

## **User-Centered Design Approach in Developing User Interface and User Experience of Sculptify Mobile Application**

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### **ABSTRACT**

In the increasingly digital era, user interface (UI) and user experience (UX) design have become crucial factors in application development. The success of an application is not only determined by its functionality, but also by how well users can interact with the application. User Centered Design (UCD) is an approach that places users as the main focus in every stage of design, from initial research to final evaluation, to ensure that the resulting product truly meets user needs and expectations. This study applies the UCD approach to the UI and UX design of the Sculptify application, which is designed to facilitate the buying and selling of sculptures and other three-dimensional works of art. Given the complexity and uniqueness of art product transactions, effective UI and UX design is very important. This study involves the active participation of potential users through methods such as interviews, surveys, and usability testing to create an intuitive interface and provide a satisfying experience for users. The research stage begins with research to understand user needs and preferences, followed by initial design and a series of tests and iterations based on user feedback. The final evaluation is carried out to measure the extent to which the final design meets user needs and expectations. The results of the UCD implementation are expected to provide valuable insights into the importance of placing users at the center of the design process and how this can improve the quality of interactions and overall user satisfaction.

**Keywords:** User Centered Design; UI UX; Mobile Apps

### **1. INTRODUCTION**

In an increasingly advanced digital era, user interface (UI) design and user experience (UX) have become key elements in application development. The success of an application depends not only on its functionality, but also on how well users can interact with the application. User Centered Design (UCD) is an approach that places the user at the center of attention at every design stage, from initial research to final evaluation, to ensure the resulting product truly meets the user's needs and expectations. Sculptify is an application designed to facilitate the sale and purchase of sculptures and other three-dimensional works of art (Koswara & Alifin, 2024). Given the complexity and uniqueness of art product transactions, effective UI and UX design is very important. Users of this application have diverse backgrounds, from artists, collectors, to ordinary buyers, so the application must be imaginative and easy to use by various types of users (Salah et al., 2024).

The urgency of UI and UX design at Sculptify is not only related to the desire to create an attractive and functional interface, but is also closely related to the efficiency and success of the business processes being carried out. In the complex art transaction ecosystem, where any error or inconvenience in the interface can result in lost business opportunities, effective design is critical. Artists need a platform they can easily use to display their work and manage sales. Collectors want a shopping experience that makes it easy for them to find and purchase quality art, while casual buyers are looking for a simple and fast transaction process. Thus, poor UI and UX design will not only reduce user satisfaction but can also hinder transaction flow and reduce business efficiency.

The User Centered Design (UCD) approach emphasizes user participation at every stage of design, from initial research to final evaluation. The first stage of research is research to understand user needs and preferences (Mizalfi et al., 2022). By engaging users through interviews and surveys, we collect data that is essential to designing an interface that meets their expectations and needs. This data is then analyzed to identify patterns and trends that can provide valuable insights into how users interact with the Sculptify application (Koswara & Alifin, 2024). After the

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initial research stage, the process moves to the initial design stage. At this stage, initial concepts and prototypes of the user interface are developed based on the findings from the research stage. These prototypes are then tested by a group of users to obtain feedback (Sulastri et al., 2023). Usability testing is conducted to identify potential issues and areas for improvement. This process is iterative, where user feedback is used to make improvements and adjustments to the design. The final evaluation is conducted to measure the extent to which the final design meets user needs and expectations (Sutara et al., 2024).

This stage involves more comprehensive testing to ensure that all aspects of the interface have been refined and are ready for widespread use. The results of the UCD implementation are expected to provide valuable insights into the importance of putting users at the center of the design process and how this can improve the quality of interactions and overall user satisfaction (Sudirjo et al., 2024). Through this systematic and user-centered approach, it is hoped that the Sculptify application can provide significant added value to all its users. By ensuring that every element of the interface and user experience is designed with their needs and preferences in mind, Sculptify can become a platform that is not only functional but also enjoyable to use. This approach not only improves the quality of user interactions, but also ensures that the application can meet the needs of a diverse market, from artists to collectors and casual buyers (Rafi et al., 2023).

