User-Centered Design Approach for a Mobile Travel App: UI/UX Case Study of Ciletuh-Palabuhanratu Geopark

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Abstract

This study presents the design of a mobile travel application named Explore, aimed at enhancing the tourism experience in the Ciletuh-Palabuhanratu Geopark, West Java, Indonesia. Using a User-Centered Design approach, the process followed four stages: Context Analysis, Defining Requirements, Design, and Evaluation. Key features include an AI-powered assistant chatbot, real-time crowd updates, ticketing, and intuitive navigation. The design evolved from wireframes to high-fidelity prototypes tailored for mobile use. Usability testing with fifteen participants using the System Usability Scale resulted in an average score of 81.5, indicating high user satisfaction and effective functionality. This application not only complements the existing Geopark website by offering a more interactive and functional platform but also improves access to tourism information for visitors. Additionally, it supports local economic growth by encouraging increased activity in nearby sectors such as culinary services, accommodations, and transportation. The findings highlight that integrating user feedback and AI-based features can significantly enhance user experience in digital tourism platforms.

Keywords: User-Centered Design, Mobile Application, UI/UX, Geopark Tourism, Artificial Intelligence.

I. INTRODUCTION

Sukabumi Regency, located in southern West Java, holds considerable promise for the province's tourism growth [1]. Sukabumi features a tourist spot named Ciletuh-Palabuhanratu Geopark. A Geopark is a designated area that holds significant geological value, where local communities are actively involved in protecting and enhancing the natural heritage. This includes not only geological features, but also archaeological and cultural elements within the region. The term "Geopark" stands for "Geological Park," which refers to a geological or earth park [2].

Ciletuh-Palabuhranratu is the first national geopark in West Java Province. It is located in Sukabumi District, southwestern part of West Java Province [3]. Ciletuh-Palabuhanratu Geopark, covering approximately 1.261 km² and encompassing 74 villages across 8 sub-districts [4].

Despite its UNESCO Global Geopark status and the presence of 67 potential tourist spots, only a few destinations are widely recognized and frequently visited by travelers. A survey involving 36 participants, conducted by the author via Google Form and interviews via Google Meet, revealed that 63.9% of respondents knew fewer than 5 destinations within the geopark area, while only 30.6% could name more than 10 and only 5.6% could name more than 20, indicating a significant information gap. And Ciletuh-Palabuhanratu Geopark website also has relatively low traffic, with only 328 organic visitors according to data from Ubersuggest, as checked by the author in June 2025 [5].

This uneven distribution of tourist attention often results in overcrowding at popular sites while many others remain underutilized. The limited public awareness and accessibility of comprehensive, real-time tourism information such as routes, ticket prices, facilities, and visitor density become major challenges for potential travelers and the tourism management sector.

In addressing this issue, mobile applications have become strategic platforms for enhancing user access to information. However, usability and relevance remain critical. Usability is a key factor in the success of an application and reflects how well it is accepted by users [6]. This study adopts the User-Centered Design (UCD) approach to ensure the design process focuses on user needs and experiences. High-quality UI/UX design is crucial for enhancing user satisfaction and customer retention [7]. Furthermore, integrating Artificial Intelligence (AI) also serves to enhance the usability of this mobile application. AI plays a valuable role in simplifying and supporting the needs of users in today's world [8]. The AI

feature implemented in this study is a chatbot designed to answer questions related to travel destinations. It can provide information such as the distance and best route to a location, notify users about available discounts at tourist spots, give insights into crowd levels at specific destinations, and even help create travel itineraries. By leveraging AI, the application not only delivers relevant information but also offers practical solutions for users. The application UI/UX design will be evaluated using the System Usability Scale (SUS) to measure the perceived ease of use and effectiveness.

Previous studies in Indonesia, such as the one by Hafidh Firdaus and Deny Hidayatullah (2022) titled "Developed a tourism information system for Geopark Ciletuh using the User-Centered Design" [9], focused only on Palangpang Beach and did not include a SUS test. Another study conducted in Malaysia by Nor Azman Ismail et al (2021) titled "User-centred Design and Evaluation of Web and Mobile based Travelling Applications" [10], concentrated on evaluation and comparison using the SUS method. In contrast, the author's current study focuses on user-centered design and the implementation of an AI chatbot feature.

