UI/UX Design on Digilearn Application with the Iterative Design Thinking Methodology

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ABSTRACT

Innovations in education and learning today are followed by advances in technology. The increasing use of online information technology has encouraged educational institutions to invest in new learning technologies such as E-Learning. E-Learning is teaching and learning that is supported and developed through technology and digital media, and is also a form of the concept of distance learning or distance learning. By understanding what they are complaining about, researchers as product designers can empathize with them, so that they can define their problems perfectly, create brilliant ideas, design solutions based on ideas, and try the results of these designs on target users. Therefore, researchers learn that empathy is the key to the success of a product because in the end, the product will be used by the users that the designer has expected.

1. Introduction

Education is the acquisition of knowledge, skills, and habits by a group of people that are passed down from one generation to the next through teaching, training, or research [1]. From a global perspective, it is acknowledged that education plays a crucial role in efforts to improve human resources towards a better direction [2]. It is also supported by Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 regarding the National Education System Pasal 3 which states that education functions to develop abilities and shape the character and civilization of the nation in order to enhance the intellectual life of the nation [3].

1.1. Background

Innovation in education and learning in the present time is accompanied by technological advancements. The increasing use of online information technology has prompted educational institutions to invest in new learning technologies such as e-learning. E-learning refers to teaching and learning that is supported and developed through technology and digital media, and it is also a form of distance learning concept [4]. This is also supported by many students who have become accustomed to conducting their educational activities online due to the COVID-19 pandemic that has been ongoing for the past three years. Therefore, there is a need for effective learning platforms that can support the entire learning process effectively.

1.2. Goals and Benefits

Based on the aforementioned issues, the researcher has developed the UI/UX design for the Digilearn Application using the Iterative Design Thinking Process method. The goal is to solve complex or unknown problems by reframing them from a human-centered perspective, generating numerous ideas through brainstorming sessions, and adopting a hands-on approach in creating initial

designs and conducting testing [5]. As a result, the Digilearn Application can be designed to address all the issues experienced by students, thereby assisting them in their teaching and learning activities and fostering the creation of outstanding graduates.

1.3. Previous Research

The following are some of the previous research studies that the researcher used as references and sources:

Table 1. The following is a list of previous research journals related to the past three years

No	Journal Title	Equality
1	Pengaruh media pembelajaran visual Dan Minat belajar terhadap hasil belajar Siswa Mata pelajaran Ekonomi Kelas XI IPS SMA Negeri 1 AEK Kuo Tahun Ajaran 2019/2020 [2].	The researcher cited the important role of education from a global perspective in the journal.
2	Efektifitas Penggunaan E-Learning Moodle, Google Classroom, dan Edmodo [4].	The researcher cited the definition of E-Learning in the journal.
3	Analysis and Design of UI/UX with the Design Thinking Method on the Academic Information System of Jenderal Soedirman University [6].	The researcher utilized the same development design method as mentioned in the journal.
4	Pengembangan Prototipe Aplikasi Community Aggregator Beskem dengan Pendekatan UCD Menggunakan Balsamiq Mockup dan FIGMA [7].	The researcher utilized the same development design platform as mentioned in the journal.
5	Desain UI UX Aplikasi Penjualan Menyelaraskan Kebutuhan Bisnis menggunakan Pendekatan Design Thinking [8].	The researcher utilized the same development design method as mentioned in the journal.

2. Research Methodology

2.1. The Iterative Design Thinking Process Method

The development methodology that the researcher used to develop the Digilearn application is the Iterative Design Thinking Process, adapted from Lewrick, Link, and Leifer (2018). This methodology involves several processes, including Empathize (Understand & Observe), Define, Ideate, Prototype, and Test.

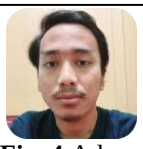
A. Empathize

User Interview

The researcher conducted interviews with five respondents who fit the target user demographics to gain a better understanding of the perceived issues and needs. The interview results are as follows:

Table 2. The results of the interviews

Interviewee Profile	Perceived Issues	Identified Needs
 **Fig. 1.**Catur. (21 Years Old, Batch 2019)	-Learning process hindered due to the pandemic -Difficulty accessing knowledge through mobile website	-Integrated electronic learning platform -Practical E-Learning application
 **Fig. 2.**Suhri. (21 Years Old, Batch 2019)	-Confusion in viewing enrolled courses -Lack of notification for opening course discussion forums	-E-Learning design that is easy to understand -Integrated electronic learning application
 **Fig. 3.**Ocha. (20 Years Old, Batch 2020)	-Unable to see rankings in certain courses -Unable to track all assigned tasks by instructors	-E-Learning with ranking feature in each course -Integrated electronic learning application

