Journal of Intelligent Computing and Information Systems (JoICIS)
Vol. 1, No. 1

Applying Design Thinking to UI/UX Design of a Hotel Reservation Mobile App: A Case Study of Ascent Premiere Hotel

Rizdania[1*], Tegar Wahyu W.W. Putro[2], Lafnidita Farosanti[3], Maya Rayungsari[4]

[1,2,3,4] Computer Science Department, Faculty of Technology and Science, Universitas PGRI Wiranegara, Pasuruan, Indonesia
[*]E-mail : rizdania.uniwara@gmail.com

Abtract

This research demonstrates the implementation of the Design Thinking methodology in the UI/UX design of a mobile hotel reservation application for the Ascent Premiere Hotel. The hotel lacked a dedicated mobile application, leading to difficulties for customers in the online booking process. The five stages of Design Thinking were executed sequentially to ensure the resulting design aligned with user needs. The Empathize stage involved user interviews and observations, which were synthesized into an empathy map. In the Define stage, this data was used to create user personas and frame key challenges using "How Might We" questions. The Ideate stage generated a prioritized list of features, which were then developed into a high-fidelity prototype in Figma during the Prototype stage, complete with user flows and a style guide. Finally, the Test stage involved usability testing with 10 users. The prototype achieved high scores across five usability metrics: learnability (85.4%), efficiency (87.2%), memorability (86.3%), errors (82.7%), and satisfaction (91.8%). The overall usability score was 86.7%, indicating an excellent user experience. This study concludes that the Design Thinking framework is highly effective for developing user-centric UI/UX designs, as it can understand user needs, so the resulting design is expected to produce a good user experience.

Keywords: *UI/UX, Design Thinking, Hotel Reservation, Usability, Mobile Application*

1. INTRODUCTION

In the digital transformation era, the hospitality industry is experiencing a significant shift towards online reservation systems to enhance customer experience and operational efficiency [1]. Mobile applications for hotel reservations are becoming essential for users seeking convenience, speed, and reliability in booking accommodation [2]. However, poorly designed interfaces and inadequate understanding of user needs can lead to suboptimal user experiences and hinder the adoption of such technologies [3].

According to the problems at Ascent Premiere, customers had difficulty making online reservations because the hotel did not yet have a personal application to facilitate the independent reservation process. Therefore, an online reservation application is needed that can facilitate customers. In this study, UI/UX design will be carried out to ensure that the application design is based on user needs [4], [5], [6].

Design Thinking has emerged as a human-centred methodology that places user empathy and iterative problem-solving at the core of product development [7]. This study explores the application of the Design Thinking methodology in a mobile hotel reservation application's UI/UX design process. Ascent Premiere, a hotel in Pasuruan city, is used as a simulated case to model the development process and evaluate the effectiveness of Design Thinking in addressing user-centric challenges.

The design will lead to an application that allows guests to book their rooms online without contacting the hotel directly. In addition, the information in the application includes photos of the rooms, information about hotel facilities, and reviews from previous guests, which helps guests make better decisions. A practical solution for such a situation is a prototype-based hotel room reservation application using the design thinking method.

This study investigates how each stage of the Design Thinking framework—Empathize, Define, Ideate, Prototype, and Test—can contribute to creating a more intuitive, responsive, and engaging user interface. By focusing on user needs, this research aims to demonstrate how Design Thinking can guide the development of digital solutions in the hospitality domain, even in simulated environments.

2. METHODOLOGY

This study adopts the Design Thinking methodology as the core framework for developing a hotel reservation mobile application [8]. The process follows five sequential stages: Empathize, Define, Ideate, Prototype, and Test [9]. Each stage is applied with a user-centred perspective to simulate a realistic design process based on assumed user needs for the Ascent Premiere hotel. **Figure 1** shows the stages of the Design Thinking method.