## 2. LITERATURE REVIEW

### 1. User Persona

A user persona is a fictional representation of a group of end users of a product or service. These personas are built based on relevant data and research to help development teams understand user needs, goals, and behavior. A user persona is a detailed description of a specific type of user who is expected to use a product or service. It includes demographics, background, goals, needs, and behaviors of the user. The main purpose of creating a user persona is to create a better understanding of who the product's users are, so that design and development decisions can be more focused and relevant (Djamaluddin et al., 2022). This concept is important in User-Centered Design (UCD), which places user needs as the main focus in product development. User personas help in aligning teams' understanding of who their users are and what they need. Personas enable teams to design relevant features and make more informed decisions. Persona creation usually starts with qualitative and quantitative research. Commonly used research methods include interviews, surveys, and analysis of existing user data. This research aims to collect information about user demographics, behavior, motivation and goals (Aprillia et al., 2024).

### 2. Context Diagram

Context diagrams are visual tools used to depict the boundaries of a system and its interactions with external entities. This tool is often used in systems analysis and design to provide a macro view of how a system interacts with its surrounding environment. Context diagrams help in understanding the flow of information and key processes involved in the system. A context diagram is a visual representation of a system that shows how it interacts with external entities (Amanda & Putri, 2024). It is an essential part of systems analysis and design, especially in the early stages of system development. Constructing a context diagram usually begins by identifying the external entities that interact with the system. These external entities can be users, other systems, or external hardware (Ramadhani & Limin, 2023). Once the external entity is identified, the next step is to describe the flow of data or information between the system and the entity.

### 3. Wireframe

Wireframing is an important step in the digital product design process which serves to construct the basic framework of a web page or application. A wireframe is a visual representation of a page structure that shows the layout of key elements without regard to the final visual design or content (Hinderks et al., 2022). Wireframes help in planning, communicating, and validating design concepts before entering more detailed development stages. Wireframing is a crucial step in the user interface (UI) and user experience (UX) design process that involves creating the basic framework of an application page or screen. This is an initial visual representation of the page structure and layout that does not involve final design elements such as colors, images, or typography. Wireframes focus on functionality, information hierarchy, and how users will interact with elements on the page. Creating a wireframe usually starts with identifying user needs and goals, as well as key elements that must be present in the page or application (Alao et al., 2022). The main steps in creating a wireframe include: Collecting data about users, business

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goals, and technical requirements. Create initial sketches to explore various page layouts and structures. Use digital tools such as Adobe XD, Sketch, or Balsamiq to create more detailed and interactive wireframes. Involve stakeholders to provide input and iterate based on the feedback received (Wibawani et al., 2023).

Research with the title "Perancangan UI/UX untuk aplikasi bank jago menggunakan metode user centered design" raised by Calvin Ravelino and Yetemia Al Susetyo, exploring the user centered design approach to the Bank Jago application. This research produces a prototype of the Last Wish feature in the Bank Jago application which meets the principles of usability in the context of human-computer interaction. By testing public perceptions of the Bank Jago application prototype, this application can be a solution to help people make plans that anticipate unexpected events in the future that could affect the lives and welfare of their families (Ravelino & Susetyo, 2023). The second research was conducted by Mario Saputra with the title "peran user-centered design terhadap perancangan user experience aplikasi community marketplace". This research shows that user-centered design approaches and usability testing methods have a very important role in the User Experience (UX) design of website prototypes (A'ang et al., 2022). The aim is to make it easier for authors to explore and obtain the information needed by users in managing a marketplace community. From the results of the prototype design, the host dashboard makes it easier for hosts to record participants, manage event activities, and understand the information obtained from the event to completion (Yaputra, 2023).

### 3. METHOD

In designing the User Interface and User Experience, there are four stages that can be implemented, namely:

#### 1. Analysis Stage

The analysis stage aims to collect and understand user needs and preferences for the Sculptify application. User persona can be done at the analysis stage. User persona is based on the data collected and describes the perfect user in this application.

#### 2. Design Stage

The design stage focuses on creating solutions that suit the user needs that have been identified at the analysis stage. The prototyping stage for system developers aims to have an initial understanding and see user responses to the application system that will be built in the next stage. Wireframing and Prototyping can also be interpreted as making initial sketches (wireframes) and interactive prototypes that describe the structure and flow of the application. This prototype is used to get initial feedback from users.

