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User Interface Design for Baduy Ecotourism Website Using User Centered Design Method

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Abstract: Baduy is one of the ecotourism destinations which offers captivating natural and cultural attractions, making it a worthy place to visit. The lack of available information in the media has piqued the author's interest in designing a visually appealing website to attract tourists. To address this issue, a user interface design will be created for the Baduy Tribe Ecotourism website using the User Centered Design (UCD) method. This method focuses on users and involves four stages, specifying the context of use, specifying requirements, designing a solution, and evaluating the design. Furthermore, to assess how well users interact with a product, usability testing will be conducted using the System Usability Scale (SUS) and Single Ease Question (SEQ). The usability testing results on the created website interface obtained a SUS score of 81 and generated 3 rating components in the SEQ method, fairly easy, easy, and very easy. Therefore, it can be concluded that the usability score falls within the category of good and is acceptable to users. Through this research, the author hopes that the user interface design for the Baduy Tribe Ecotourism website will meet users' needs, providing them with easy access to valid information and a seamless experience in discovering the natural wonders of the region.

Keywords: Single Ease Question, System Usability Scale, Usability, User Interface, User Centered Design, Website

INTRODUCTION

Tourism is a sector that contributes to the economic development of a country. One of the aspects is cultural diversity in the tourism sector, which attracts tourists. Tourists interested in the local tourism sector can drive the development of the region and enhance tourism in Indonesia (Adiyanto & Supriatna, 2019).

Lebak Regency is one of the administrative regions in Banten Province that has attractive and worth-visiting tourism potential. Lebak Regency offers various tourist attractions, including cultural tourism, which is a form of tourism that showcases the richness and uniqueness of a place's culture, also known as ecotourism (Sabilla et al., 2020).According to The International Ecotourism Society (International Ecotourism Society, 2015),ecotourism is a type of travel that takes place in areas with pristine natural environments, while respecting the cultural and natural heritage, supporting conservation efforts, avoiding negative impacts, and providing sustainable social and economic benefits, including involving local participation. One of the ecotourism destinations in Lebak Regency is the Baduy Tribe tourism, which has its own uniqueness and allure.

The Baduy tribe is a part of the Sundanese indigenous community residing in the remote region of Lebak, Banten. The Baduy tribe is renowned for their unique culture and traditions, which they have preserved for centuries. Despite technological advancements and changing times, the Baduy tribe remains committed to their traditional way of life and adheres to customary rules (Afiyanti et al.,

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2018).The uniqueness found within the Baduy tribe should be preserved by developing the tourism sector to make it known to a wider audience.

Based on an interview conducted on November 16, 2022, with a representative from the Department of Culture and Tourism of Lebak Regency, the author proposed a plan to design the user interface of the Baduy Tribe Ecotourism website and obtained permission to proceed with the design. After submitting the research title, the Department of Culture and Tourism of Lebak Regency expressed their hope that the proposed design would include comprehensive and easily accessible information media, allowing Baduy Tribe Ecotourism to be widely recognized. One effective way to promote Baduy Tribe Ecotourism is using a website. Currently, there are no official information media available for Baduy Tribe Ecotourism. Therefore, the development of information media, such as a website, is necessary to meet the marketing needs of the tourism industry in the area.

By designing the user interface for the Baduy Tribe Ecotourism website, it is expected to help promote the tourism sector of Lebak Regency to a wider audience and compete with tourism in other regions. To attract visitors, visual support on the website is necessary. This research aims to develop a user interface for the Baduy Tribe Ecotourism website using the User-Centered Design (UCD) method. The selection of the UCD method aims to fulfill user needs for information related to Baduy Tribe Ecotourism. The research also includes testing the developed prototype using the System Usability Scale (SUS) and Single Ease Question (SEQ) methods to measure the level of usability. According to (Rasmila, 2018), the System Usability Scale is a testing tool that consists of 10 questions to measure the effectiveness, efficiency, and user satisfaction with a product and does not require a large sample size. On the other hand, according to (Sauro & Lewis, 2016), SEQ is a testing method that contains 1 question with a rating scale from 1 to 7 related to the given task, and the process is conducted by participants after using the product. Therefore, with the implementation of the User-Centered Design (UCD) method for the user interface design of the Ekowisata Suku Baduy website and the testing of the created prototype, it is expected to provide a well-designed user interface that meets user needs, ensuring usability elements, and ensuring that the designed features function properly.