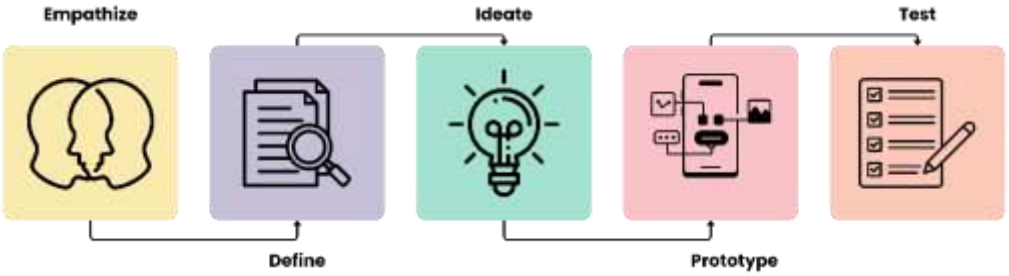

Figure 1. The Stages in the Design Thinking Method [10]

2.1 Empathize

In this stage, the goal was to understand the hypothetical users' needs, behaviours, and pain points [11]. Simulated user personas were developed based on typical customer profiles of hotel guests, such as business travellers, tourists, and families. Assumptions were made regarding their motivations and challenges in using digital hotel booking services. Observational insights and user expectations were synthesized from existing literature and reviews of similar applications.

2.2 Define

The Define stage involved formulating clear problem statements based on insights gathered during the Empathize stage [12]. These statements were translated into user needs, such as "users need a fast and simple way to check room availability," and "users want secure and clear booking confirmation." The process aimed to articulate specific design goals in the following stages.

2.3 Ideate

A brainstorming session was conducted to generate ideas that respond to the defined user needs [13]. Wireframes and low-fidelity sketches were produced to explore different layout options, navigation flows, and key features of the mobile application. Creative solutions were prioritized based on usability, feasibility, and alignment with user goals.

2.4 Prototype

In this phase, a high-fidelity mobile application prototype was developed using UI/UX design tools. The prototype included interactive mockups of key screens such as login, room selection, booking details, and payment confirmation. Visual consistency, accessibility, and intuitive interaction were emphasized to simulate a functional interface [14].

2.4 Test

The prototype was evaluated through hypothetical usability testing with feedback derived from simulated user interactions. Common usability principles were applied to assess user flows, layout effectiveness, and clarity of information. The test stage aimed to reflect realistic design iteration based on logical analysis and heuristic evaluation [15].

3. RESULTS AND DISCUSSION

The application of the Design Thinking methodology resulted in a structured and user-centred design process that produced a mobile hotel reservation application prototype tailored to the simulated needs of potential users. Each methodology phase contributed specific insights and outputs as described in the following sections.

3.1 Empathize

In the empathize stage, the author conducts research through questionnaires and competitive analysis. The purpose of the empathize stage is to help designers understand the views and needs of target users through research before defining problems and finding solution ideas. The first step is to conduct research using a method that has been determined together with users with criteria according to the desired target users, as listed in **Table 1**.

Table 1. Empathize Questions

No	Question
1	How do you usually search for hotel information when planning a trip?
2	Have you ever made a hotel reservation online through an application?
3	If so, how did you make a hotel reservation using the application?
4	How important is it for you to have easy access to information about the facilities and services offered by the hotel before you make a reservation?
5	Have you ever experienced any obstacles when booking a hotel?
6	If so, what were the obstacles you faced?
7	In your opinion, would it be more efficient if there were a special application for hotel reservations?
8	In your opinion, can a hotel reservation application make the booking process easier?
9	Se How important do you think it is to have the ease of making a reservation through an application?berapa penting menurut Anda kemudahan dalam melakukan pemesanan melalui aplikasi?
10	If so, what do you think about the easy booking process?

After getting the answers from the respondents, the process of categorizing user problems can be carried out by creating an empathy map. **Figure 2** is the resulting empathy map.