The goal of this study to produce high-quality UI/UX design mobile application with an intuitive interface and helpful chatbot. This allows users to easily access information about the Ciletuh-Palabuhanratu Geopark and enhances their overall travel experience within the area.

II. RESEARCH METHOD

This study adopts a User-Centered Design (UCD) approach in designing the UI/UX of the mobile travel application for the Ciletuh-Palabuhanratu Geopark. The User-Centred Design approach is based on Ergonomics and Usability knowledge to find the user's needs [11]. During the process, the author needs to conduct direct investigations with users and manage the collected information to define their needs [12]. In general, the User-Centered Design (UCD) process is divided into four main stages (see Figure 1).

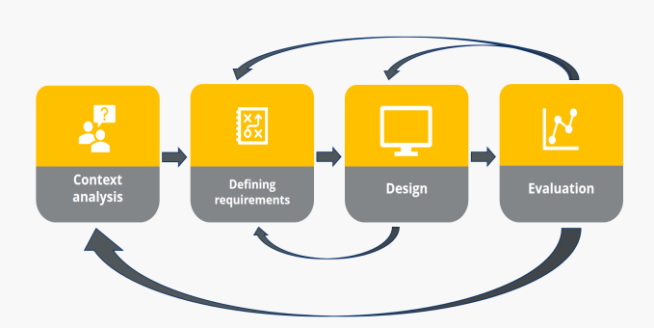


Figure 1. User Centered Design Flow [13]

A. Context Analysis

In this stage, data collection was conducted through the distribution of questionnaires to 55 respondents via Google Forms and interviews with selected participants via Google Meet. The respondents were specifically chosen because they are familiar with UI/UX design principles and frequently visit the Ciletuh-Palabuhanratu Geopark area, making their feedback highly relevant to the application's target context. For the interviews, three informants were selected based on their active interest in tourism and prior experience with the geopark. The list of questionnaire questions is presented in Table 1.

Table 1. List of Questionnaire Questions

No	Question
1	How often do you travel or go on vacation?
2	Have you ever heard of or visited the Ciletuh-Palabuhanratu Geopark?
3	What makes you hesitant to visit the Ciletuh-Palabuhanratu Geopark as a travel destination?
4	How many tourist spots do you know within the Ciletuh-Palabuhanratu Geopark?
5	How do you usually search for information about the Ciletuh-Palabuhanratu Geopark?
6	If the Ciletuh-Palabuhanratu Geopark had a digital platform, would you prefer to use a mobile app or a website?
7	What information should be included in the Ciletuh-Palabuhanratu Geopark platform?
8	What features should be included in the Ciletuh-Palabuhanratu Geopark platform?
9	Would you frequently use an AI chatbot assistant feature?

Based on Table 1, the questionnaire consists of a total of 9 questions.

B. Defining Requirements

After the Context Analysis stage, this phase involves implementing and defining the results from the questionnaires and interviews conducted earlier, ranging from the main functions to the features desired by users. In this stage, the researcher also selects the tools that will be used.

C. Design

After the Define Requirements stage, this phase focuses on designing the UI/UX based on the main functions and features identified earlier. The design process begins with the creation of a site map, wireframes, user flow, followed by high-fidelity designs and prototypes, and concludes with the final UI/UX mockups.

D. Evaluation

In this final stage, an evaluation is conducted on the design developed in the previous phase. The evaluation will be carried out using the System Usability Scale (SUS), measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The System Usability Scale questionnaire will be distributed via Google Forms. The list of System Usability Scale questions is presented in Table 2.

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Table 2. List of SUS Questions

No	Question
1	I think I would use this application again.
2	I found this application unnecessarily complex.
3	I thought the application was easy to use.
4	I think that I would need the support of a technical person to be able to use this application.
5	I found the various functions in this application were well integrated.
6	I thought there was too much inconsistency in this application.
7	I would imagine that most people would learn to use this application very quickly.
8	I found the application very cumbersome to use.
9	I felt very confident using the application.
10	I needed to learn a lot of things before I could get going with this application.