LITERATURE REVIEW

User-Centered Design

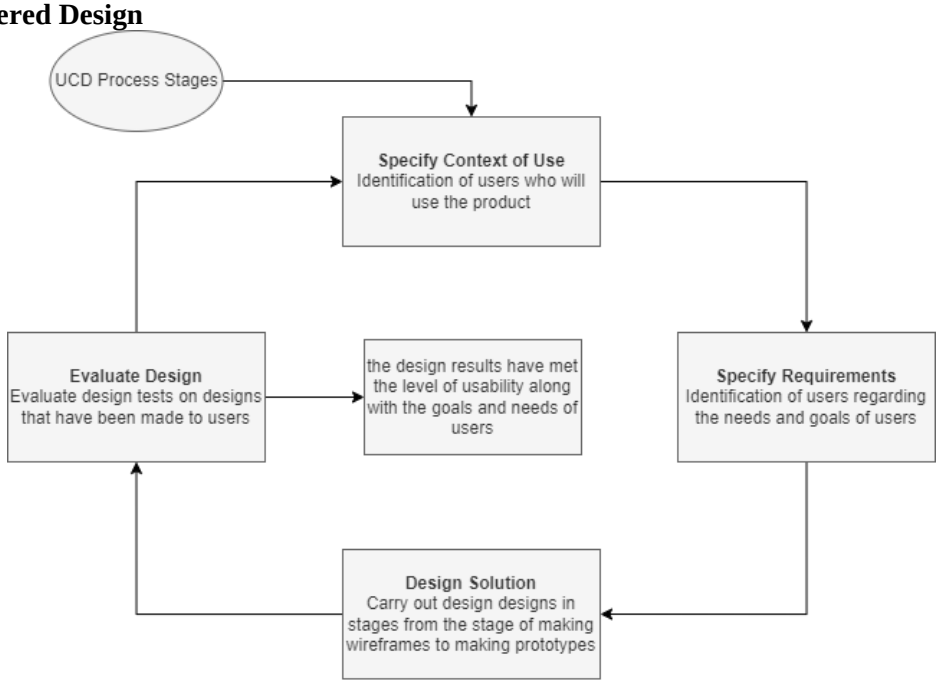

Fig 1. Staged Process of User-Centered Design according to (Jokela et al., 2003)

User-centered design (UCD) is a method that focuses on users in the process of designing a user interface (Utomo, 2019). In this method, users provide feedback on the proposed design and are involved in all stages of the user interface design process. With this approach, the user interface designer can obtain

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requirements that align with user preferences. The stages depicted in the design process using UCD can be seen in Figure 1.

Usability

Usability is a measure of users' experience when using a specific product or design (Interaction Design Foundation, n.d.). According to (Jordan, 2020), usability refers to the extent to which users can learn and use a product to achieve their goals and the level of satisfaction they derive from its use. According to (Nielsen, 2012), usability has five attributes for assessment, including learnability, efficiency, memorability, errors, and satisfaction.

User Persona

In creating a user interface design, there is an initial step of understanding user characteristics. After conducting interviews, one method to understand user characteristics is by creating user personas (Cooper, 2014). User personas identify user behavior through interviews conducted with users. Personas are powerful as they can serve as a design tool to address various issues in the development of an application.