 **Fig. 4.**Adam. (20 Years Old, Batch 2020)	-Lack of class reminders -Inability to access submitted task history	-E-Learning with calendar feature for class reminders and task history
 **Fig. 5.**Qisthi. (19 Years Old, Batch 2021)	-Learning process hindered due to the pandemic -Inability to provide feedback to each instructor	-Practical and integrated E-Learning application -E-Learning with feedback feature from all instructors

User Feedback

The researcher then conducted research on reviews or feedback from users. The research findings can be seen in the following ratings:

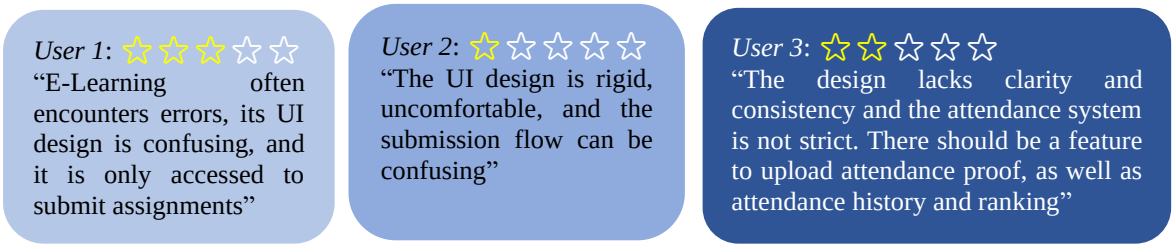


Fig. 6. Ilmu UPN Veteran Jawa Timur Rating

Secondary Research

Based on the data from the Report of the Project Result (Athens, 2011), p.12 regarding the issues faced by e-learning users, 57% of them experience a lack of appropriate infrastructure. Additionally, digital illiteracy is also a common problem [9].

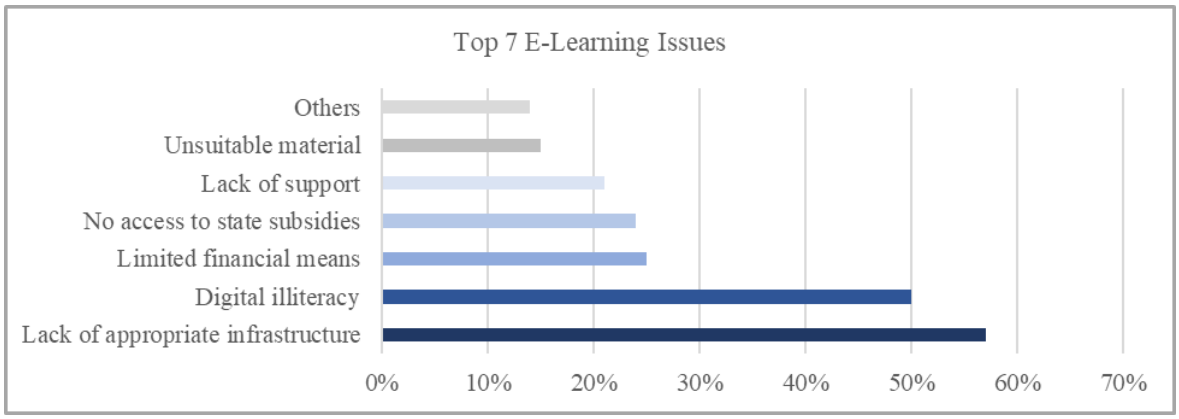


Fig. 7. Graphic of Top 7 Issues in E-Learning Faced by Users.

B. Define

Empathy Mapping

To define the issues experienced by users, the researcher used Empathy Mapping.

Who are we empathizing with?	College Students, Students, Learners
What do they need to do?	Studying, attending academic activities
What do they see?	E-Learning Ilmu UPN Veteran Jawa Timur

What do they say?	Requires improvements in terms of UI/UX, assignments submission system
What do they do?	Submitting assignments, downloading course materials
What do they hear?	E-Learning Application at other institutions that are more integrated
What do they think or feel?	Requires systems significant improvements in terms of UI/UX and system functionality

User Persona

Based on the data obtained in the previous stage, the researcher formed two User Personas to define the target users of the application.

Picture 2.
Raihan

20 Years Old

UPN Veteran Jawa Timur Students Batch 2020

From:
East Java

Objectives:
1. Enhance learning potential in each subject/course.
2. Enable studying anytime, even during the COVID-19 situation.
3. Develop discipline in academic schedules

Frustrations:
1. Learning activities disrupted due to the COVID-19 pandemic.
2. Unable to access updated schedules for classes, exams, and assignment submissions.