Based on Table 2, the SUS consists of a total of 10 questions.

III. RESULT AND DISCUSSION

A. Context Analysis

Based on data collected from questionnaires and online interviews with 55 participants, one key finding revealed that most people are only familiar with fewer than five tourist spots within Geopark Ciletuh-Palabuhanratu. Therefore, the application will be named Explore. The respondents who filled out the questionnaire were those already familiar with Geopark Ciletuh-Palabuhanratu. Table 3 is a summary of the respondent data:

Table 3. Summary of The Respondent Data

Question	Answer
Gender	32 male (58%), 23 female (42%)
Age	12 peoples 14-19 years (22%), 43 peoples 20-50 years (78%)
Occupation	10 student (19%), 17 university students (31%), 10 freelance (19%), 18 other (29%)

The results of online interviews with three individuals who are familiar with Geopark Ciletuh-Palabuhanratu and have a passion for traveling will be used to develop user personas.

The interview with Muhammad Faras (Figure 2) revealed that he expects the UI/UX design of the travel application to be user-friendly and easy to navigate. He also expressed the need for multiple payment options to make it easier for users to purchase tickets. In addition, Faras suggested the inclusion of a live chat feature and supported the idea of integrating an AI assistant. He also preferred the UI/UX design to be focused on a mobile platform.

The interview with Istri Asmawati (Figure 3) showed that she expects the UI/UX design of the Explore application to be as simple and straightforward as possible. She also emphasized the importance of a customer service feature to help users quickly resolve any issues they may encounter. Additionally, she suggested the inclusion of a review feature, allowing users to read feedback from others who have visited the tourist spots.

The interview with Kevin Ruuhan Nuur (Figure 4) revealed that he expects the UI/UX design of the travel application to be both user-friendly and aesthetically pleasing. Kevin also expressed the need for a feature that helps users create a well-structured travel itinerary. In addition, he supports the integration of AI in the Explore application.