System Usability Scale (SUS)

The System Usability Scale (SUS) is a questionnaire-based assessment useful for measuring the usability of an application or website. The SUS test consists of 10 questions with 5 response options for each question, using a scale of 1 to 5, where a score of 1 indicates "strongly disagree" and a score of 5 indicates "strongly agree" with the statements (Brooke, 1996). The following is a table of 10 questions on the system usability testing scale. can be seen in Table 1.

Table 1. System Usability Scale Questions

No	Questions
1	I think I will use this system again.
2	I find the system complicated to use.
3	I find the system easy to use.
4	I need help from other people or technicians in using this system.
5	I feel that the features of this system work properly.
6	I feel there are many inconsistencies in the system.
7	I feel others will understand how to use this system quickly.
8	I feel the system is confusing.
9	I feel there are no barriers to using this system.
10	I need to learn a lot before using this application.

Single Ease Question (SEQ)

The Single Ease Question is a test conducted after participants complete each given task in a usability study. The evaluator will ask the participants to rate overall how easy or difficult they found it to complete the given task on a seven-point rating scale from 1 (very easy) to 7 (very difficult) (Sauro & Lewis, 2016). The SEQ Rating Scale can be seen in Figure 2.

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Fig 2. The SEQ Rating Scale (Laubheimer, 2018)

(Laubheimer, 2018) argues that the Single Ease Question (SEQ) is asked at the end of each task completion for two reasons. First, it allows us to compare the different areas of the user interface that are causing problems for users. Second, because the task has just been completed, participants are still able to remember their emotional response to it, which gives us a more accurate assessment of their overall experience.

METHOD

Research Stage

This research flow outlines the stages that will be conducted during the research. This research employs the user-centered design method. As shown in Figure 3.

