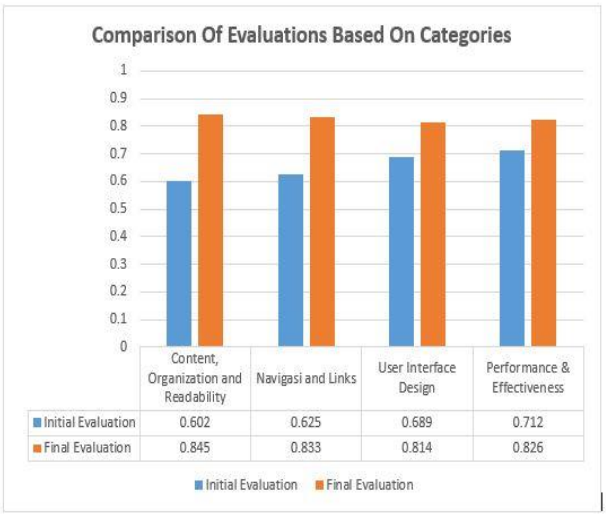


Figure 7. High-fidelity Desktop

C. Evaluation

This stage will conduct an evaluation using the WEBUSE method. The WEBUSE questionnaire consists of 24 questions, referring to 4 categories based on usability criteria: content organization & readability, navigation & links, user interface design, and performance & effectiveness. The WEBUSE questionnaire does not require validity and reliability testing as usability testing using WEBUSE is considered valid and reliable [5].



	Content, Organization and Readability	Navigasi and Links	User Interface Design	Performance & Effectiveness
Initial Evaluation	0.602	0.625	0.689	0.712
Final Evaluation	0.845	0.833	0.814	0.826

Figure 8. Comparison Of Evaluations Based On Categories

Figure 8. shows a comparison of initial and final evaluation results based on categories experiencing an increase in usability levels. From an initial usability score of 0.657, which falls in the "good" range (0.6 – 0.8), it increased to a usability score of 0.829, reaching the "excellent" level (0.8 – 1).

In the Content, Organization, and Readability category, the initial usability score was 0.602, experiencing a 24% increase to 0.845 in the final evaluation. This indicates that improvements to these aspects on the new website have successfully enhanced the user experience and content quality.

Meanwhile, the Navigation and Link category had an initial usability score of 0.625, which then increased by 20% to 0.833 in the final evaluation. This result suggests that adjustments to the navigation and links of the new website have improved user efficiency in navigating web pages, reducing confusion experienced in the initial evaluation.

In the User Interface Design category, initially scoring 0.689 in usability, it increased by 12.5% to 0.814 in the final evaluation. This reflects the success of changes in the user interface design of the website, enabling more effective and efficient interactions, which can enhance user satisfaction and overall website performance.

The Performance & Effectiveness category had an initial usability score of 0.712, which increased by 11% to 0.826 in the final evaluation. This indicates that actions to enhance the website's performance and effectiveness have been successful, allowing users to utilize it more efficiently.

Overall, the average initial usability score was 0.657, but it increased to 0.829 in the final evaluation, indicating a 17% improvement.

IV. CONCLUSION

In this study, we successfully designed a website for SDN 1 Sukamulya by applying the Five Planes method in the design process and using the WEBUSE method for the evaluation process. Based on the comparison of evaluations using the WEBUSE method, the website's usability score improved from the initial usability score of 0.657, which falls within the "good" range (0.6 – 0.8), to a usability score of 0.829, reaching the "excellent" level (0.8 – 1).

This score indicates that the website's usability within the "good" range (0.6 – 0.8), to a usability score of 0.829, reaching the "excellent" level (0.8 – 1).

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