UI/UX design of the PDBI digital art gallery web application using design thinking method

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ABSTRACT

Documentation of digital artwork is essential for designers, serving as a copyrightable asset that can be included in a student's portfolio. User interface design is chosen as the gateway for developing the PDBI Digital Art Gallery Application. It is anticipated that a well-designed user interface will be part of the feasibility analysis for further development into a comprehensive and beneficial application. The research method employed in this study is design thinking, involving the construction of a user interface and usability testing for the PDBI digital art gallery application using a qualitative approach with a case study research type. Data collection techniques include observation, competitor analysis, and questionnaire distribution to obtain user experience feedback on the application. The introduction of the PDBI Digital Art Gallery application is expected to enable PDBI students to easily archive, showcase, sell, and create digital works, empowering student digital products as intended.

Keywords: Digital Art Gallery, PDBI, User Interface, User Experience, Students, Design Thinking

1. INTRODUCTION

Creating art in the digital era presents its own set of challenges. Currently, digital art creation can be carried out through various platforms and showcased in virtual 3D spaces (Setiaji, 2023). Documenting artistic creations in digital form is a necessary activity, given the current era of information openness. Beyond serving as a personal archive, this documentation can become a digital asset with market value.

Artistic creations are divided into two types: pure art and applied art. Applied art can be produced using digital tools throughout the production process. This type of art is known as digital art, where every stage of the process involves a computer, from conceptual sketches to the final product and exhibition (Marcos, 2009). Examples of applied art falling into the category of digital art include graphic design, modeling art, 2D/3D visualization and animation, and digital illustration. Digital art produces files that can be used both in print and electronically. Managing these digital products is essential to add value for art enthusiasts and to archive them as digital assets for institutions or individuals.

In the current era of open information, educational institutions are required to enhance learning support facilities. This is crucial

as information access needs to be designed quickly, effectively, and efficiently so that institutions can have a competitive edge globally (Sari et al., 2020). In the case of the Multimedia Engineering Program, being a digitally-based program that produces multimedia products, the academic community strives to innovate and create a space for TRM (Multimedia Engineering Technology) students specializing in Digital Art within the Multimedia Profession Association.

Therefore, managing digital works is essential for the campus to serve as a portfolio for the profiles of respective students. Portfolios can even serve as an assessment instrument for educators in this digital era (Masluhah & Afifah, 2022). The development of a digital art gallery application is intended for managing students' digital artworks, enabling them to showcase, archive, be evaluated, and compete in specific events, ultimately becoming valuable assets to introduce PDBI (Boash Indonesia Digital Polytechnic) to the public. This application is designed to fulfill both internal and external campus needs. With the existence of this application, it is hoped that digital artworks by students will be appreciated as creations that add value for both the individual students and the institution.

This research emphasizes the design of the application interface (User Interface), which is subsequently tested in terms of user

experience (UX). UI involves the design of input and output that engages end-users (Satzinger, et al., 2012). On the other hand, UX is the user's assessment of satisfaction and comfort with a product, system, or service (Fernando, 2020). The approach taken in interface design is through the design thinking method, chosen for its comprehensiveness in creating solutions towards sustainable innovation, involving stages of empathize, define, ideate, prototype, and test (Razi et al., 2018).

DESIGN MODEL
The design of the web application is carried out using the Design Thinking method and qualitative research methods, where data collection and analysis are based on competitor analysis for UI and questionnaires for UX. The research implementation scheme is adapted to the stages of these methods, as follows:

Figure 1. Design Thinking Process

Design thinking was chosen as a user interface design model for the PDBI Digital Art Gallery application because this model really represents the problem of archiving and managing digital artwork in an educational institution/university. This approach was also chosen as the best approach for designing creative and innovative new systems (Foster 2021).

