User Interface Design of Banyumas Wayang Museum Introduction Using Design Thinking

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Abstract

This research was carried out because of the importance of introducing the Banyumas Wayang Museum to add insight and introduce the existence of the museum, considering that there are still many who do not know about it. This application is expected to be an effective medium for education and preservation of local culture. To solve this problem, the research involves potential users of the application and the creation of interface design is carried out based on five stages of Design Thinking, namely Empathy, Define, Ideate, Prototype, and Testing. The result of this research is the design of the User Interface of the Banyumas Wayang Museum introduction application made using the Figma application. The trial stage was carried out to test the feasibility of the design that had been made using the System Usability Scale method and obtained a score of 77.75 with a grade of B, which means that this design was successfully made and can be continued to the application system development stage. This score shows that this design has met the standards of comfort and ease of use for potential users. This research is expected to make a real contribution to efforts to preserve local culture and promote the Banyumas Wayang Museum more widely, for the results obtained conclude that this research is completed and the design can be deployed into a system.

Keywords: Wayang Museum; Figma; Design Thinking; User Interface; System Usability Scale

1 Introduction

There are many museums in Indonesia but their existence is unknown, one of the factors causing this is the lack of dissemination of information related to the existence of the museum (Nabawi et al., 2024). There are so many methods that can be used to convey information, one of which is utilizing technology. All Indonesian people are the majority of internet users as a source of learning. In addition to the internet, information can also be obtained by visiting tourist attractions such as zoos or museums. A museum is a place where information, collections of objects, and events from the past can be seen and studied.

Currently, the promotion and engagement strategies of museums primarily rely on physical visits and traditional media outlets. This approach often fails to reach a wider audience, particularly in an era where digital presence is pivotal. Museums play an essential role in safeguarding cultural heritage and imparting historical knowledge to the public (Prasetiyo et al., 2023). Despite their importance, many museums, especially those located in less urbanized areas, struggle with low visitor numbers and limited public awareness of their offerings.

One significant issue with the current system is its inadequate promotional reach and the consequent lack of public interest. The Sendang Mas Wayang Museum in Banyumas, Central Java, for instance, faces challenges in attracting visitors despite its rich collection of wayang puppets and traditional performance artifacts (Mailangkay & Sinaga, n.d.). Traditional marketing efforts have not effectively raised awareness or interest, particularly among younger, digitally-savvy audiences, indicating a clear need for more innovative and accessible promotional methods.

To address these challenges, this research proposes developing a mobile application designed to promote the Sendang Mas Wayang Museum through a user-centered design approach known as Design Thinking. This method involves five stages: Empathy, Define, Ideate, Prototype, and Testing, ensuring the design process is grounded in user needs and preferences (Fauzi Ridwan & Sumaryana, 2023). The proposed application will feature interactive elements, educational content, and virtual tours to enhance the museum's accessibility and appeal. The implementation plan includes several key steps. Initially, comprehensive user research will be conducted to gather insights into user needs and preferences. Following this, the design phase will create detailed wireframes and prototypes using design tools like Figma.

These prototypes will undergo rigorous testing with potential users to refine the design based on feedback. Finally, the fully developed application will be launched, with ongoing evaluation and updates to ensure it remains user-friendly and effective This research aims to significantly contribute to cultural preservation efforts and increase public engagement with the Sendang Mas Wayang Museum. In this study, an application design will be made using design thinking. Several similar previous studies were used as literature review material.

The first research was conducted by Nugroho et al., aiming to design a User Interface (UI) prototype for a waste recycling application. The goal is to increase public awareness about the importance of recycling and to expand access to more efficient recycling services. By creating an intuitive and user-friendly interface, the application seeks to simplify the recycling process and encourage broader participation. This study provides valuable input for stakeholders, including local governments and environmental organizations, to promote sustainable practices and improve waste management systems (Nugroho, 2024).

The second research was conducted by Kurniawan et al. to create interactive and entertaining learning media that follows technological advances. In this study, a game ui/ux was made that will be used by students in Lampung. The content of this game introduces learning the Lampung script, students can learn the Lampung script in a relaxed and fun way. This game can also help develop students' skills, such as recognizing the Lampung script, its letters, and how to write it (Yanutiar & Prabowo, 2024).