Picture 1.
Zabina

20 Years Old

UPN Veteran Jawa Timur Students Batch 2020

From:
East Java

Objectives:
1. Maximize engagement in the learning process during classes.
2. Submit tasks before the deadline, Study anytime, anywhere to achieve good and satisfactory grades.

Frustrations:
1. Learning activities disrupted due to the COVID-19 pandemic.
2. Unable to provide feedback to instructors for better learning experiences in the future.

Fig. 8. Two User Personas.

Problem Statement

Based on the data and issues obtained in the previous stages, as well as the analysis of empathy mapping and user persona, the following are three problem statements experienced by the target users: 1) Lack of integrated e-learning application; 2) Difficulty in understanding e-learning features due to confusing design; 3) Difficulty in accessing updated class schedules and assignments.

C. Ideate

How Might We & Solution Mapping

Based on the defined problem statements, here are the HMW statements along with proposed solutions by the researcher based on pain reliever & gain creator classification.

	How Might We Create E-Learning Integrated Application	How Might We Create simple, easy, and also Understandable UI/UX Design	How Might We Create Schedule, & Reminder Feature
Pain Reliever	Menyediakan fitur manajemen waktu	Memberikan desain tampilan yang fresh dan tidak membingung-kan	Menyediakan akses user untuk menambahkan jadwal kegiatan mereka
Gain Creator	Mengintegra-sikan semua pelajaran, tugas, dan informasi akademis menjadi satu	Memberikan kombinasi warna yang tidak terlalu mencolok	Mengintegrasi-kan jadwal perkuliahan dengan jadwal pribadi

Fig. 9. Two User Personas.

D. Prototype

Wireframe

Before creating a high-fidelity prototype, the researcher starts the prototyping phase by creating low-fidelity wireframes.

Fig. 10. Low-fidelity Prototype

Design Systems

Next, the researcher creates design system specifications to maintain consistency and facilitate the creation of a high-fidelity prototype.