#### 3. Evaluation Stage

The UI/UX wireframe design evaluation stage is carried out in completing the prototype design, which is then evaluated repeatedly to obtain continuous feedback on the wireframe design that has been created. This cycle is carried out periodically and intensively until we get a UI/UX wireframe design that best suits the user. This stage of the evaluation process is in accordance with the UCD approach which is very focused on the end user, with the technique used being to show the design results from the previous process stage in front of the end user. One of the methods used in this evaluation is guerrilla usability testing, which is a fast and simple evaluation method where the prototype is tested with random users in an unstructured environment, such as a cafe or other public place. Users are asked to perform certain tasks with the prototype, while observers note difficulties and feedback provided by the user. This method is effective because it can be done quickly and does not require complicated preparation, allowing the design team to get direct feedback from real users in everyday situations.

#### 4. Implementation Stage

The implementation stage is the final stage where the evaluated and refined design is implemented into a functional application. In the implementation stage, the UI/UX design plan that has been evaluated. The last process in designing the UI/UX design is the implementation process stage in the form of an android application. The implementation process stage is carried out by creating an application design plan using android studio.

By following these stages, this research is expected to produce a Sculptify application that is not only functional, but also provides an optimal and satisfying user experience.

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4. RESULT

1. Analysis Stage

In the analysis phase, preliminary data collection can be conducted through different methods. In this study, the analysis phase involved creating a user persona to identify the most appropriate users for the application being developed.

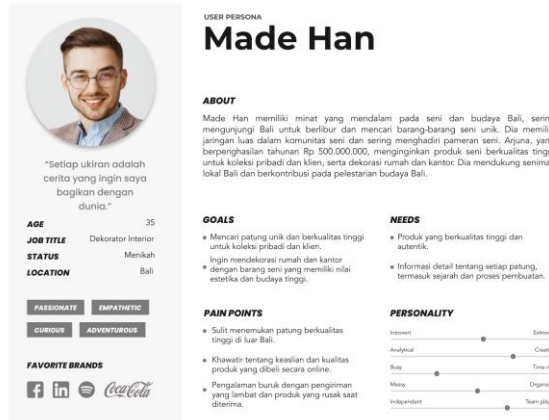


Fig. 1 User Persona

Fig. 1 is a user persona owned by the Sculptify application. Made Han is a fictional user who is appointed as a user persona. Made Han is an interior collector, especially in sculpture art. He lives in Bali and has an interest in Balinese culture and art. Made Han has a desire to get a high-quality sculpture product that still contains a strong culture, so that later the sculptify application can facilitate one of Made Han's goals, which is to find a unique statue with high quality.

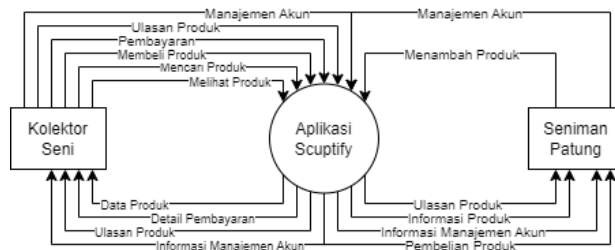


Fig. 2 Context Diagram

Fig. 2 is a context diagram of the sculptify application. This application facilitates 2 roles, namely as an art collector and a sculpture artist, where the art collector has a role as a regular user who can view, search, buy products, make payments, review products and manage accounts. The sculpture artist has a role as a user administrator who can add sculpture products and receive orders from regular users.

2. Design Stage

The design stage can be done by building a design prototype with a wireframe to then proceed to the next stage. In this study, there are several wireframes that are owned to be used as a reference for developing the next application display.

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Fig. 3 Wireframe phase 1

The image is a wireframe display of the sculptify application. The wireframe page is a wireframe page for the home menu and product detail page. The Home menu displays initial information related to the products in the sculptify application. The menu detail page contains detailed product information up to the price and the button used to order the product.