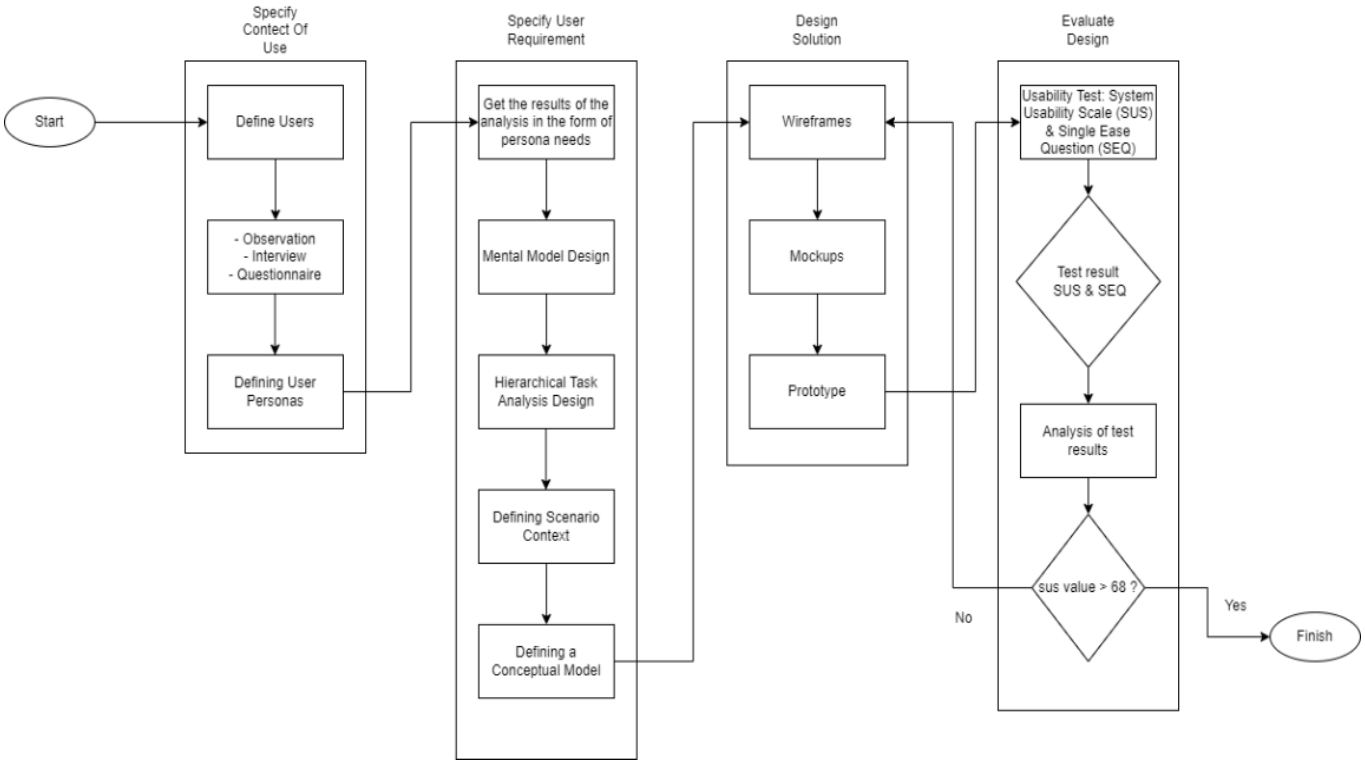

Fig 3. Research Stage

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Specify Context of Use

In this phase, understanding and planning of user characteristics, including demographics, skill level, behavior, environment, attitude and activity, goals, and needs, are conducted. To obtain user persona data, the process carried out in this stage is conducting interviews with potential users.

Specify User Requirements

In this stage, the user's needs and goals will be identified. From the data obtained from the created user personas, the process of analyzing user needs will be carried out by creating contextual scenarios. Following that, task analysis using Hierarchical Task Analysis (HTA) will be performed, and finally, a conceptual model analysis will be conducted.

Design Solution

In this stage, the design process will be conducted gradually, starting from the initial stage of creating the basic design framework to building design prototypes. Based on the results of the analysis of contextual scenarios, Hierarchical Task Analysis (HTA), and conceptual models, the design process will involve creating wireframes (low fidelity), mockups (high fidelity), and designing the design prototype.

Evaluate Design

In this stage, an evaluation of the created design will be conducted. Then, testing will be done on the design prototype, resulting in an analysis of its outcomes.

RESULTS

Specify Context of Use

In this stage, data collection will be conducted with users to understand their habits and needs through interviews with 15 ecotourism tourists from the Baduy tribe. The interview results will be consolidated to create a user persona, which aims to understand user responses during the design of the Baduy Ecotourism website user interface. It also aims to gather user feedback regarding the expected design of the user interface.

Table 2. User Persona

Objective	Persona
Demographic	Age: 21 – 50 Years Gender: Male and Female Profession: Student, Teacher, Entrepreneur, Government Employee, Private Sector Employee, Housewife and Contract Worker
Skill Level	Internet access frequency: Often Time required to understand how an application works: 1-2 hours Typing, reading, and comprehension skills in searching for information: Good
Behavior	Searching for information about tourist destinations. Looking for information about access and accommodation at the intended tourist places. Conducting searches for information about events or activities related to the intended tourism. Searching for pictures of the intended tourist places.
Environment	Using a laptop at the office and at home. Using a smartphone at the office and at home.
Attitude and Activity	Prefer websites that provide ease of access. Choose websites with attractive designs and appearance. Prefer websites that are simple and easy to use. Share enjoyable travel-related information with family/friends.
Goals	Desire websites that provide detailed and comprehensive information. Desire ease in searching for travel information.

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	Desire websites that provide information about upcoming events. Desire websites that are regularly updated.
Needs	Getting information about the introduction of the intended tourist destination. Easily obtaining information about tourist destinations, such as accommodation-related details (tickets, lodging, etc.). Getting updates about news related to the intended tourist destination. Getting information about events related to the intended tourism.

