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Learning Application UI/UX Design Based on the Introduction of Indonesian Cultural Variety

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Abstract

The problem of lack of understanding and appreciation for Indonesia's cultural diversity among children is increasingly emerging. This is due to the lack of effective and fun learning media, as well as the dominance of games that only contain entertainment without educational value. This research aims to develop a learning application that is specifically designed to introduce various Indonesia cultures to children. The method used to solve this problem is Design Thinking, which includes five stages: empathy, definition, ideation, prototyping, and testing. Through this stage, the design of the user interface (UI) and user experience (UX) that suits the needs of the user has been successfully created, with interesting and informative content regarding Indonesia's cultural diversity. The results of the application of this method were evaluated using the System Usability Scale (SUS), which tested the feasibility and effectiveness of the design. The app gets an average SUS score of 81, which indicates the B/Excellent category. Thus, this study successfully solved the problems identified and the methods used were successful so that it can be concluded that providing appropriate and interesting educational tools can increase cultural awareness among children.

Keywords: User Interface; Design Thinking; System Usability Scale; Indonesian Culture; Learning

1 Introduction

Education is the main foundation in shaping the understanding and appreciation of the cultural heritage of a nation. In Indonesia, a country rich in cultural diversity, education about cultural diversity is very important to strengthen national identity and maintain existing cultural diversity. However, often the conventional approach to delivering cultural material is less attractive to younger generations who are more accustomed to modern technology (Fajar, 2023).

In today's digital age, games have become one of the most popular mediums among children and teenagers. Media can be thought of as a tool used to convey messages from one party to another. As part of communication, the media helps convey messages from teachers or facilitators to students, bringing learning materials in accordance with the established curriculum (Fikri et al., 2022). Media can be grouped based on technological developments into two broad categories, traditional media and cutting-edge technological media. An example of a cutting-edge technological medium is computer games or what is known as Educational Games. Thus, it can be concluded that the media acts as an intermediary in the learning process, helps in delivering learning material, and attracts students to learn.

As technology evolves, people are more interested in interactive and fun gaming experiences. Therefore, the emergence of game-based learning approaches has become a trend that attracts the interest of many educators and curriculum developers (Purbaya et al., 2023). This approach combines elements of play with learning to create an engaging and effective learning experience. The development of learning games about the variety of Indonesian culture has become very relevant. By utilizing the potential of games in attracting and maintaining user attention, we can create a more fun and effective learning experience

in introducing and understanding the richness of Indonesian culture (Aprikasari et al., 2024).

Indonesia, as the largest archipelagic country in the world, is rich in diversity of tribes, languages, beliefs, and cultures (Dzaky et al., 2021). The Ministry of Education and Culture recorded more than 67,273 cultural heritages in Indonesia, including 11,627 immovable cultural heritages, 53,538 movable objects, and 2,108 intangible cultural heritages. Each region has a distinctive culture that reflects its identity, many of which are even recognized by UNESCO (Purbasari, 2023).

In carrying out cultural preservation efforts, there are challenges that arise due to the influence of foreign cultures, one of which is the impact of rapid technological advances. The development of technology affects people's mindset, especially with the rise of various types of games (Willyan et al., 2021). Although games are still considered as mere entertainment, the basic characteristics of challenging and fun games can cause dependence, especially if the game is not educational. Today, many games are available only for entertainment and are potentially addictive. Examples are games such as mobile legends, free fiyers and so on, which have a variety of genres including those that contain elements of violence. The genre of violence in games is not recommended because it can encourage negative behavior, as evidenced by an increase in aggression in children who play violent games for a certain period of time, while children who play non-violent games do not show a significant increase in aggression (Setiawan et al., 2022).

In addition to having a negative impact on the younger generation, games also have many positive impacts (Mazaya, 2023). One of them is as a learning tool. In addition to utilizing technological advances, playing online games utilizes elements that appeal to the younger generation. Educational online games are expected to help in introducing culture and become a learning medium that provides insight to children (Anggara et al., 2022).

Efforts to preserve regional culture through educational games as a learning medium are alternatives that are expected to be effective to be applied. Technology combined with learning can increase learning motivation and involve players, so that the learning process becomes more enjoyable. In addition, playing games is a familiar activity for most of the younger generation. In fact, the survey results show that 91% of children aged 2-17 years often play games and computers because it is one of their hobbies (Ningrum et al., 2022).