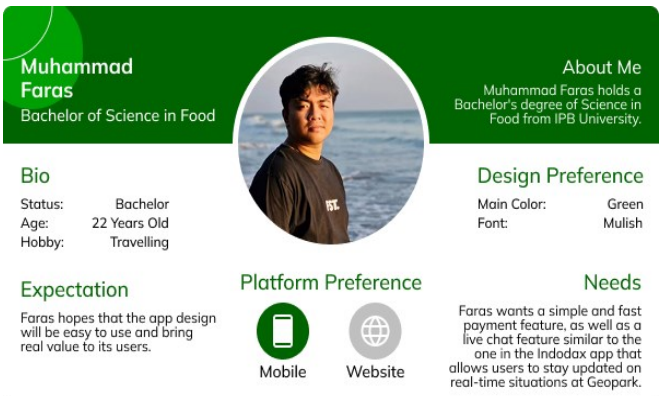


Figure 2. User Persona Muhammad Faras

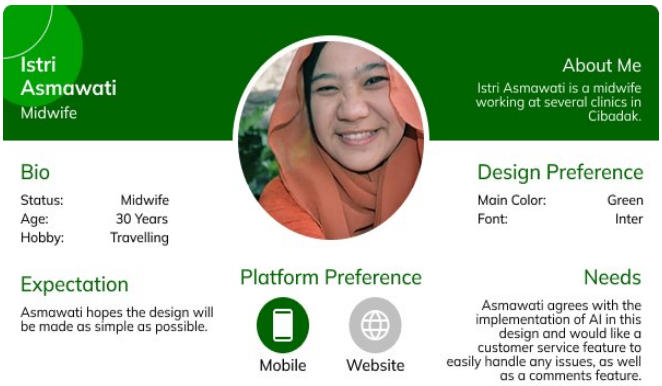


Figure 3. User Persona Istri Asmawati

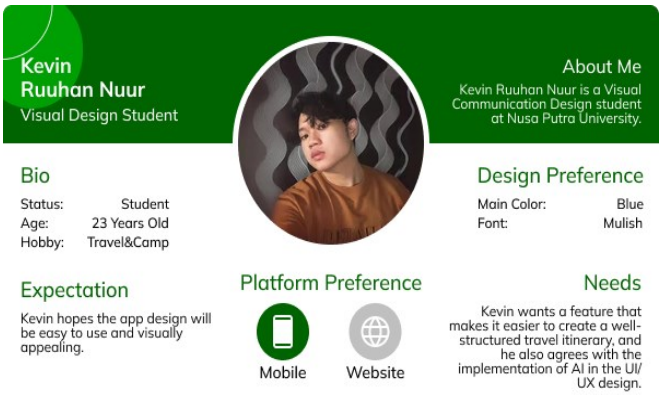


Figure 4. User Persona Kevin Ruuhan Nuur

B. Defining Requirements

The tool that will be used is Figma. Based on the results of the context analysis, the following are the main functions and

features that will be included in the UI/UX design of this travel application can be seen in Table 4 and Table 5.

Table 4. Main Function

No	Main Function	Detail
1	Provides information about tourist spots in Geopark Ciletuh-Palabuhanratu.	This function is intended to address one of the research questions. In the UI/UX design, it is specifically focused on providing complete and accurate information about the tourist spots that users plan to visit.

Based on Table 4, the main function of this travel application is to provide users with complete and accurate information about tourist spots in Geopark Ciletuh-Palabuhanratu. This feature is designed to address one of the core research questions by ensuring that users have access to reliable and detailed insights about each destination, helping them make informed travel decisions.

Table 5. Feature Lists

No	Features	Detail
1	AI as an Assistant	This feature is designed to help users navigate and use the application more easily. The AI assistant will be presented in the form of a chatbot that can provide useful information, such as the crowd level at a selected tourist spot, the best route to reach a destination, and even assist in creating a personalized travel itinerary.
2	Ticket Purchase	This feature is designed to address users' concerns about inconsistent ticket pricing. With this feature, all users—whether local residents or not—will receive the same ticket prices, ensuring fairness and transparency in the purchasing process.
3	Trip Maker (Itinerary Planner)	This feature is designed to help users easily create a well-structured plan for their travel visits.
4	News	This feature allows users to stay updated by viewing news related to Geopark Ciletuh-Palabuhanratu.
5	Events	This feature enables users to view upcoming events at Geopark Ciletuh-Palabuhanratu.
6	Points System	This feature rewards users with points for completing transactions. These points can then be redeemed for discount coupons as a form of appreciation.
7	Priority	This feature is designed to make users feel more valued by providing a tier system for user accounts, offering different levels of appreciation.
8	Coupons	This feature allows users to apply discounts when purchasing tickets.
9	Reviews	This feature enables users to leave feedback and share their experiences about the tourist spots.
10	Referral	This feature allows users to invite their friends to use the Explore app and rewards them when their friends successfully join.
11	Customer Service	This feature helps users quickly resolve any difficulties or issues they may encounter while using the Explore app.
12	Map	This feature allows users to access a map without leaving the app. It also enables them to check the distance between their current location and the tourist spots they wish to visit.
13	Chat Room	This feature enables users to receive live information about tourist spots, news, and other users' experiences in real time.

Based on Table 5, the exploration application design includes 13 features.

C. Design

This stage focuses on providing solutions and realizing the needs and problems of users identified through questionnaires and interviews from the previous phase. The UI/UX design process in this stage consists of four steps: creating the site map, developing wireframes, sitemap, designing high-fidelity prototypes, and concluding with the final UI/UX mockups.

1. Site Map

In this study, the site map serves to map out the core pages that will be included in the design, ensuring all necessary pages are accounted for and preventing any from being overlooked (see Figure 5).

2. Wireframe

Wireframing is the next step after creating the site map (see Figure 5). At this stage, an initial sketch or outline of the design is made based on the pages identified in the site map. Creating wireframes makes the following design phases easier and faster to complete. The wireframes shown here represent only the main menu pages (see Figure 6) and ticket purchase pages (see Figure 7).

