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

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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 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.

1.2. 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>
<thead>
<tr>
<th>No</th>
<th>Journal Title</th>
<th>Equality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>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].</td>
<td>The researcher cited the important role of education from a global perspective in the journal.</td>
</tr>
<tr>
<td>3</td>
<td>Pengembangan Prototipe Aplikasi Community Aggregator Beskem dengan Pendekatan UCD Menggunakan Balsamiq Mockup dan FIGMA [7].</td>
<td>The researcher utilized the same development design platform as mentioned in the journal.</td>
</tr>
<tr>
<td>4</td>
<td>Desain UI UX Aplikasi Penjualan Menyelaraskan Kebutuhan Bisnis menggunakan Pendekatan Design Thinking [8].</td>
<td>The researcher utilized the same development design method as mentioned in the journal.</td>
</tr>
</tbody>
</table>

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

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

- **User 1:** ⭐⭐⭐⭐⭐
  “E-Learning often encounters errors, its UI design is confusing, and it is only accessed to submit assignments”

- **User 2:** ⭐⭐⭐⭐⭐
  “The UI design is rigid, uncomfortable, and the submission flow can be confusing”

- **User 3:** ⭐⭐⭐⭐⭐
  “The design lacks clarity and consistency and the attendance system is not strict. There should be a feature to upload attendance proof, as well as attendance history and ranking”

**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

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### 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.

### Objective:
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.

#### 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 1](Pics/1.png)  
**Picture 1. Zabina**  
20 Years Old  
UPN Veteran Jawa Timur Students  
Batch 2020  
From: East Java

![Picture 2](Pics/2.png)  
**Picture 2. Raihan**  
20 Years Old  
UPN Veteran Jawa Timur Students  
Batch 2020  
From: East Java

#### 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.

#### 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.

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

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![Fig. 8](Pics/3.png)  
**Fig. 8.** Two User Personas.

<table>
<thead>
<tr>
<th>Picture 1. Zabina</th>
<th>Picture 2. Raihan</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 Years Old</td>
<td>20 Years Old</td>
</tr>
<tr>
<td>UPN Veteran Jawa Timur Students</td>
<td>UPN Veteran Jawa Timur Students</td>
</tr>
<tr>
<td>Batch 2020</td>
<td>Batch 2020</td>
</tr>
<tr>
<td>From: East Java</td>
<td>From: East Java</td>
</tr>
</tbody>
</table>

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![Fig. 9](Pics/4.png)  
**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.

Design Systems

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

![High-fidelity Prototype](Link Prototype: bit.ly/Prototype-Digilearn)

**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.

![Interview User Testing](Link Prototype: bit.ly/Prototype-Digilearn)

**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).
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.

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Geographic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students or college students in the age range of 17-23 years with enrollment years of 2017-2022</td>
<td>College students of UPN Veteran Jawa Timur, Rungkut, Surabaya, Indonesia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Psychographic</th>
<th>Behavioral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students or college students who lack effective and supportive learning resources</td>
<td>Using smartphones and interested in learning and actively participating in academic activities</td>
</tr>
</tbody>
</table>

Fig. 15. Segmentation Categorization

Targeting

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

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

Fig. 16. Targeting Categorization

B. Application Scope

The Digilearn application is designed for the following purposes:

<table>
<thead>
<tr>
<th>Hardware</th>
<th>System Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>Minimum</td>
</tr>
<tr>
<td>iOS 13</td>
<td>iOS 15</td>
</tr>
<tr>
<td>Android 7.0</td>
<td>Android 8</td>
</tr>
<tr>
<td>Storage</td>
<td>200 MB Internal Storage</td>
</tr>
<tr>
<td>Processor</td>
<td>4GB RAM</td>
</tr>
</tbody>
</table>

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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

At the beginning, before logging in, the user will encounter a splash screen and an onboarding page that will provide a brief overview of the application.

On the login page, users can register if they don’t have an account yet.

On the home menu page, there is important information displayed at the top, and below it, there are the classes that the student is enrolled in.

In the second navbar section, the “All Task Page” will display all tasks owned by the user, including the deadline information for each task.
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.

References


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