### 3. Evaluation Stage

After carrying out the process of collecting information through creating a user persona, then proceed with building a wireframe as the foundation for the application display, then continue with carrying out the evaluation stage. This evaluation stage is needed to ensure the appearance of the application is acceptable and easy for potential users to use later. In this research, the evaluation stage was carried out using a User Centered Design approach. UCD focuses on the end user or end users.

Guerrilla usability testing was conducted to assess the UI/UX prototype design of the Sculptify application. This test engaged random users in diverse, informal settings such as sculpture shops, parks, and other public areas. Before starting the evaluation, users were briefed on the application design and system process flow. They were then asked to observe and evaluate the system flow of the application prototype while observers documented any challenges encountered and feedback given by the users.

The test results obtained were that it was necessary to update several displays to make it easier and attract attention, so that they were in accordance with the artistic theme being carried. Some users suggest using a contrasting background because the target users are relatively mature, so it will make it easier for users to receive information from this application.

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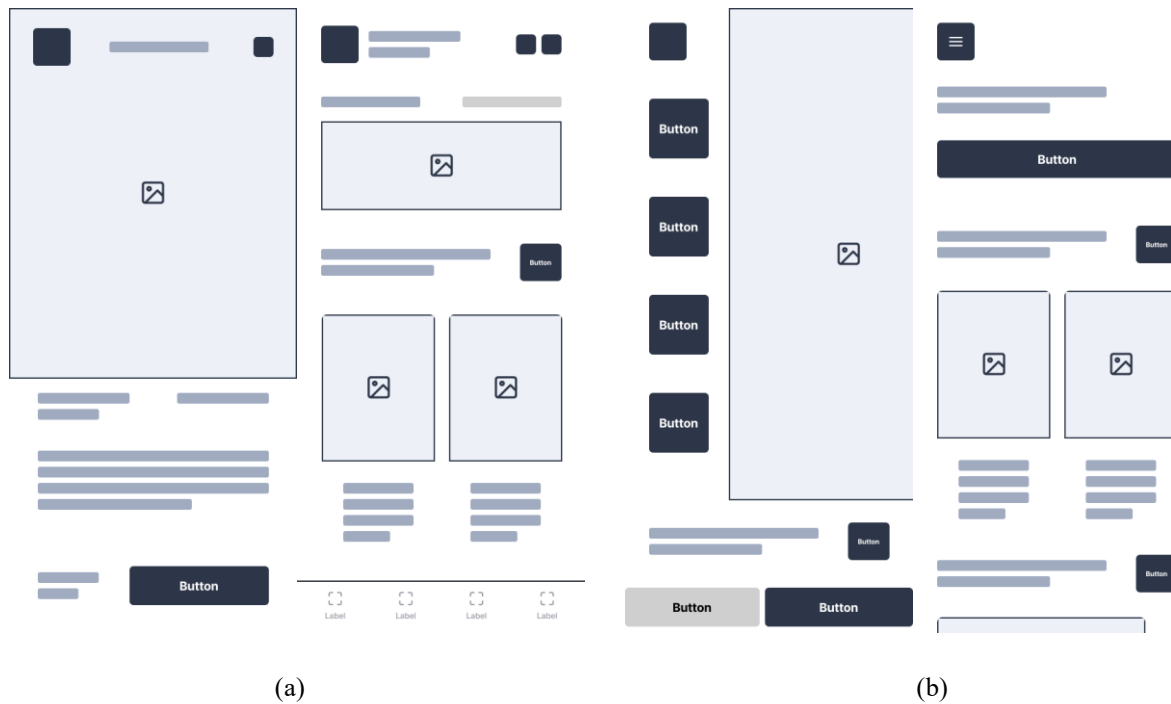


Fig. 4 Improved wireframe appearance

The tests revealed several areas for improvement in the wireframe design, which were identified through interviews with potential application users. The findings indicated that certain elements needed to be replaced and made more dynamic, incorporating specific characteristics tailored to the needs of the application users.