The use of educational games as a learning tool to introduce regional culture is considered appropriate because it can use technology that continues to develop (Ramadhan et al., 2022). However, the success of this learning game implementation depends heavily on good user interface (UI/UX) design. Proper UI/UX design will ensure that users can easily interact with the game, understand the concepts conveyed, and feel engaged in the learning experience (Fitriaruli & Suyatno, 2024). Therefore, this study aims to develop an optimal UI/UX design for learning games about Indonesian cultural diversity.

There are several studies that are used as literature review material in this study. The first study was conducted by research English subjects to children through educational games, focusing on writing skills. In the development of this game, the GDLC (Game Development Life Cycle) method is used. After the game was created, it was tested on elementary school children in grades 4 and 6, which showed an increase in positive results. The majority of children feel that the game helps them in learning English (Yonata et al., 2022).

The second study was conducted by Focus on User Interface (UI) in game development. Using the method "Design Thinking" was used in this study. The sample consisted of children learning Arabic. The results of the System Usability Scale calculation show good UI design quality. Thus, UI design has successfully followed the Design Thinking method, resulting in attractive and easy-to-use games (Nillahi et al., 2023).

The third study was conducted by aims to revive the diversity of Indonesian spice culture, especially for generation Z who have difficulty recognizing spices. Through the Design Thinking approach, data collection is carried out through various methods such as questionnaires, interviews, observations, and literature reviews. The result is an interesting and informative mobile application prototype design, as a medium to introduce Indonesian spices and biodiversity to the younger generation. Hopefully, this application will not only be a solution in cooking, but also a

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method of education for other fields (Surya et al., 2023).

This research is different from previous research, in previous studies discussing the creation of game base learning for general subjects such as English, mathematics and others, none of them discussed culture. While the research this time made a user interface design about indigenous cultures in Indonesia.

This research will make a UI/UX design that will be implemented into an Android-based game that aims as a game and learning tool to introduce Indonesian Cultural Heritage to children aged 6-12 years. It is hoped that this educational game design can be used in the learning process to get to know the culture of the region to children so that they can better understand and preserve the existing culture. Thus, later this game can be an effective tool in increasing understanding and appreciation of Indonesian cultural diversity among the younger generation.

2 Methodology

In this research, the method to be used is Design Thinking. Figure 1 shows the research flow with the design thinking method.

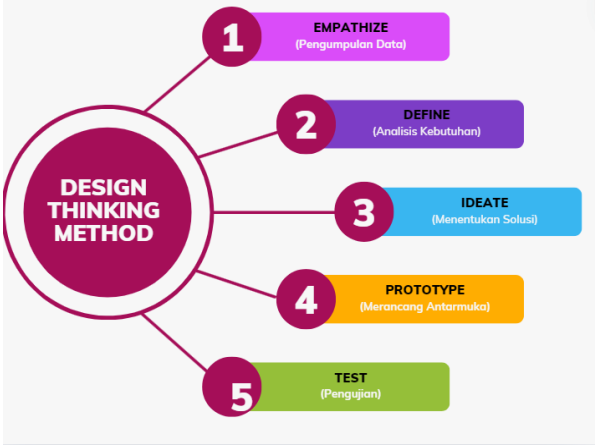

Figure 1. Alur metode design thinking

The Design Thinking method is a comprehensive approach to complex problems with a focus on a deep understanding of the end user. It is called "Design Thinking" because this process adapts the designer's way of thinking in solving problems, which includes empathy for users, problem identification, idea creation, prototype development, and solution testing. This method is not only limited to physical product design, but can also be applied in a variety of contexts, including service development, user experience, and business strategy. Furthermore, this method has five stages such as Empathize, Define, Ideate, Prototype and Test (Teknika et al., 2021).

2.1 Empathize

This stage involves gathering information and a deep understanding of the user, including their needs, desires, and challenges. This is done through direct observation, interviews, and direct interaction with users. Direct observation allows us to see how users interact with the product in their natural environment and identify the challenges they encounter. Interviews with users help gather insights into their experiences, motivations, and problems they face. Additionally, surveys and questionnaires are used to collect quantitative data from a larger audience. By combining all these methods, we can develop solutions that truly meet the needs of users and improve their experience.