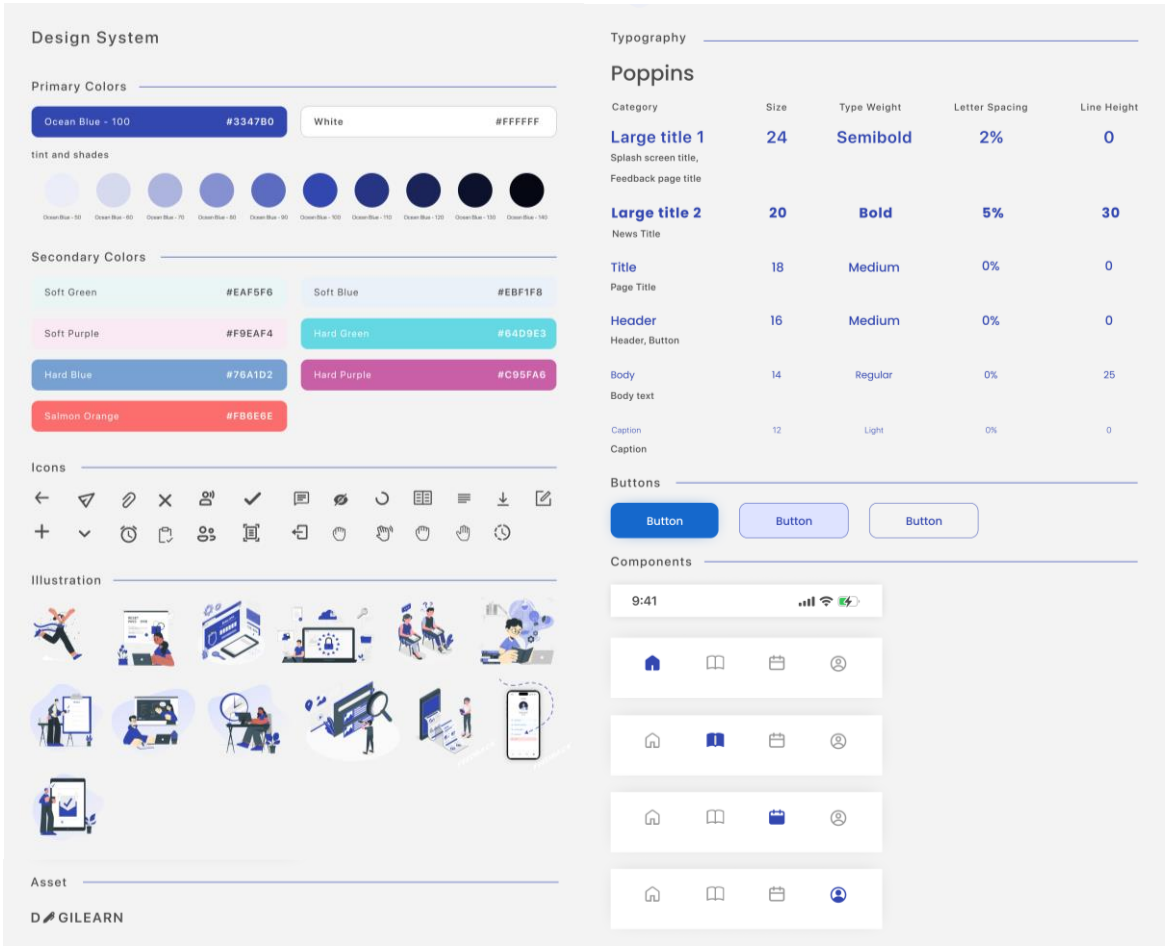


Fig. 11. Design Systems

High-fidelity prototype

Next, the researcher builds a high-fidelity prototype using the prototyping tool Figma. A detailed explanation of the features and design of the Digilearn application can be found in the Discussion section.

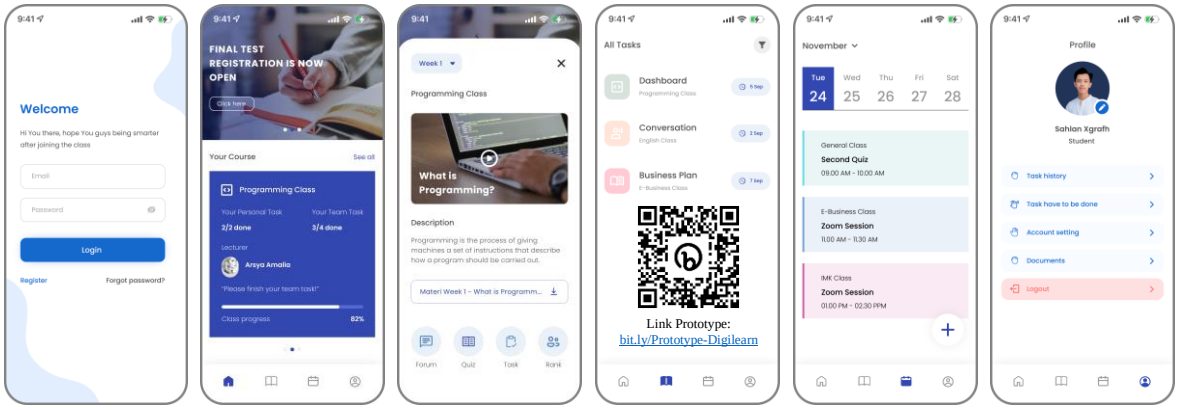


Fig. 12. High-fidelity Prototype

E. Test

Usability Testing

In this stage, the researcher conducts Usability Testing with five target users who have the following demographics:

- 21-year-old students from Batch 2019
- 20-year-old students from Batch 2020
- 19-year-old students from Batch 2021

The researcher asked the target users to use the Digilearn application through a Zoom meeting so that they can observe and experience how the Digilearn application works.