#### 4. Implementation Stage

The final stage is the implementation stage. All the information needed to build a good application display has been fulfilled. In this research, the application display was built using Android Studio based on the user interface that was developed from the Figma application

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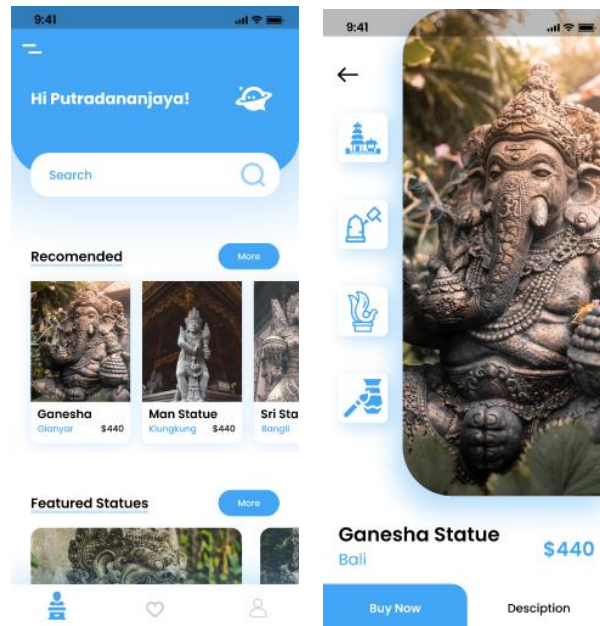


Fig. 5 User Interface

This is a home menu page and product details that have been built based on references from the wireframing stage. The home page contains the user name, search feature, product recommendation feature and featured products. The menu detail page will be accessible when the product is selected on the home page. The detail page contains 1 image of the selected product along with 4 advantages of that product. The bottom of the detail page contains the product name, product location, product price, product description and button to continue purchasing the product.

## 5. DISCUSSION

The findings from this study underscore the critical role of the User-Centered Design (UCD) approach in developing effective and satisfying UI and UX for the Sculptify mobile application. By actively involving potential users throughout the design process, the study was able to gather comprehensive insights into user needs, preferences, and behaviors, which informed the creation of a highly intuitive and user-friendly interface. The initial stage of research highlighted the diverse needs and expectations of different user personas, including artists, collectors, and casual buyers. Interviews and surveys revealed that artists prioritize showcasing their work effectively and efficiently, while collectors and buyers focus on the ease of navigating the platform and discovering new pieces. This segmentation was crucial in tailoring the UI and UX to cater to these varied requirements. The use of wireframing in the early design stages proved instrumental in mapping out a clear and logical structure for the application. This method facilitated the visualization of user journeys and interactions, allowing the design team to identify potential issues and areas for improvement early on. The usability testing phase provided critical data on how users interacted with the application.

## 6. CONCLUSION

In an increasingly advanced digital era, designing the user interface (UI) and user experience (UX) has become an important element in the success of an application. The User Centered Design (UCD) approach which places the user as the main focus in every design stage has been proven to be able to produce products that are not only functional but also satisfying and enjoyable for the user. Sculptify application, which is designed to facilitate the sale and purchase of sculptures and other three-dimensional works of art, requires special attention to UI and UX aspects. By identifying different user personas, such as artists, collectors, and casual buyers, development teams can better understand different user needs, goals, and behaviors. The use of wireframing in the early stages of design helps create a bright page structure and easy navigation, thereby increasing efficiency and collaboration time and saving time and money in the development process. Through a systematic and user-centered approach, it is hoped that the Sculptify application

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can provide significant added value for all its users. By ensuring every interface element and user interaction is carefully designed, Sculptify can become a platform that not only meets diverse market needs but also improves the quality of interactions and user satisfaction. This approach shows that putting users at the center of the design process is key to creating successful and sustainable applications. The contribution of this research includes the development of a UCD-based design framework applied to the Sculptify application, which can be used as a reference for other application developers who want to optimize their UI and UX. In addition, this research also highlights the importance of a deep understanding of user personality in designing effective and satisfying digital products. For future research, it is recommended that further studies explore the application of emerging technologies such as artificial intelligence (AI) and machine learning (ML) in the personalization of user experience. Research could also focus on developing new tools and methods for real-time UX evaluation, as well as examining the impact of inclusive design on the experience of users with various special needs.

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