The third research conducted by Dika et al. aims to apply the Design Thinking method to the Android-based Digital Checksheet application. The results of this study show that the use of the Design Thinking method in making UI/UX design for the Digital Checksheet application is successfully implemented and in accordance with theories related to Design Thinking (Sugiharti & Mujiastuti, 2023).

The fourth research was conducted by Agus et al., who focused on designing a UI/UX prototype for the My CIC application. The authors proposed a solution to create a user interface (UI) that enhances the user experience (UX) by providing a streamlined and intuitive design. This design process utilized Figma software, which is well-regarded for its powerful prototyping and design capabilities. The My CIC application, as envisioned by Agus et al., includes features that provide users with easy access to academic information and financial transactions. This approach not only aims to improve the usability and functionality of the application but also seeks to ensure that users can navigate the app seamlessly and efficiently. By incorporating user feedback and iterative design practices, the researchers were able to develop a prototype that effectively addresses user needs and preferences. This study highlights the importance of using advanced design tools like Figma to create applications that are both aesthetically pleasing and highly functional (Kresna A & Yuliana, 2022).

The fifth research was carried out by Samuel et al. to create an application UI to assist the Ndalem Gondosuli Museum in creating uniqueness in marketing their products by utilizing Augmented Reality technology, accompanied by the principles of user interface design (UI) (Hawari et al., 2021).

Therefore, this research will produce a UI design that is specifically tailored to the needs of users. The design process will involve analyzing user needs, prototyping, and design iterations to ensure that the resulting UI is intuitive, easy to use, and meets user expectations. After the UI design is completed, the researcher will conduct a thorough test of the application. This test covers aspects of functionality, usability, and feasibility of implementation to ensure that the designed UI can be implemented properly on android-based systems.

This research is different because it will specifically discuss the creation of a user interface (UI) for a puppet museum designed for the android platform. Thus, the results of this research are expected to make a real contribution to improving the user experience in wayang museums through user-friendly, effective, and efficient android applications.

2　Method

For this research, it will be carried out using the design thinking method in figure 1 is the flow of research.
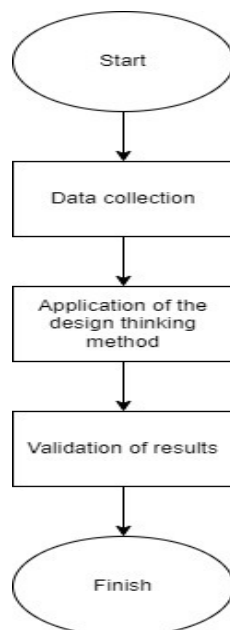
Figure 1. Research Flow

2.1　Data Collection

Data collection is a process or step in research that involves collecting relevant information or facts to be used in analysis and drawing conclusions Muttaqin et al., 2022). Data collection methods can include various techniques, such as interviews, observations, filling out questionnaires, documentation studies, experiments, and so on. The purpose of data collection is to obtain the information needed to answer research questions or achieve predetermined research objectives.

2.2　Application of Design Thinking method

Design thinking is an approach used to tackle complex problems and develop innovative solutions by focusing on the end user Wahyudi et al., 2023). This method encourages creative and collaborative

thinking with the goal of deeply understanding user needs, finding effective solutions, and testing those solutions iteratively. In figure 2 is the stage of design thinking.
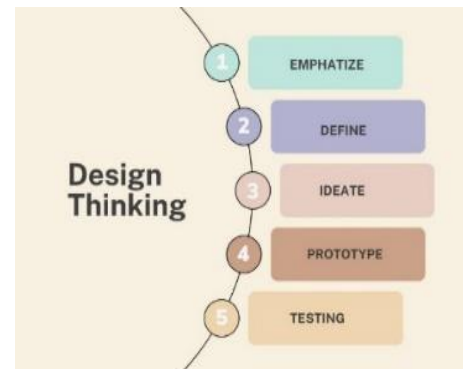
Figure 2. Stages Design Thinking

2.2.1　Emphatize

The first step is to deeply understand the user's experience, needs, and motivations. This involves making first-hand observations of how users interact with a product or service, conducting interviews to gain in-depth insights into their perspectives, as well as gathering relevant information from various sources (Firdonsyah et al., 2023).