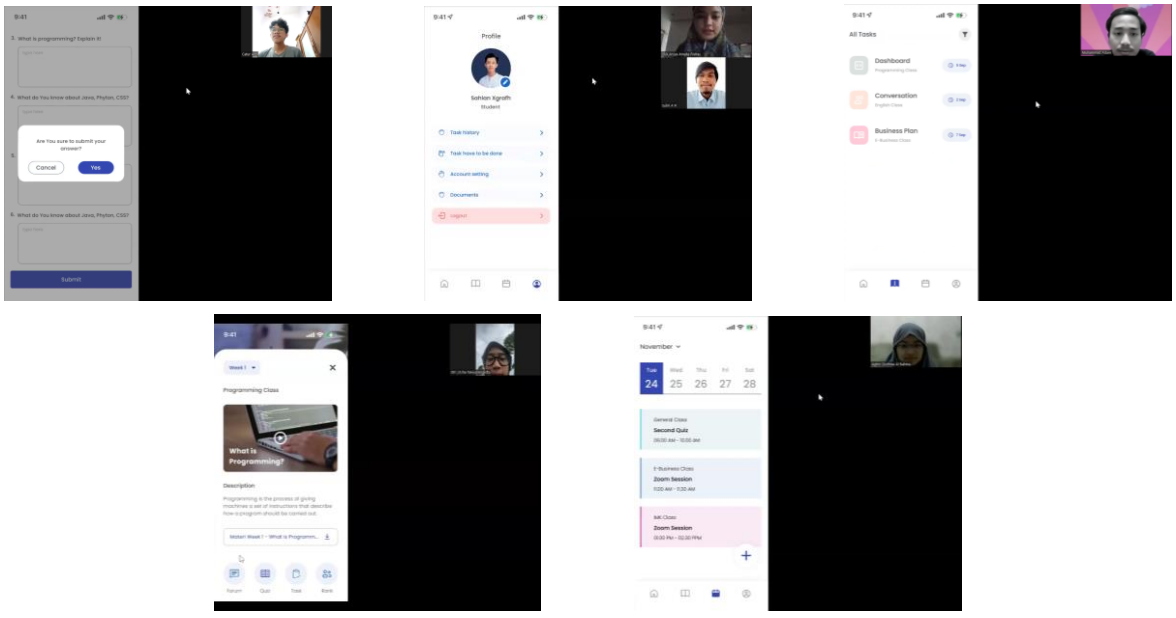


Fig. 13. Interview User Testing

System Usability Scale

The usability testing evaluation is conducted using the System Usability Scale (SUS) assessment. The evaluators are asked to rate each indicator of the System Usability Scale on a scale of 1 (strongly disagree) to 5 (strongly agree).

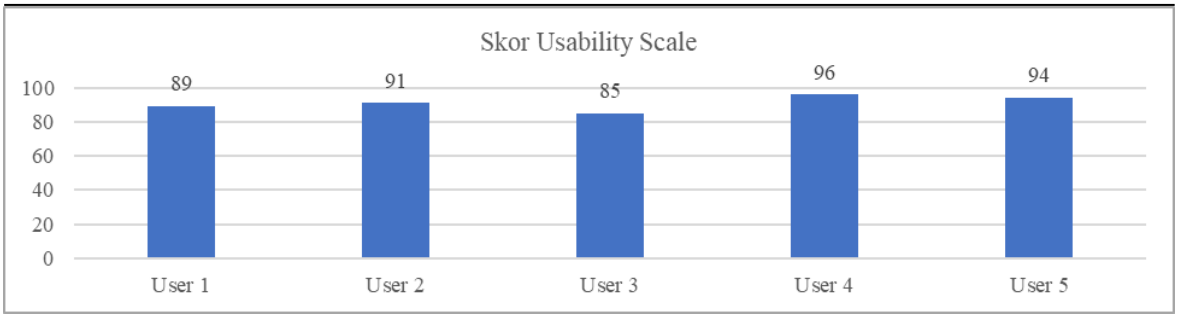


Fig. 14. Interview User Testing

The System Usability Scale (SUS) assessment results indicate an average score of 91, which suggests that the Digilearn application system has a high level of usability or is considered excellent.

2.2. Analysis of Design Work

The Digilearn application is an E-Learning (Electronic Learning System) application that aims to assist students in Indonesia in their learning process, which can be accessed anytime and anywhere.

A. Target users

Segmentation

Here are the target users of the Digilearn application based on demographic, geographic, behavioral, and psychographic categories.

Demographic Students or college students in the **age range of 17-23 years** with **enrollment years of 2017-2022**	**Geographic** College students of **UPN Veteran Jawa Timur**, Rungkut, Surabaya, Indonesia
Psychographic Students or college students **who lack effective and supportive learning resources**	**Behavioral** Using **smartphones** and **interested in learning** and actively participating in academic activities

Fig. 15. Segmentation Categorization

Targeting

Here are the target users of the Digilearn App based on profitability, size & accessibility categories:

Market Profitability Students or university students who **require effective** and integrated **learning resources**	**Market Size** There are **23,000 active students** who are still seeking suitable e-learning solutions	**Market Accessibility** The **increasing use of technology** has made students more adept at using mobile applications

Fig. 16. Targeting Categorization

B. Application Scope

The Digilearn application is designed for the following purposes:

Table 3. The results of the interviews

Hardware	System Requirements	
	Minimum	**Rekomendasi**
Operating System	iOS 13 | Android 7.0	iOS 15 | Android 8
Storage	200 MB Internal Storage	400 MB Internal Storage
Processor	4GB RAM	8GB RAM

The Digilearn application has a limited scope, specifically for users who are enrolled at UPN Veteran Jawa Timur and primarily use the Indonesian language. However, the application features can be available in both Indonesian and English languages.

C. Platform Used

The platforms used by the researcher are as follows:

Figma: Digital design & prototyping tool. The researcher used Figma to create wireframes, design systems, high-fidelity prototypes, and mock-ups.

Miro: Virtual whiteboard tool for collaboration in a project. The researcher used Miro to create user stories.