2. RESULTS AND DISCUSSION

1. Empathize
The empathy phase is built by conducting a comparative study of similar applications. For the Digital Art case, the author compares several applications, considering the functions of similar applications.

a. Competitor Analysis
In building the PDBI Digital Art Gallery system, in-depth analysis of various aspects is essential. Since this system is built from scratch, analyzing similar applications is beneficial to identify unique values that can set it apart. As stated by Fleisher & Bensoussan (2007), competitor analysis is conducted by strategic management to assess the strengths, weaknesses, and current potential of competitors. The competitor analysis is presented in a SWOT analysis matrix, as follows:

Table 1. SWOT Analysis of Competitor Application Analysis

Strengths	Weakness
• The application can be a source of income for students • The application can serve as a storage for students' digital assets • The application can be a platform for campus promotion • The application can be a platform for public competitions	• Lack of internal campus regulations for the benefit of campus stakeholders • Still in the development phase, hence untested quality
Opportunities	**Threats**
• No similar application exists on campus • LMS is not designed for storing and exhibiting digital assets • Students need to experiment with graphic design, 2D, 3D, VR, AR • Students need financially rewarding experiences	• Existing digital art marketplaces with a significant number of assets • Need for AI-based asset tracking to maintain professional ethics as a digital artist (Possibility of significant plagiarism)

b. Customer Journey Map
At this stage, the researcher conducted a review of competitor websites and designed the findings in the form of a Customer Journey Map, as illustrated below:

Figure 2. Customer Journey Map of Competitor Application

From the user experience (researcher) in exploring similar applications, the researcher found convenience in the contributor features and faced some challenges with the artwork upload feature due to rigidly set file sizes and detailed requirements for the subsequent process of buying and selling digital assets.

2. Define
a. Problem Statement
After conducting the empathy phase, the application developers can answer the following 4Ws questions:

Table 2. Problem Statement to Define Issues in the Define Stage

No.	Question	Answer
1.	Who: who faces the problem?	Users completing tasks on this application are: • Students • Lecturers • Visitors • Admin
2.	What: what is the problem faced?	Problems: • No platform for archiving digital artworks in PDBI • No application serving as a platform for students to organize and conduct digital art competitions • No application serving as a soft-selling platform for the campus through student art exhibitions
3.	Where: where can the contest be accessed?	Two categories of places in this case: • The application can be accessed online • Competitions can be participated in online or offline (detailed information depends on the specific competition to be held)
4.	Why: why is there a need for the app?	The goal of the presented solution is: • A platform for students to create and earn • A platform for campus promotion based on PBL (Project Based Learning) results Values presented : • Visitors can get information, participate in competitions • Students can archive work, earn income from buying and selling digital assets • Lecturers can assess student performance and evaluate competition results • The campus can attract more students through organizing competitions and art exhibition

b. Insight HMW
Insight HMW is conducted as the result of brainstorming by the system development team after the empathy phase. Insight HMW is created in several notes, which are then filtered into

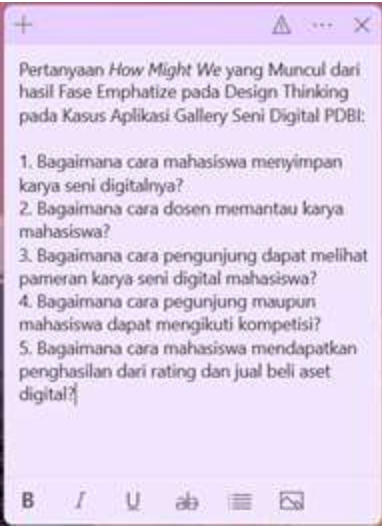several priority questions according to the system's needs, as shown below:

Figure 3. Priority Question Notes Resulting from Insight HMW

3. Ideate
a. Impact Effort Prioritization Matrix
This stage is designed to prioritize proposed work based on the analysis in the previous stage.