The goal is to develop empathy for users, so that we can truly understand what they feel, what they need, and what drives them in the context of using the product or service (Teknika et al., 2020). In this stage, the researcher conducted a direct observation process at the puppet museum in Banyumas, then conducted interviews with museum keepers

2.2.2　Define

This stage aims to formulate the problem to be solved in a specific and focused way. In this process, we identify and articulate the most important user needs, as well as the key obstacles and challenges they face (Satria et al., 2023). Proper problem definition is essential because it will be the basis for all subsequent stages of design.

We collect and analyze the data that has been obtained from the empathy stage to find common patterns and themes that indicate the core problems that need to be solved (Humanism et al., 2021). It involves sifting through the information to determine the most critical and relevant aspects that affect the user experience.

2.2.3 Ideate

This ideation process is creative and inclusive, where each team member is encouraged to contribute to generating diverse ideas (Lim et al., 2021). Ideation begins with a brainstorming session that allows all team members to think freely without restrictions or criticism. This approach aims to bring up unique and innovative ideas that may not have come up in a more controlled environment. All ideas, even those that seem unconventional or impractical, are considered valuable because they can spark further thinking and inspiration for other ideas.

2.2.4 Prototyping

Prototyping is the process of creating an initial version or model of a product or system that is used to test and evaluate concepts, designs, functions, and usability before full development (Rachman et al., 2023). Prototyping allows designers and developers to explore ideas, identify problems, and receive feedback from users quickly and efficiently. This is an important step in the iterative design process that helps ensure that the final product will meet the user's needs and function as expected (Tasril et al., 2023).

In this study, the application used in design or prototype is figma. Figma is a cloud-based design application used to create and collaborate on user interface (UI) and user experience (UX) design. Figma allows designers to easily create wireframes, prototypes, and graphic designs, as well as enable real-time collaboration with teams or clients.

2.2.5 Testing

The prototype is tested to users to get immediate feedback. The goal of a trial is to test the effectiveness of the solution, understand user reactions, and evaluate the feasibility of the solution. Later testing is carried out as evaluation material to test the feasibility or not of a design. Testing stages using the System Usability Scale (SUS) method (Darmawan et al., 2021).

System Usability Scale (SUS) is a tool used to evaluate the usability of a system or product. SUS consists of 10 statements rated by users on a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree."

This statement covers various aspects of the user experience, such as ease of use, complexity, and user confidence when using the system (Nur Siam & Fauzi, 2023). Results from SUS provide an overall score indicating the usability of the system, which can be used to identify areas that require improvement and compare usability between different systems (Hamdanuddinsyah et al., 2023). SUS is a fast, simple, and widely applicable method in a variety of product research and development contexts.

3 Result and Dicussion

3.1 Emphatize

In the emphatize stage, the researcher obtained the results from direct observation to the puppet museum in Banyumas and conducted interviews with the guards of this museum. The result is that there are still many who do not know the existence of this puppet museum, then this puppet museum can function as a place for learning but this is contrary to the existing situation. This museum seems to be limited to a museum where there is nothing in it. So a technology is needed to introduce the museum and in the technology provides an overview of what is in the museum. Therefore, this research is very necessary to be carried out.

3.2 Define

After the researcher conducted observations and direct interviews, it continued to enter the second stage, namely Define. At this define stage, the process of identifying problems is carried out by making problem points and how-might-we

How-might-we is one of the methods used by researchers to turn problems into questions, thereby encouraging the creation of innovative ideas or solutions to overcome the challenges faced. So that the solutions provided will be in accordance with the existing problems. For more details, Figure 3 shows the problem points that have been obtained, while Figure 4 is the result of how-might-we.
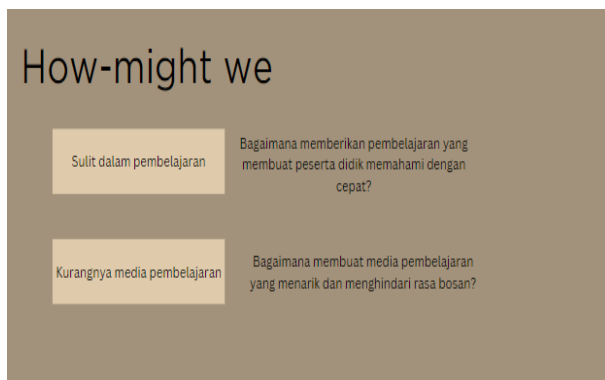
Figure 3. Pain Points

Figure 4. How-might we

In figure 3, there are pain points that show various problems that have been identified and detailed. These pain points include aspects that are obstacles for users in undergoing certain processes, be it in the use of technology, interaction with services, or daily experiences. The narrowing down of these issues is done to focus attention on the most significant and urgent issues to be resolved. By analyzing pain points, researchers can understand the needs and expectations of users in a deeper way, which is the basis for designing more effective and targeted solutions.