Fig. 17. Logo Platform Used

D. User Story

User stories are narratives that describe the goals and benefits of each task that users perform in the Digilearn application.

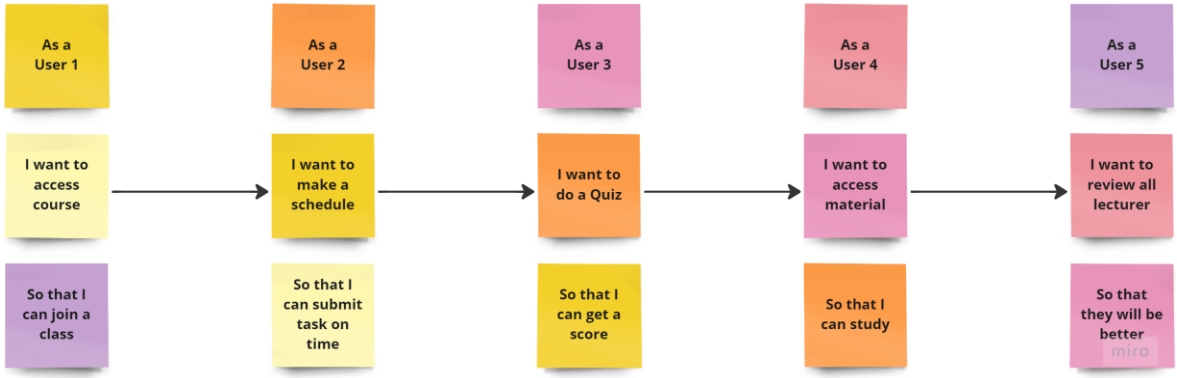


Fig. 18. User Story

3. Results and Discussion

3.1. User Scenario

The user scenarios for using the Digilearn application are as follows:

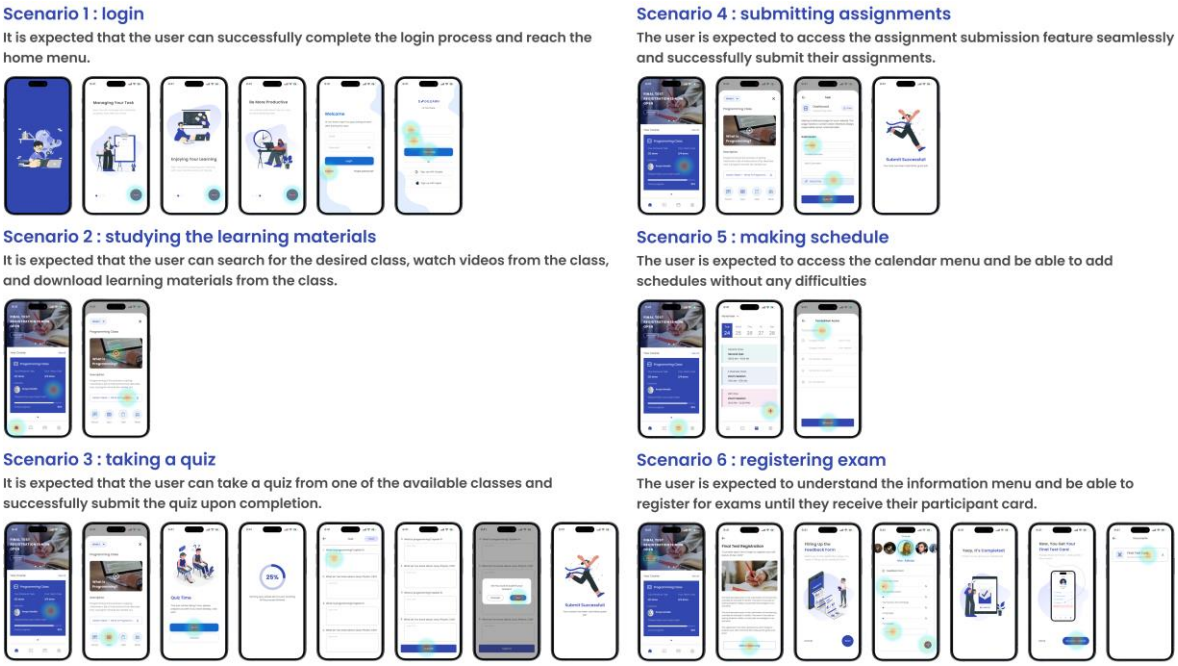


Fig. 19. User Scenario

3.2. Experience Map

The Experience Map for the Digilearn application is as follows:

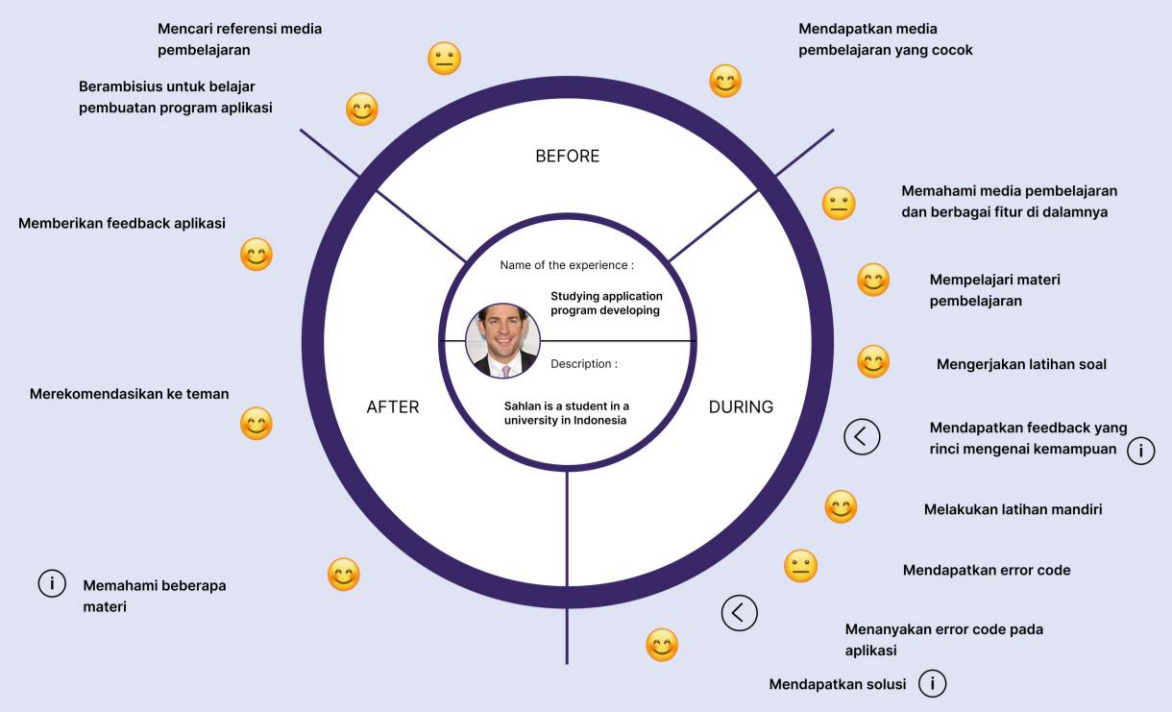
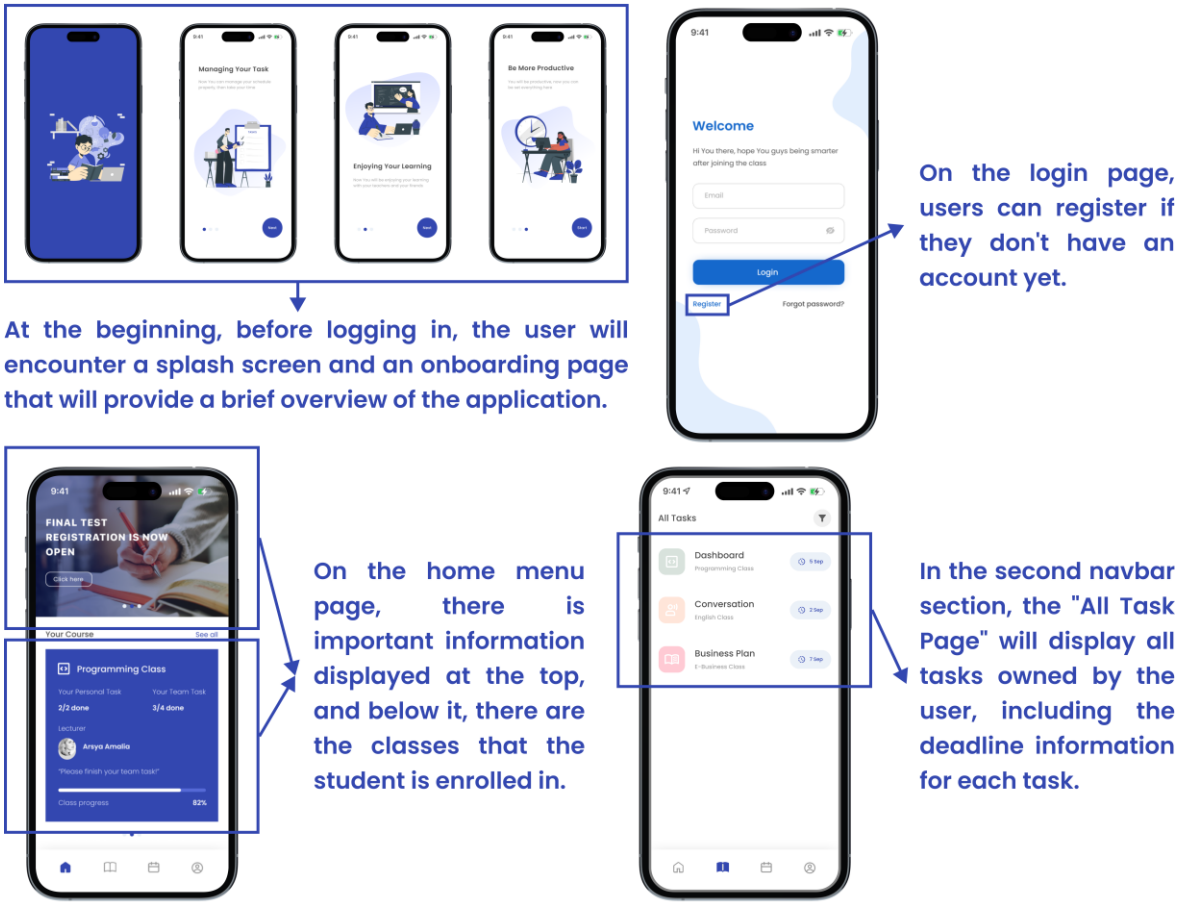