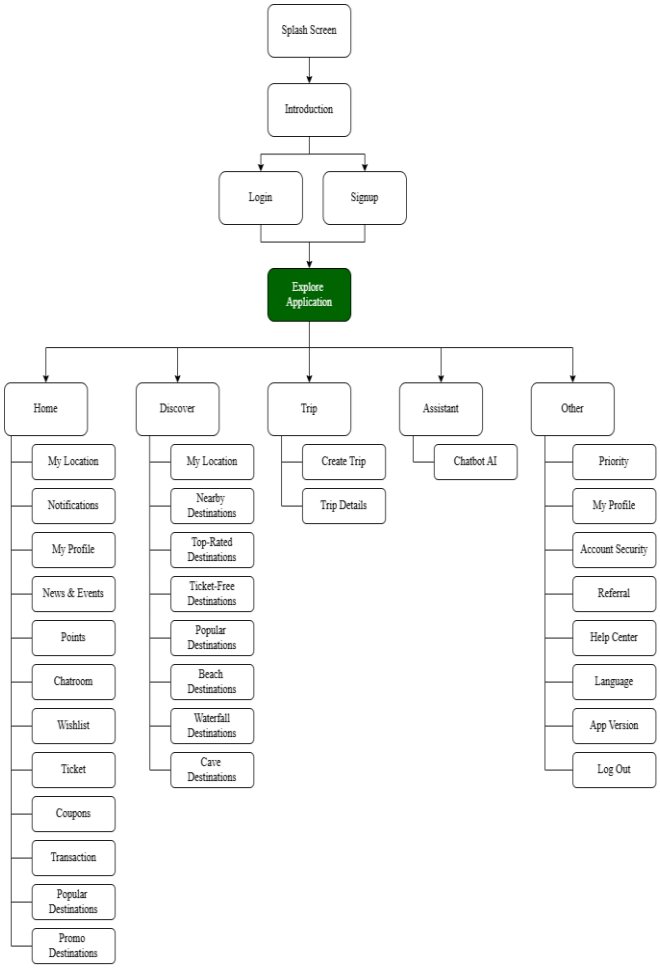


Figure 5. Site Map

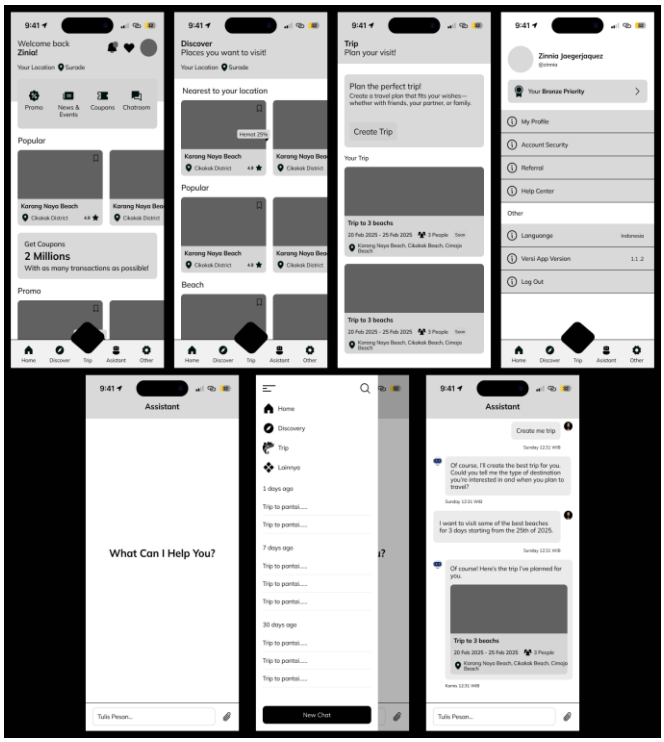


Figure 6. Wireframe Main Menu Pages

Based on Figure 6, the main menu displays pages including Home, Discover, Trip, Assistant, and others.