Furthermore, in Figure 4, the "how-might we" method is shown which is useful for grouping the problems that have been identified and turning them into questions that guide the search for solutions. This approach helps research teams and designers to think creatively and structured in finding answers to the challenges they face. By formulating the problem in the form of a "how-might we" question, the team can explore various possible solutions and consider various perspectives, so as to develop innovative ideas that fit the user's needs.

The use of the "how-might we" method also allows for more effective collaboration among team members, as everyone can contribute with their ideas based on a common understanding of the problem at hand. The questions posed through this method aim to open up discussion and encourage the exploration of solutions that are not limited to conventional approaches. Thus, this method not only helps in identifying problems more clearly, but also in designing more creative and innovative solutions to improve the user experience.

3.3 Ideate

The third step is ideate which obtains the result of the solution to the problem that has been described in how-might-we. The results of the ideate can be in figure 5.

Figure 5. Solution Idea

3.4 Prototype

In this study, at the prototype stage, the researcher obtained the results of the application flow, wireframe, and application mockup to be made.

3.4.1 User Flow

User Flow is a diagram or map that illustrates the steps taken by users to achieve a specific goal when interacting with an application or website. In this study, the user flow describes the flow of the application program to be created, starting from splashcreen to dashboard. For more details, the researcher describes the user flow of the application, which can be seen in figure 6.
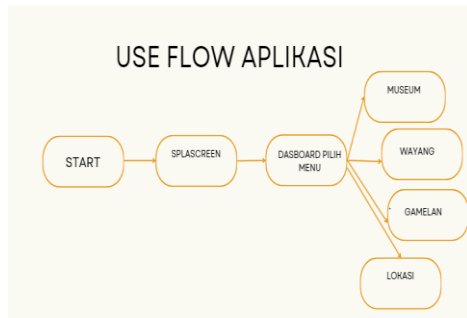
Figure 6. User Flow Application

In figure 6 of this study, the application flow is meticulously outlined, beginning with the splash screen page that serves as the initial interface upon launching the application. This screen typically showcases the application's logo and introductory visuals, setting the stage for user engagement. Following the splash screen, users are directed to the dashboard select menu, which acts as the central navigation hub within the application. This dashboard prominently features four key functionalities designed to cater to user needs seamlessly. Firstly, the "Recycling Information" feature provides comprehensive details on recycling practices, including types of recyclable materials and best practices. It aims to enhance user awareness and understanding of sustainable waste management.

Secondly, the "Collection Schedules" section offers users access to precise schedules for waste collection in their locality. This functionality ensures users are well-informed about upcoming collection dates, enabling them to plan their recycling activities effectively. Thirdly, the "Recycling Locations" feature facilitates easy identification of nearby recycling centers and drop-off points through an interactive map and detailed listings. Users can locate the most convenient sites for disposing of recyclables, complete with operational hours and contact details.

Lastly, the "User Feedback and Support" component enables users to provide feedback on the application's usability and report any issues encountered. It also includes resources such as FAQs and contact information for user support, ensuring a responsive and user-centric experience. This application flow not only streamlines user interaction but also enhances accessibility to recycling information and services, thereby promoting sustainable practices effectively.

3.4.2 Wireframe

The next step is to make a Wire Frame. The wireframe in this study can be seen in figure 7.

Figure 7. Wireframe Application

A Wireframe is a basic sketch or diagram of an application page or screen that shows the layout and structure of key elements, without any visual details such as colors, images, or typography. Wireframes are used in the early stages of design to focus on functionality, information hierarchy, and user experience without being distracted by aesthetic elements.

3.4.3 Mock Up

Furthermore, after completing the creation of the user flow of the application, the final step in the process of creating a user interface is that the researcher makes a Mock Up. A mock up is a visual representation of a product design, such as an app or website, that displays the layout, UI (user interface) elements, and basic interactions. Mock ups are used to illustrate how the final product will look and function, without the need to implement the functionality fully. In Figure 8 is an application mock-up of the introduction of the Banyumas Wayang Museum.