Fig. 20. Experience Map

3.3. Mock-up Interface



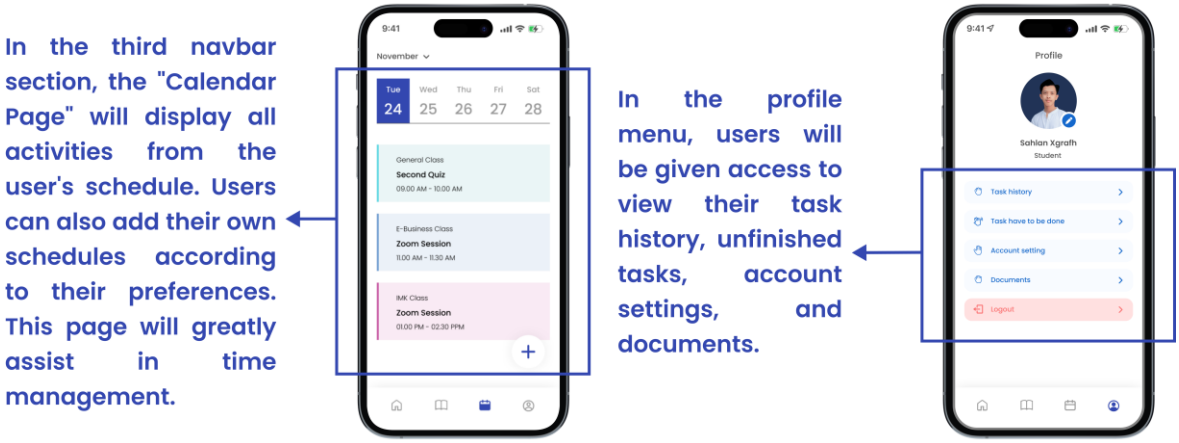


Fig. 21. Mockup Digilearn App

4. Conclusion

The case study provided as an assessment for the Final Semester Examination of the Human-Computer Interaction Class in 2022, taught by Research Lecturer Dr. Eng Agussalim, S.Pd, M.T, has provided valuable knowledge for solving a problem faced by students at UPN Veteran Jawa Timur. The researcher hopes that the impact of the Digilearn Application will enable UPN Veteran Jawa Timur students to utilize the learning resources effectively in order to fulfill all the needs and obligations of a student. By creating an effective learning tool, the researcher aims to accomplish the mission of Indonesian education to produce intelligent and globally competitive graduates.

Working on this case also taught the researcher that the design of a product should not only consider its appearance and assumed issues but also understand the root problems faced by the target users, including students. By understanding their concerns, the researcher, as a product designer, can empathize with them and define their problems perfectly, generate brilliant ideas, design solutions-oriented concepts, and test the design outcomes with the target users. Therefore, the researcher learned that empathy is the key to the success of a product because ultimately, it will be used by the users the designers had in mind.

The next steps the researcher will take involve conducting further research on the created features, developing more detailed and improved design models for designers and users, and conducting more extensive testing with the students. By doing so, the researcher hopes to create a more effective and efficient product in the future.

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