2.2 Define

At this stage, researchers look for deeper information to identify the actual problem that needs to be solved. Analyze the data that has been collected from observations, interviews, surveys, and other interactions to find key patterns and themes. Through this process, researchers try to uncover the root cause of the problems faced by users by asking "why" questions repeatedly until they reach a deep understanding.

After that, the researcher formulates a specific, clear, and focused problem statement based on a deep understanding of the user and their context. This issue statement determines who the user is, what their needs are.

2.3 Ideate

Ideate is the phase where ideas are developed through the process of brainstorming. Brainstorming involves an infinite group of people coming up with an infinite variety of ideas to find creative solutions to specific problems (Juliansyah et al., 2020). At this stage, designers will generate many ideas by creating wireframes containing images, components, and elements in the application in an effort to find solutions to existing problems. At this stage, designers are encouraged

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to be creative by formulating diverse ideas after doing the empathy stage.

2.4 Prototype

Prototype, or commonly called a prototype or archetype, is the initial or standard size of a model. A prototype is an initial version of a product that is not final, used to build a picture of the desired final product. Prototypes should be formed first before the development or creation of the final design that will be used by users (Pratiwi et al., 2022). The principle of "fail quickly" is very important in this process to identify failures as quickly as possible and determine the next steps without waiting long. In making prototypes, tools are used Figma.com.

Figma is a very popular web-based design tool for designing User Interfaces (UI) and User Experience (UX) (Steven et al., 2022.). This tool allows designers to collaborate in real-time, making the design process easier with features that support prototyping, design designing, and design testing with users. Figma allows multiple users to work on the same project simultaneously, much like Google Docs, which makes it easy for design teams to collaborate without having to send files back and forth (Bryant et al., 2024).

Designers can create interactive prototypes to test and present how an app or website will function before entering the development stage. In addition, Figma uses vector graphics that allow designs to scale without losing quality, essential for creating responsive designs. Other users can also comment directly on the design, facilitating quick and efficient feedback (Ngurah et al., 2020). Figma can be integrated with a variety of other tools such as Slack, Zeplin, and Trello, which helps connect design workflows with broader team workflows. Available in both web-based and desktop versions, Figma gives users the flexibility to work from multiple platforms seamlessly. With these features, Figma has become one of the key tools for UI/UX designers around the world, simplifying the design process from the initial stages to completion and implementation.

2.5 Test

Testing is a process carried out to evaluate the performance, reliability, and quality of a system or product. In the context of software development, testing is very important to ensure that the application or systembuilt functions as desired and meets the needs of users (Novianto & Rani, 2022).

Later in the study, prototypes are tested by users to get valuable feedback. This process helps the team understand how users react to proposed solutions and identify areas that require further improvement or iteration. In this study, the test method to be used is the SUS method. SUS (System Usability Scale) is a standard tool used to measure user perception of the usability of a system or product. This tool was designed in 1986 by John Brooke and has become one of the most commonly used methods in the field of user experience (UX) and user interface design (UI) (Adam & Pernando, 2024).

SUS consists of a collection of questions designed to evaluate the usability and ease of use of a system or product (Mubarok et al., 2022). The scale consists of 10 user-rated statements with the Likert scale, where users are asked to rate the degree to which they agree with each statement. For SUS questions can be seen in table 1.

Table 1. System Usability Scale Questions

No	Question
1	I'm thinking of using this system again?
2	I feel that this system is complicated to use?
3	I feel that this system is easy to use?
4	Do I need help from someone else or a technician in using this system?
5	I think these system features are working properly?
6	I feel like there are a lot of inconsistencies (incongruities on this system)?
7	I feel that others will understand how to use this system quickly?
8	I find this system confusing?
9	I feel that there is no obstacle in using this system?
10	I need to familiarize myself first before using this system?

3 Result And Dicussion

3.1 Empathize

The empathize stage is the initial stage carried out in this study. Conducted interviews directly and then obtained problems, namely Lack of understanding of the diversity of Indonesian customs and culture often makes users prefer games or applications that only provide entertainment without learning education. Difficulties in learning Indonesian culture are also

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caused by the lack of interesting learning media or the unavailability of appropriate learning media.