Specify Requirements

At this stage, user persona needs will be identified by designing goals & requirements. This phase will also involve the design of a mental model, hierarchical task analysis (HTA), context scenario, and conceptual model.

Goals & Requirements

After creating a persona, the next step is to identify the user's goals and requirements, which are necessary to fulfill their objectives. Once the goals and requirements are known, they can be used to design the product or service to better meet the needs of the user.

Table 3. Goals & Requirements

Goals	Needs	Requirements
Desiring a website that has complete and well-organized information	Able to access information about Baduy tourism	The website features well-organized and comprehensive information about tourism
Desiring ease of finding tourism information	Can easily find Baduy tourism information	Easy and flexible tourism information search feature
Desiring a website that provides information about upcoming events	Can search for information about events related to Baduy tourism	Feature of a collection of event information related to Baduy tourism)
Desiring an up-to-date website	Can find the latest news information related to Baduy tourism	Features a collection of the latest information related to Baduy tourism

Mental Model

A mental model is a diagram that illustrates how users interact with an application (Pradipto, 2020). This diagram is essential to create before the system is implemented. as it forms the foundation for other design documents, such as Hierarchical Task Analysis, Context Scenario, and Conceptual Model. For the mental models, it can be seen in Figure 3. The specific mental model can be seen in the appendix.

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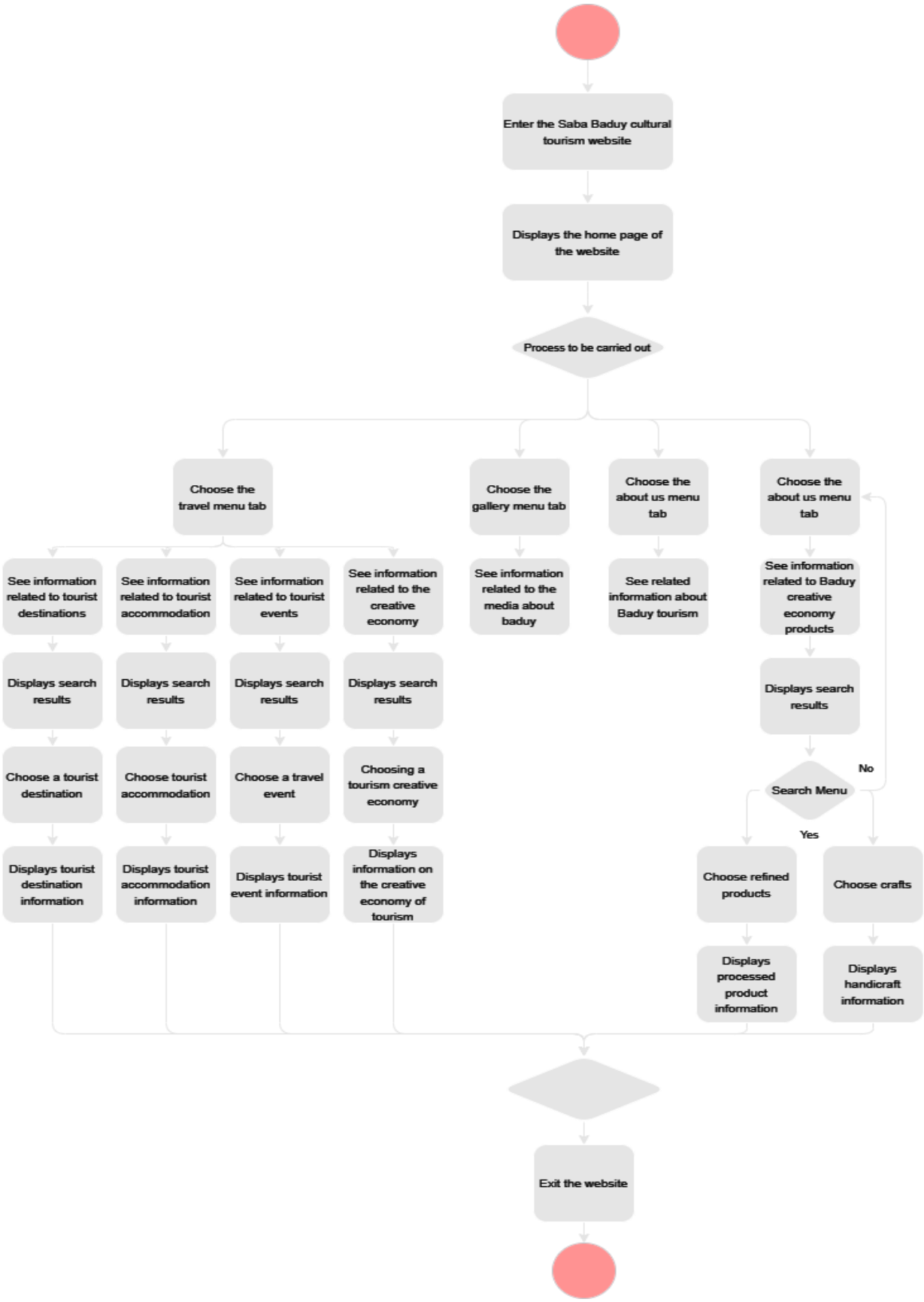