Impact Effort Prioritization Matrix

Solution:
1. Collecting students' digital art assets
2. Organizing design/animation competitions every semester
3. Curating/evaluating competition results by the committee and lecturers
4. Hosting public exhibitions of students' digital art
5. Displaying winners of design/animation competitions on the website
6. Managing student artworks based on likes and ratings
7. Selling students' artworks
8. Purchasing artworks displayed in the gallery
9. Filtering artworks and providing comments as a precaution against plagiarism before submission to the public

b. Solution Idea

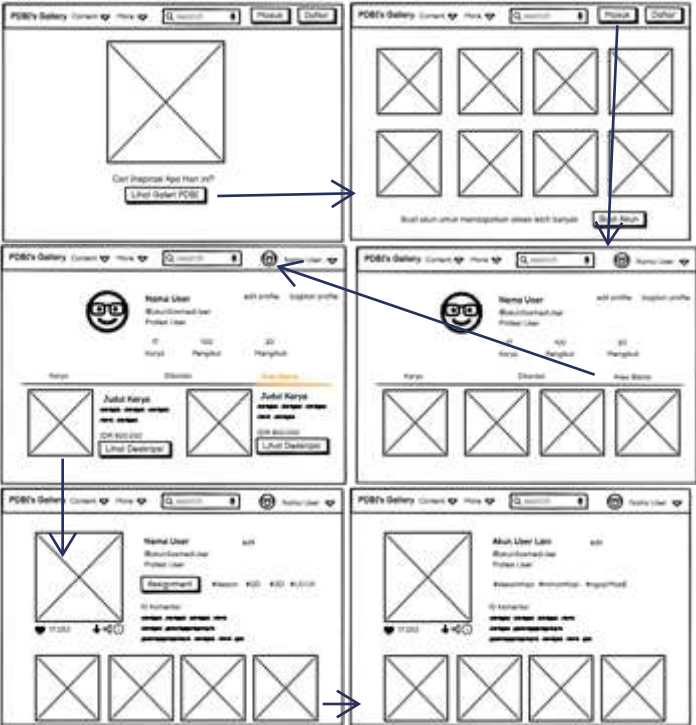Figure 4. Solutions Resulting from the Ideate Stage

c. Wireframe

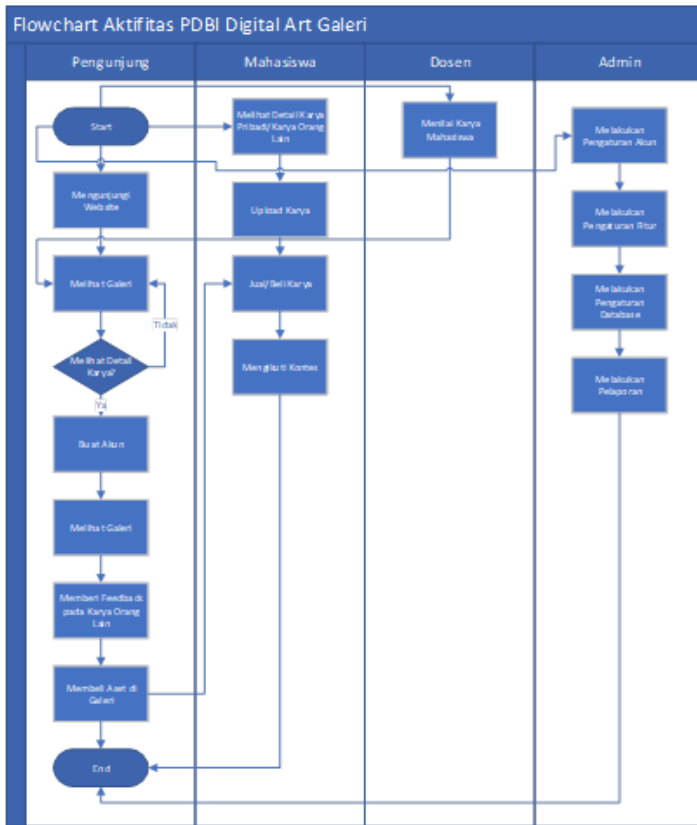Figure 5. Wireframe of the PDBI Digital Art Gallery Application

d. Design System
i. User Flow
The design of the user flow can be seen by observing the flowchart of the PDBI digital art gallery application as follows:

Table 3. Flowchart of the PDBI Digital Art Gallery Application

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From the above flowchart, the user flow is then designed in the form of the following user flow diagram:
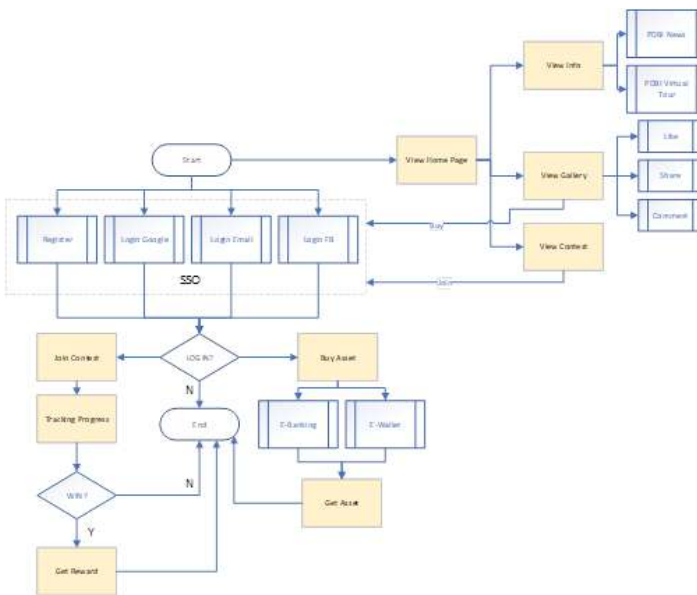• User: Visitor

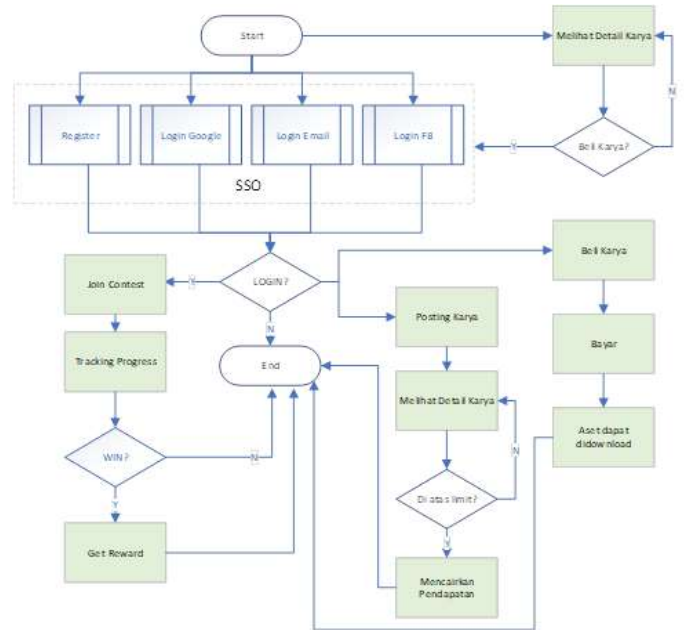Figure 6. User Flow from the Visitor's Perspective

• User: Student

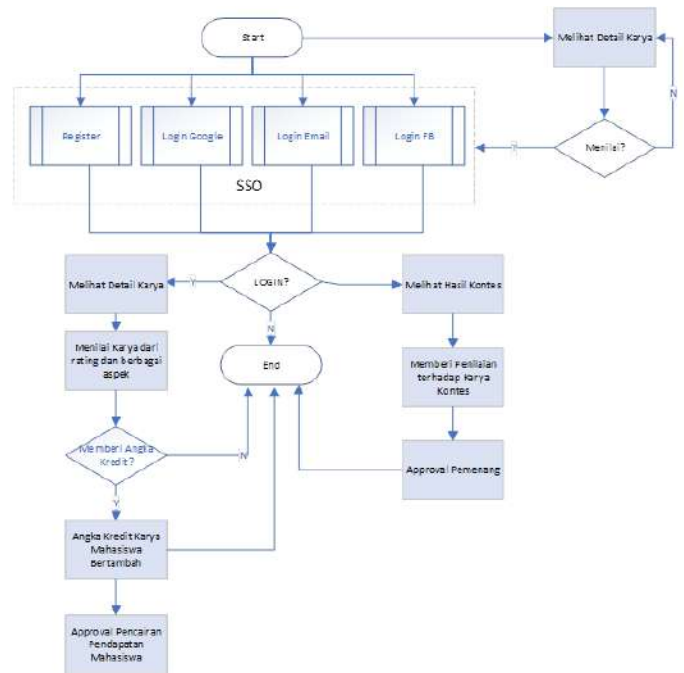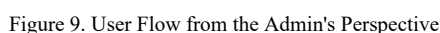Figure 7. User Flow from the Student's Perspective