Figure 8. Mock Up Application

3.5 Testing

The testing step is the final stage in this study, testing is used as evaluation material related to designs that have been made before. The questionnaire in this study was filled out by ten respondents because this study was only making designs so that the questionnaire was enough to be distributed by ten people. This has been regulated in the System Usability Scale method, then table 1 is the pure result of the questionnaire score that has been collected then in table 2 is the questionnaire score that has been calculated using the SUS method.

Table 1. Initial Score of Questionnaire

Responden	Question SUS									
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
RSP 1	5	4	5	4	3	2	3	4	5	4
RSP 2	4	3	4	5	3	4	4	4	3	5
RSP 3	3	4	5	4	4	5	3	5	3	4
RSP 4	4	3	5	4	3	3	4	5	4	3
RSP 5	5	3	5	4	3	2	3	4	5	4
RSP 6	4	3	5	3	4	5	4	3	3	5
RSP 7	4	5	3	4	4	4	4	3	3	3
RSP 8	4	4	4	3	3	5	4	3	5	4
RSP 9	3	5	3	4	5	4	5	3	4	5
RSP 10	4	3	3	4	4	3	4	5	4	4

Table 2. Questionnaire Count Results

Responden	Question SUS										Number Scores	Results
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
RSP 1	4	3	4	3	4	4	4	3	4	3	36	90
RSP 2	3	4	3	4	4	3	3	3	4	4	35	87,5
RSP 3	3	3	4	3	3	4	3	4	3	3	33	82,5
RSP 4	3	2	4	3	2	2	3	4	3	2	28	70
RSP 5	4	2	4	3	2	1	2	3	4	3	28	70
RSP 6	3	2	4	2	3	4	3	2	2	4	29	72,5
RSP 7	3	4	4	3	3	3	3	4	4	3	34	85
RSP 8	3	3	3	2	2	4	3	2	4	3	29	72,5
RSP 9	2	4	2	3	4	3	4	2	3	4	31	77,5
RSP 10	3	2	2	3	3	2	3	4	3	3	28	70
System Usability Scale Score Results												77,75
Grade												B

It can be seen in table 1 is the initial score of the respondents that have been collected. This study only used 10 respondents because it was still in the stage of making a user interface design. After the
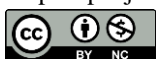
design is successfully made, the design in the test can be seen in table 2, which is the final result of the test. The design obtained a System Usability Scale value of 77.75, therefore obtained a grade of B. So it can be concluded that the design that has been made in this study is successful and can be applied to a mobile-based application.

4 Conclusion

After completing each stage in design thinking, a prototype of the Banyumas Puppet Museum Introduction application design was successfully produced. Design thinking methods used in the design and analysis of user interfaces and user experience are able to understand user needs and solve existing problems. The prototype design of the Banyumas Wayang Museum application is produced according to user needs, with the application of design thinking methods starting from the empathize, define, ideate, prototype, and testing stages. The test was conducted using a questionnaire based on the author's experience regarding the problem of using the Banyumas Wayang Museum Introduction application, and tested on respondents with a system usability scale (SUS). The results are quite satisfactory, namely obtaining a score of 77.75 and obtaining grade B, so it can be concluded that this research is successful and can be developed into an application. Furthermore, this research has a positive contribution to education today, by providing examples of practical application of design thinking theory in application development. It can be a reference for students and researchers in the fields of information technology, information engineering, and product design, as well as enrich learning materials on user-centered product development methods.

5 Future Work

This research has successfully designed a user interface (UI) for an Android-based puppet museum application that is tailored to user needs and has been tested for feasibility. However, there are several things that can be developed again, such as the development of additional interactive features such as augmented reality (AR) and virtual reality (VR) can provide a more immersive and enjoyable experience for users, for example by displaying puppets in 3D form or providing virtual museum tours. Second, improving user experience (UX)

through further research involving broader user surveys and more detailed usability testing sessions can help improve the UI and UX elements of the application. Third, integration with Internet of Things (IoT) technology can create a more interactive and connected museum experience, such as using sensors and beacons to provide contextual information to users based on their location within the museum.

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