Fig 4. Mental Model

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Hierarchical Task Analysis (HTA)

Hierarchical Task Analysis (HTA) is carried out to identify and depict features as tasks and sub-tasks in a more organized manner using a tree diagram (Diaper & Stanton, 2004). HTA is used to facilitate the development of interface design as it contains the content and flow that will be constructed into an interface. The specific hierarchical task analysis can be seen in the appendix.

Context Scenario

Context scenarios are built based on the behavioral persona while interacting with a system (Pradipto, 2020). The components required for constructing context scenarios are tasks, subtasks, users, goal tasks, and descriptions of a system. The specific context scenario can be seen in the appendix.

Conceptual Model

The conceptual model is an overview of the detailed tasks required by users and serves as a tool to understand the design of the system to be developed (Pradipto, 2020). The conceptual model provides an overall picture of the tasks and responses to be designed based on the previously obtained task analysis stage. The result of this conceptual model stage will produce a table containing explanations about tasks, subtasks, expected responses, layout, elements, and descriptions of the design to be created. The specific conceptual model can be seen in the appendix.

Produce Design Solution

In this stage, the user interface design will be developed based on the analysis of the needs and issues of the users obtained from the previous phase. The first step in the design process is to create a preliminary representation or wireframe, which provides a sketch of the system's display framework and layout. After that, the process continues to the next stage, which is the creation of mockups. The mockups add visual aspects to the previously created wireframes. Finally, the last stage involves transforming the mockups into prototypes, allowing them to have interactive functionality and be tested by users.

Wireframe

A wireframe is a simplified blueprint of a web page or app that shows the basic structure, content, and functionality of the page. It is used to help designers and developers understand the user's needs and expectations to communicate their ideas to others. Wireframes can be classified into three levels of fidelity such, low, medium, and high (Uzayr, 2022). The following is the wireframe of the homepage menu on the Baduy tribe ecotourism website, it can be seen in Figure 4. The detailed wireframe can be seen in the appendix.

Mockup

A mockup is a more detailed version of a wireframe that shows the final look and feel of a user interface. It includes all the text, images, and styling that will be used on the final page. Mockups are used to demonstrate the user experience and final appearance of a project and get user feedback on the design (Pleten, 2019). There are many different tools that can be used to create mockups, such as Figma, Balsamiq, Mockflow, and Adobe XD (Kitakabee, 2022). The following is the mockup of the homepage menu on the Baduy tribe ecotourism website, it can be seen in Figure 5. The detailed mockup can be seen in the appendix.