• User: Lecturer

Figure 8. User Flow from the Lecturer's Perspective

• User: Admin

Figure 9. User Flow from the Admin's Perspective

ii. Use Case Diagram

The diagram illustrating users and their activities in the PDBI Digital Art Gallery application is depicted in the following use case diagram:
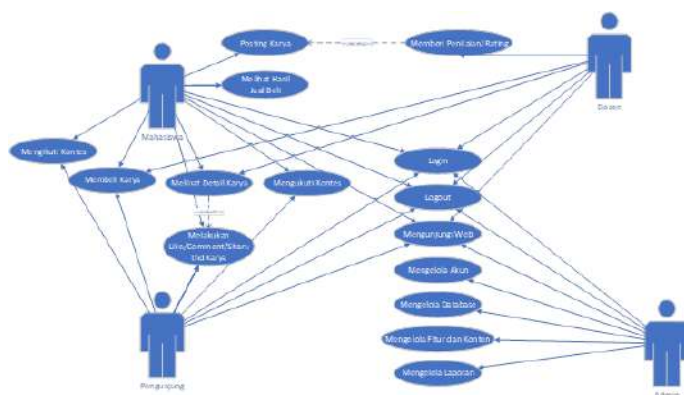

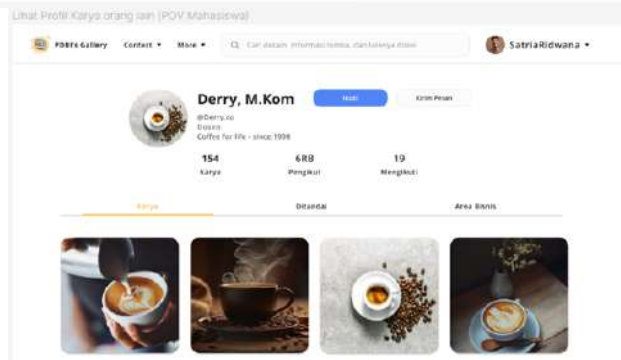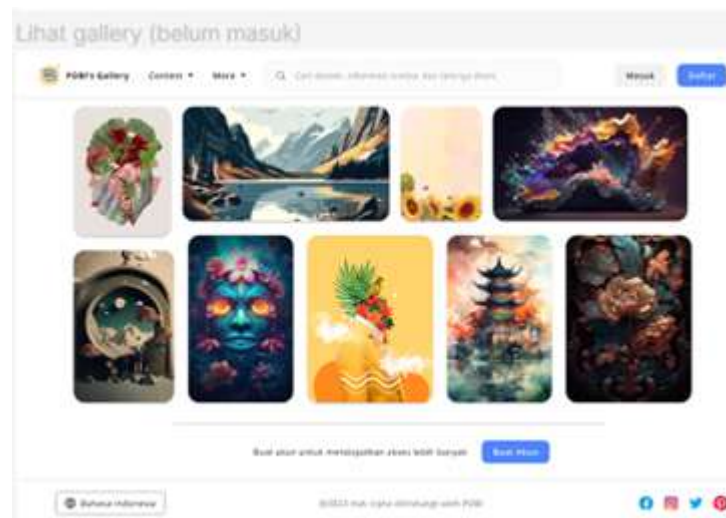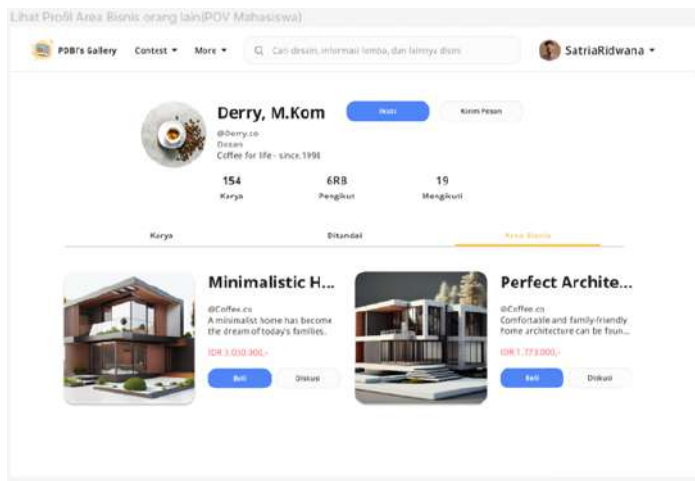Figure 10. Use Case Diagram of the PDBI Digital Art Gallery Application