3.2 Define

In the define process, a more detailed grouping is carried out between the problems faced by users and solutions that can solve these problems. The results of the define stage can be seen in table 2.

Table 2. Define problem results and solutions

Problem	Necessity
- Lack of knowledge about the diversity of Indonesian customs and cultures, users often prefer games or applications that only contain entertainment and no learning education.	- An interactive and easy-to-use learning media is needed.
- The difficulty in learning Indonesian culture due to the lack of learning media / learning media used is not interesting.	- Create an application that contains education on cultural customs in Indonesia

3.3 Ideate

After knowing the problems and needs needed, the next step isideate. In this study, ideate obtained a wireframe. A wireframe is a simple visual representation of a user interface or web page that shows the basic structure and layout of its elements. This is usually a rough image that displays blocks of text, images, and other elements without complete design details or content.

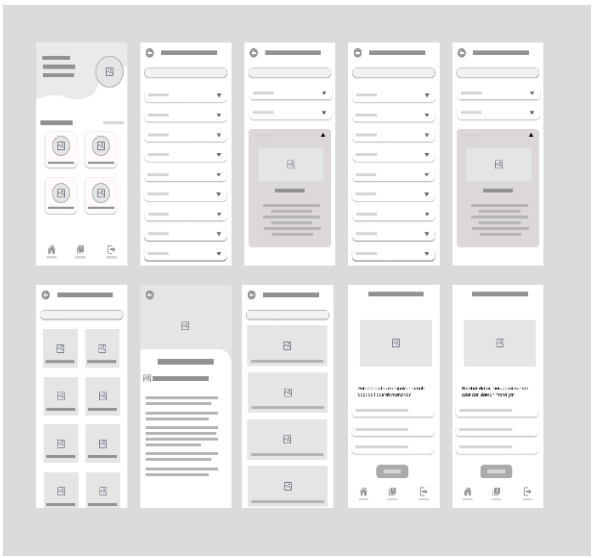

Figure 2. Application wireframe

Wireframes help in planning the structure and organization of a user interface before starting to design or develop in detail. To be clear, figure 2 is a wireframe of this study.

3.4 Prototype

The next step before testing is to make a prototype. In this research, the prototype was made a design interface design that was equipped with colors to make it look more attractive, then given the image or icon needed. For prototype can be seen in figure 3.

In the prototype there are several menus, namely regional food menus, traditional clothing menus, traditional house menus to traditional ceremony menus found in all provinces in Indonesia. Then in it there are details that will be displayed, for example in traditional clothing When clicking on one of the traditional uses originating from an area, a description of the clothing will appear. Furthermore, if you want to know more details related to traditional ceremonies When clicked on one of the regions, users will be directed to a video of the traditional ceremony. In the application there are those who use videos but there are also those who use details with images and are equipped with words that are easy to understand.

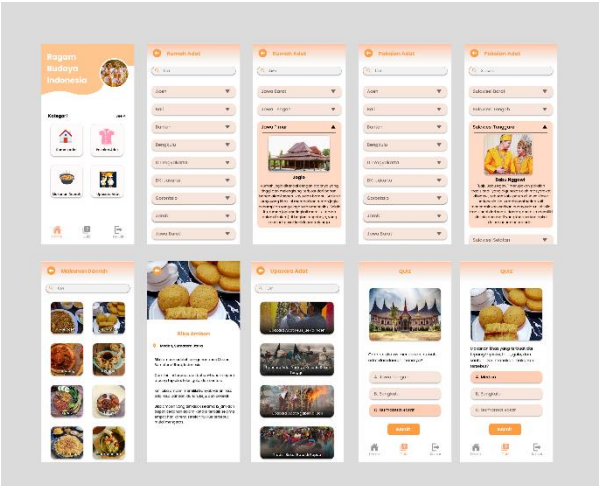

Figure 3. Application Prototype

After making a prototype, researchers make a flowchart of the application flow. Flowcharts are used to make it easier for users to understand an application that has been made besides that flow charts are systematic sequences that are made sequentially.

In this study, there are two flowcharts, namely flowchart home and flowchart quiz. For flowchart home can be seen in figure 4 while flowchart quiz is in figure 5.