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Fig 5. Wireframe on the homepage menu

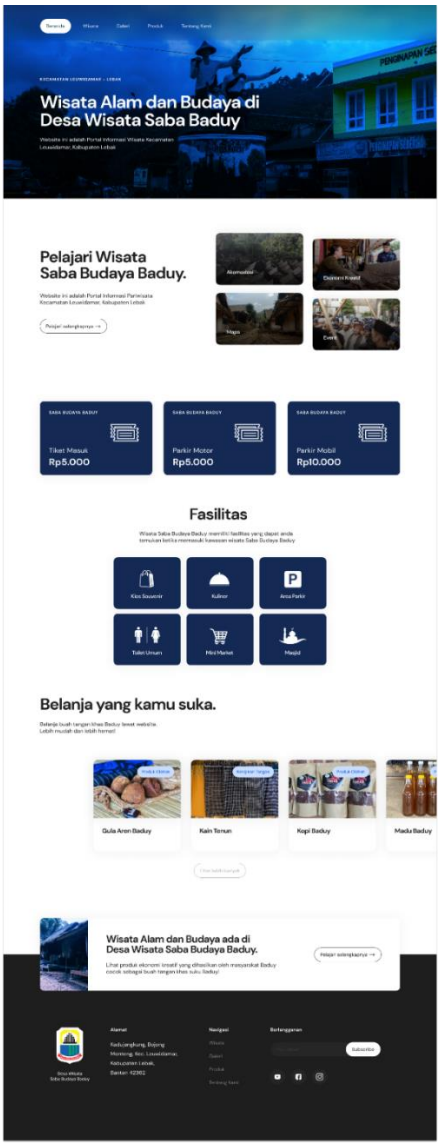

Fig 6. Mockup on the homepage menu

Prototype

Prototypes and mockups are two distinct types of design artifacts. Prototypes are interactive and can be used to demonstrate how a user will interact with a product. Mockups are static and only show how a product will look (Pleten, 2019). At this stage, the user will perform a demonstration on the prototype of the Baduy ecotourism website interface based on the mockup that was made previously. The detailed prototype can be seen in the appendix.

Evaluate Design

At this stage, an evaluation of the created design will be conducted. Subsequently, a testing process will be carried out on the designed prototype, resulting in an analysis of the testing outcomes of the design prototype.

DISCUSSIONS

This section discusses the results and analysis of the testing results after the design has been successfully created. Subsequently, an evaluation will be conducted involving users in the testing of the developed prototype. The usability of the prototype will be measured using the System Usability Scale (SUS) and Single Ease Question (SEQ) methods. This testing is to identify and observe the issues users

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face when trying out the prototype. Additionally, the level of usability of the prototype will be measured by testing 15 respondents who will interact with the working prototype based on the tasks that will be evaluated. The following are the tasks to be tested.

Table 4. List Task

No	User	Task	Scenario
1	Traveler	Homepage	The user logs into the working prototype. The user selects the "Home" menu. The system displays the main information on the homepage.
2	Traveler	Tour	The user logs into the working prototype. The user selects the "Tourism" menu. The system will display information on the tourism menu, such as details about accommodations, creative economy, events, and maps. The user clicks on the "Accommodations" submenu, and it will display information about Baduy tourism accommodations. The user clicks on the "Creative Economy" submenu, and it will display information about creative economy products in Baduy tourism. The user clicks on the "Events" submenu, and it will display information about events in Baduy tourism. The user clicks on the "Maps" submenu, and it will display information about directions to Baduy tourism destinations.
3	Traveler	Gallery	The user logs into the working prototype. The user selects the "Gallery" menu. The system will display information in the form of image media related to Baduy tribe tourism.
4	Traveler	Product	The user logs into the working prototype. The user selects the "Products" menu. The system will display information in the form of two product options: processed products and handicrafts. The user clicks on the "Processed Products" button to view the processed products page. The user clicks on the "Handicrafts" button to view the handicrafts page.
5	Traveler	About us	The user logs into the working prototype. The user selects the "About Us" menu. The system will display information on the "About Us" page.