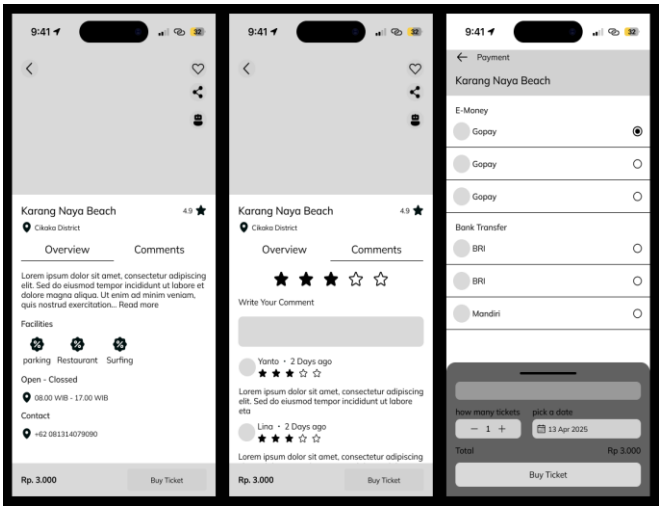


Figure 7. Wireframe Ticket Purchase Pages

Based on Figure 7, the overview and payment pages display information about the tourist spot, including a list of available facilities, user reviews, and ticket prices. The payment page also offers various payment methods that users can choose from when purchasing tickets.

3. User Flow

The user flow presented illustrates the process of purchasing tickets that users can follow (see Figure 8). The example shown demonstrates buying tickets through the Discover page.

4. High Fidelity

In the high-fidelity and prototype stage, the design is developed based on the previously created wireframes by adding color, refining the layout, and including new interface elements. The high-fidelity designs are created using Figma, allowing them to be transformed into interactive prototypes. These prototypes enable users to experience and evaluate the UI/UX design firsthand.

The colors chosen for the UI/UX design of the Explore app are green #006400, white #FFFFFF, and black #010101 (see Figure 9). Additionally, supporting colors range from pale white #EBEBEB to yellow #F3E600 (see Figure 10). Green was selected as the primary color because, based on previous interviews, it was the most preferred color. Similarly, the font “Mulish” was chosen following feedback gathered during earlier interviews (see Figure 11).

The logo of this application combines the Geopark Ciletuh-Palabuhanratu emblem with an image of a person using binoculars (see Figure 12). It symbolizes someone exploring and searching for tourist spots within Geopark Ciletuh-Palabuhanratu.