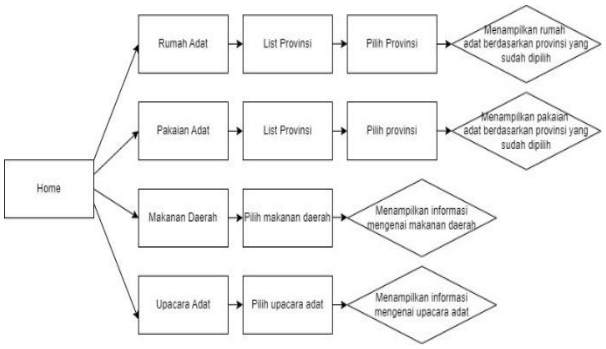

Figure 4. Application Flow Home

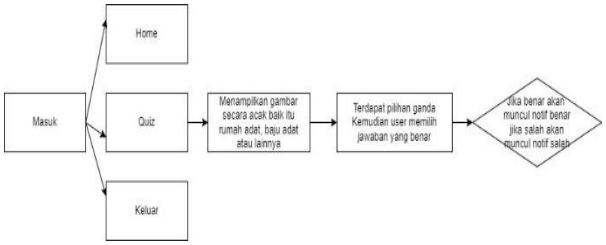

Figure 5. Application Flow Quiz

In figures 4 and 5 are the contents of the application. To make it easier to read the stage, the author provides the order of the dashboard and explains what is in the dashboard. In order to be understood, write it like that.

3.5 Test

The testing process using the User Satisfaction Test method involves five respondents for each scenario, with the aim of obtaining effective and valid results. The test was conducted involving five respondents because the system had only been completed in the design phase and had not yet been deployed. The testing method involves distributing questionnaires to respondents, and the data will be analyzed according to the SUS (System Usability Scale) method. For questionnaire questions can be seen in table 1. Then in table 3 there are pure score results of respondents' questionnaires and in table 4 are the results that have been calculated in accordance with SUS.

Table 3. Respondents' initial scores

No	Respondent Score									
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1	4	5	4	5	5	3	4	5	4	4
2	5	5	5	4	5	5	4	4	3	4
3	3	4	2	4	5	5	4	3	4	4
4	4	4	5	4	3	5	5	4	5	4
5	5	5	3	4	4	5	3	5	4	5

Table 4. SUS calculation results

No	Respondent Score										Sum	Total
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
1	3	4	3	4	4	2	3	4	3	3	33	82
2	4	4	4	3	4	4	3	3	2	3	34	85
3	2	3	3	3	4	4	3	2	3	3	30	75
4	3	3	4	3	2	4	4	3	4	3	33	82
5	4	4	2	3	3	4	2	4	3	4	33	82
Average Score												81
Description / Grade												Excellent/B

In tables 3 and 4 there are Q1-Q10, Q is Question. Furthermore, in table 2 respondent scores, the scores can be filled in from 1-5 then after the respondent data is entered, the SUS calculation is carried out which has been explained in table 4. In table 4 the initial score of respondents minus one thing is adjusted based on the SUS formula, after that the results of all respondents are added and multiplied by 2.5 so that for the whole after calculating SUS obtained an average score of 81, obtaining an excellent grade / B. Therefore, it can be concluded that this research is successful and the design that has been made can be developed

again in the future to be implemented into an Android-based application or website.

4 Conclusion

After carrying out various stages by applying the Design Thinking approach in making UI / UX designs for applications to introduce Indonesian cultural diversity, this research succeeded in creating effective and attractive solutions for users. This research succeeded in making application designs based on user needs, namely for ages 6-12 years where this age is the growth period of children who want to know various things that exist. Then not only obtaining the design was carried out but also testing the design using the System Usability Scale (SUS) obtained an average result of 81 and obtained a grade B / Excellent, reflecting a good level of usability. Thus, the UI/UX design of this application can be considered successful in meeting user needs and providing a positive user experience. Furthermore, updates and improvements to application features can be done to improve its quality and relevance in the hope that it can make a greater contribution in introducing the variety of Indonesian culture to users. The design is equipped with matching colors, there are not many confusing features so it is easy to use for children. And equipped with a quiz that is used to assess the extent of understanding after reading the existing material. For further research, it can add to the existing indigenous culture and make an Android-based application system or website combined with various existing programming languages.

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