The next step will involve testing the prototype website that has been created. According to (Nielsen, 2012), conducting product testing with 5 respondents is already sufficient to identify issues and achieve test results with an accuracy of over 75%. Minimizing the number of testing respondents can also anticipate the possibility of encountering novel issues. However, for this study, 15 tourist respondents will be selected to undergo the testing process on the designed prototype. The next step is to prepare the testing tools, which consist of the user interface prototype of the ecotourism website for the Baduy tribe,

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along with a 10-component questionnaire for the System Usability Scale (SUS) and a one-component questionnaire for the Single Ease Question (SEQ). The testing process will be conducted either in-person or online using Google Meet, depending on the availability of the respondents' time. Subsequently, the respondents will perform the testing on the prototype, and then they will be given the SUS and SEQ questionnaires containing their feedback after using the prototype.

Table 5. SUS Test Results

Respondent	Question										SUS Value
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	
R1	4	2	4	1	4	2	4	1	5	1	85
R2	5	1	4	1	4	2	4	1	3	2	82.5
R3	4	2	4	3	4	2	4	2	4	5	65
R4	4	1	5	2	5	3	5	1	5	2	87.5
R5	4	2	5	3	4	3	5	2	4	3	72.5
R6	5	2	5	2	5	2	4	2	4	2	82.5
R7	4	2	5	3	4	1	5	2	5	2	82.5
R8	4	1	4	1	4	2	5	2	4	3	80
R9	4	2	5	2	5	2	5	2	4	3	80
R10	4	3	4	1	5	1	4	1	4	1	85
R11	5	1	4	2	4	2	5	2	4	3	80
R12	4	2	4	2	4	2	4	2	4	2	75
R13	4	1	5	2	5	2	5	1	5	5	82.5
R14	4	2	4	1	4	2	5	1	5	2	85
R15	5	1	4	1	5	3	4	1	5	1	90
SUS Value											81

Based on the table above, the designed prototype website obtained an SUS score of 81. According to the SUS rating scale, this score falls within the acceptable range, the grade scale range is in the B category, and the adjective rating falls within the excellent range.

Table 6. SEQ Test Result

Respondent	Task				
	T1	T2	T3	T4	T5
1	7	7	6	6	6
2	7	6	7	7	6
3	6	6	6	5	6
4	7	7	6	7	7
5	7	6	7	7	6
6	7	7	7	7	6
7	6	6	7	7	5
8	7	6	6	7	6
9	7	6	7	7	5
10	7	6	7	7	7
11	7	7	7	7	7
12	6	6	7	7	6

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13	7	6	7	6	6
14	7	7	6	7	7
15	6	6	7	6	5

Based on the table above, it can be observed that the respondents' feedback on the given tasks has three values: 5 (fairly easy), 6 (easy), and 7 (very easy) on the Likert scale.

CONCLUSION

Based on the research and analysis conducted, the conclusion drawn is the creation of a user interface design for the ecotourism website of the Baduy tribe using the User-Centered Design method, which has fulfilled user needs by providing important information that facilitates users in searching for Baduy tribe tourism information. This is achieved by organizing the content of information into a more structured format related to tourism destinations, tourism news, and tourism events in Baduy. Additionally, the website design is kept simple to ensure easy understanding for users. Furthermore, the results obtained after implementing the User-Centered Design method on the ecotourism website of the Baduy tribe using two usability testing methods are as follows: First, using the System Usability Scale (SUS), the website obtained a score of 81, which falls within the acceptability range, B grade scale, and excellent adjective ratings. Secondly, using the Single Ease Question, three values were obtained: 5 (fairly easy), 6 (easy), and 7 (very easy) on the likert scale.

APPENDIX

All material in this study can be found at: https://bit.ly/Appendix-SINKRON.

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