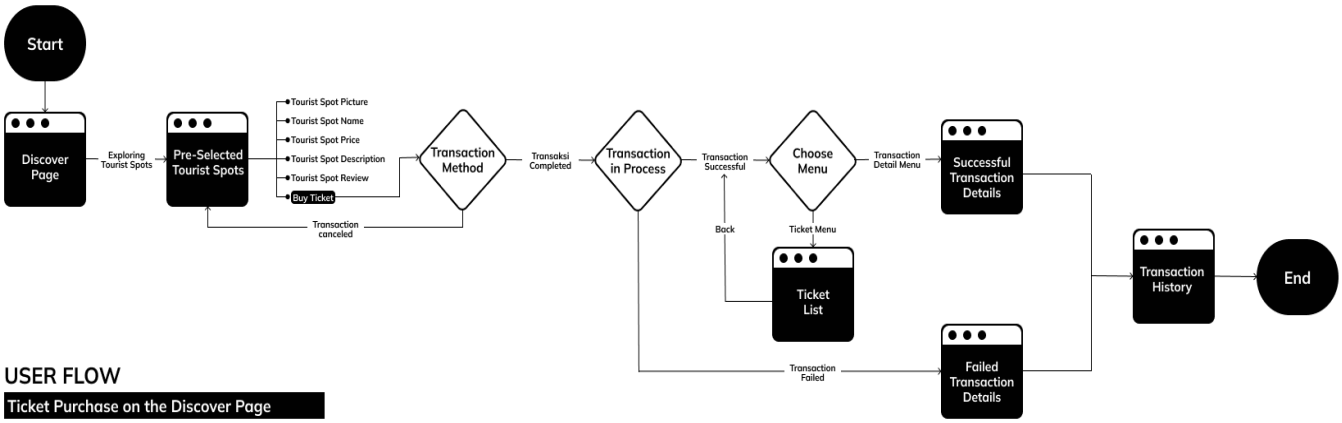


Figure 8. Wireframe Ticket Purchase Pages

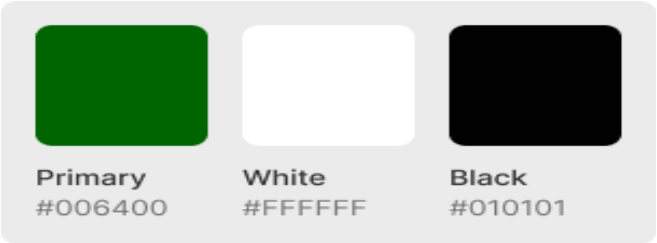


Figure 9. Main Colors



Figure 10. Supporting Colors



Figure 11. Typography



Figure 12. App Logo

After deciding on the colors, fonts, and logo, the next step is to design the high-fidelity screens and prototype (see Figure 13 and Figure 14).

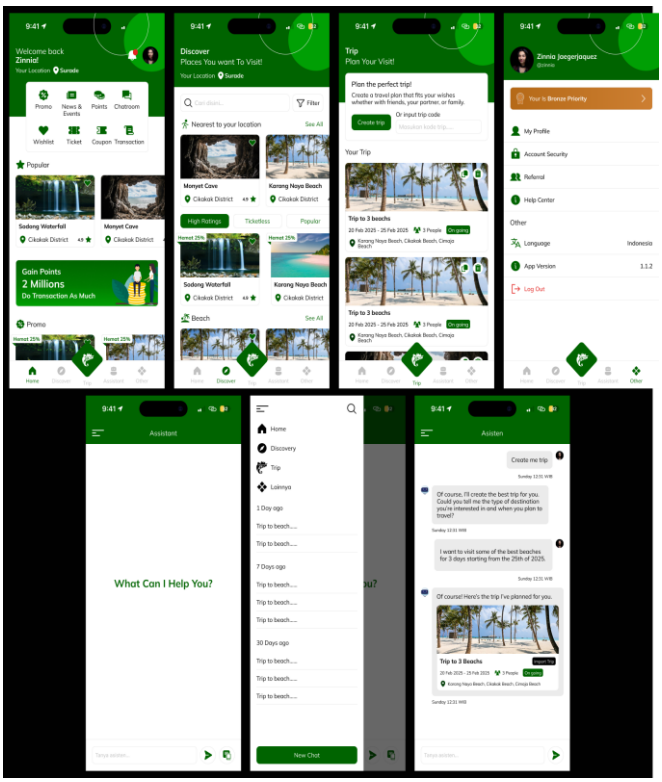


Figure 13. High Fidelity Main Menu Pages

Based on Figure 13, the main menu pages design has been enhanced compared to the earlier wireframe.

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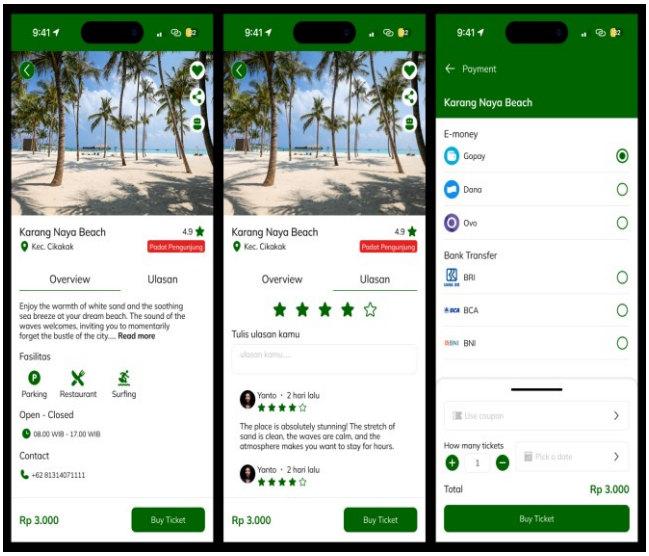


Figure 14. High Fidelity Ticket Purchase Pages

Based on Figure 14, the ticket purchase pages design has been enhanced compared to the earlier wireframe.

5. Mockup

In the mockup stage, the designs created in the previous phases are visually represented on devices such as the iPhone 16 Pro and Android (see Figure 15 and Figure 16).