4. Prototype

a. High Fidelity

In designing the prototype for the high-fidelity version, several user interface designs that represent the application are as follows:

5. Test
a. Usability Testing

In the usability testing phase, this research is conducted by creating a questionnaire based on usability aspects (usefulness, ease of learning, ease of use, satisfaction) according to the USE Questionnaire. The questionnaire is distributed to respondents representing all users: students, lecturers, and general users. Some statements presented in the questionnaire include:

Table 4. List of Statements in the Usability Testing Questionnaire

No.	Statement
Usefulness	
1.	This application makes it easy for students to store digital artworks
2.	This application makes it easy for visitors to get information about competitions and view galleries of student artworks
3.	This application is very useful for me as a user
4.	This application can provide additional income for students
5.	This application is suitable as I expected
Ease of Use	
6.	This application is easy to operate
7.	Running the application is not confusing
8.	People of all ages can use this application
9.	Using the application requires little effort
10.	The application is easy to use without written instructions
11.	No inconsistencies were found during the use of the application
12.	Errors in using the application can be easily resolved
13.	Operating the application is practical
Ease of Learning	
14.	I needed little time to learn this application
15.	This application is easy to remember
16.	I quickly used this application
Satisfaction	
17.	I feel satisfied using this application
18.	After using the application, I would recommend it to others
19.	I use the application with a happy feeling
20.	This application is very good
21.	I would like to have this application on a mobile platform
22.	This application is very comfortable to use

Measurement Scale for Usability Testing Using the Likert Scale (Wardhana 2019). The assessment is divided into 4 answers, namely:

Table 5. Usability Testing Usability Testing Measurement Scale

Value	Range	Qualification	Result
4	85-100%	Very Good	Success
3	65-84%	Good	Success
2	55-64%	Adequate	Failed
1	0-54%	Insufficient	Failed

b. Insight from User

Based on respondent answers to the questionnaire, the results show that an average of 73% of users are satisfied with the experience of using the prototype application, with the breakdown as follows:

Table 6. Questionnaire Results

Usability Aspect	Questionnaire Results
Usefulness	68%
Ease of Use	73,2%
Ease of Learning	77,04%
Satisfaction	70%
Average 72,97%	(Success)

From the usability testing results, it can be concluded that there is still a need for improvement and refinement in terms of competition features, student income features, application operation processes, consistency, and enhancing user comfort when using the application.

3. CONCLUSION

Digital art has become a widely produced product by digital talents, especially with the development of technology and the openness of information. The Digital Art Gallery application is created to encourage the spirit of PDBI (Digital Polytechnic Boash Indonesia) students to continue creating and being productive in digital art. However, this research only reaches the front-end stage, and the application is not yet perfect. Future researchers can continue the development with the following considerations:

1. Proceeding with the design towards system development (back-end) and adding specific items to indicate that students' digital artworks are protected, and their copyrights are maintained, as outlined in Copyright Law No. 28 of 2014 (Murfianti 2020).

2. Continuing the UI design in detail for buying and selling assets, managing the application from the admin side, and detailing contest features.

3. Conducting usability testing again after interface design improvements to achieve the best user satisfaction ratings.

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