Figure 15. Mockup Iphone 16 Pro



Figure 16. Mockup Android

D. Evaluation

At this stage, an evaluation of the Explore application design will be conducted using the System Usability Scale (SUS). The test will involve seven individuals who frequently travel or engage in tourism activities. These participants will be given access to interact with the designed prototype. The SUS benchmark scores can be found in Table 6.

Table 6. SUS Benchmark Score [14]

SUS Score	Grade	Adjective Rating
>90.0	A	Best
80.0-89.9	B	Excellent
70.0-79.9	C	Good
60.0-69.9	D	Okay
<60.0	F	Poor

An iteration will be conducted if the score obtained in this study falls below 70 or receives a grade lower than C. The evaluation results for the Explore application can be seen in Table 7. This evaluation was conducted with 15 participants, who were given access to the prototype by the author. The participants were selected due to their familiarity with the UI/UX field and their existing knowledge of the Geopark Ciletuh-Palabuhanratu area.

Table 7. Usability Testing

	Score															AVG
	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	
Q1	4	4	3	3	3	3	4	4	3	3	3	3	3	4	3	3.3
Q2	4	3	3	3	4	3	4	4	3	3	3	3	4	3	3	3.3
Q3	4	3	3	4	4	3	4	4	3	4	3	4	4	3	3	3.5
Q4	4	3	3	3	2	4	3	4	3	3	4	3	2	3	3	3.1
Q5	4	4	2	4	3	4	4	4	2	4	4	4	3	4	2	3.4
Q6	4	3	1	3	4	3	4	4	1	3	3	3	4	3	1	2.9
Q7	4	4	2	4	4	3	4	4	2	4	3	4	4	4	2	3.4
Q8	4	3	3	4	3	4	4	4	3	4	4	4	3	3	3	3.5
Q9	3	4	2	4	3	3	4	3	2	4	3	4	3	4	2	3.2
Q10	3	2	2	2	3	4	3	3	2	2	4	2	3	2	3	2.6
Res	95	82.5	60	85	82.5	85	95	95	60	85	85	85	82.5	82.5	62.5	81.5

Based on the results shown in Table 7, the application achieved a total SUS score of 81.5 out of a maximum of 100. Since the score exceeds 79.9, it falls within Grade B and is categorized as "Excellent" on the Adjective Rating scale.

The discussion of the results highlights that the UI/UX design has been successfully developed by following the User-Centered Design method, which consists of four stages: Context Analysis, Defining Requirements, Design, and Evaluation. In the Evaluation stage, the System Usability Scale was applied to assess usability. The high System Usability Scale score indicates that the design meets user expectations and requirements effectively. the strong usability score can be attributed to several key design features in the application, including an intuitive navigation system, the integration of an AI chatbot assistant, and streamlined ticket purchasing functionality. These features were designed based on user input gathered during the initial stages of the UCD process, ensuring that the design aligns closely with user expectations.

IV. CONCLUSION

This study successfully applied the User-Centered Design (UCD) approach to develop a mobile travel application named Explore, aimed at improving the tourism experience in the Ciletuh-Palabuhanratu Geopark. Through systematic stages context analysis, requirement definition, UI/UX design, and evaluation the application was tailored to user needs, featuring intuitive navigation, comprehensive tourist information, and a helpful AI-based assistant. The integration of features such as itinerary planning, ticket purchasing, reviews, and real-time updates addressed key user concerns identified during the research.

The usability testing using the System Usability Scale resulted in a score of 81.5, which falls under the **"**Excellent**"** category. This indicates that the developed prototype meets user expectations in terms of functionality and ease of use. The findings demonstrate that incorporating user feedback and AI features significantly enhances the usability and relevance of travel applications. Future work may include deploying the application for broader user testing and integrating geolocation-based personalized recommendations to further enrich user experience.

This research is limited to the UI/UX design phase using the User-Centered Design method. It does not extend to the development stage, and the testing is confined to a usability test using the System Usability Scale. It is hoped that future research can continue this work through the development stage and perform additional testing beyond the System Usability Scale method.

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