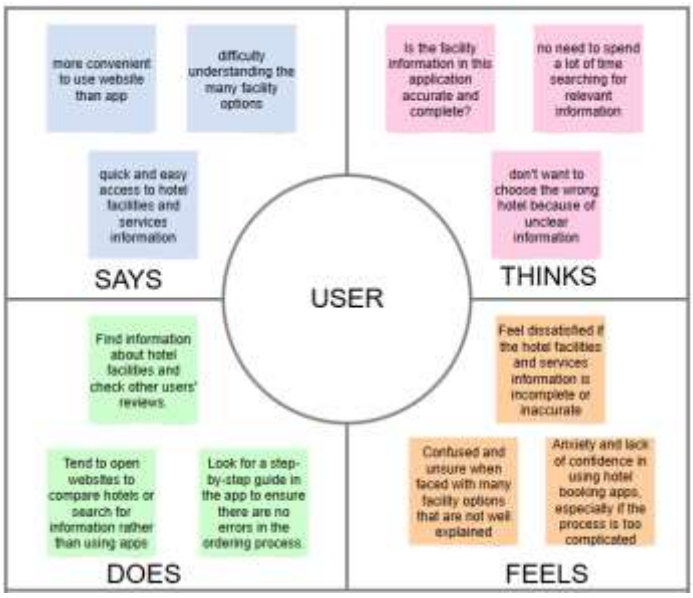

Figure 2. Empathy Map [16]

3.2 Define

After going through the empathize stage, where researchers conduct research and create empathy maps to understand the problems and needs of users, the process continues to the next stage, namely define. The define stage is a step that aims to formulate issues clearly and specifically based on the findings from the empathize stage and the results of the empathy map analysis. At this stage, the author will process data from the empathy map to identify and define the problem statement that will be the focus of finding a solution. The results of this process are listed as User Persona in **Table 2**.

Table 2. User Persona

No	Personal Data	Problem Description
1	User 1 Age: 35 Sex: Female Education: Master of Islamic Education	1. Incomplete or inaccurate information about facilities and services. 2. Need quick and easy access to hotel facilities and services information. 3. Want a fast, easy booking process and instant confirmation.
2	User 2 Age: 24 Sex: Female Education: Undergraduate Computer Science	1. Difficulty in finding relevant and accurate information in hotel booking apps. 2. Less familiar with hotel booking apps, more comfortable using websites. 3. A booking process that is not time-consuming or complicated is needed.
3	User 3 Age: 35 Sex: Female Education: Undergraduate Computer Science	1. Difficulty understanding the many choices and differences in facilities between hotels. 2. Lack of experience booking hotels online, needing an easy-to-use application. 3. Clear guidance and simple steps are needed in the booking process.

After finding the user's problems, the researcher concluded that what the user needed could be seen in **Table 3**.

.

Table 3. Users' Problem

No	Problem	Insight
1	Incomplete or inaccurate information about facilities and services.	Users need more detailed and accurate information to make informed decisions.
2	The ordering process is complicated or takes too long.	The application should be designed to simplify the ordering process and speed up confirmation.
3	The application interface is not intuitive or unfamiliar to new users.	The application needs a user-friendly interface and clear instructions to make it easy.

At this stage, to broaden the researcher's perspective in solving the problem, the How Might We (HMW) method is used by changing the statement into a question form [17] as listed in Table 3.

Table 4. How Might We

No	How Might We
1	How can we provide complete and accurate information to users?
2	How can we simplify and speed up the ordering process in the app?
3	How can we create a user-friendly interface and provide clear guidance for new users?

3.3 Ideate

In the Ideate stage, the author will use the defined problem statement to generate creative ideas and innovative solutions. Here, the author refers to the user needs analysis from the HWM (How Might We) process to create a feature that will be used in the application, shown in **Figure 3**.

The colours in the ideation process represent the priority level of the features identified for the application features.

1. Green
   Represents features that are highly prioritized and essential to be included in the application. These features are expected to contribute significantly to the user experience and are the primary focus in development.
2. Yellow
   Represents features that are important but do not have to be implemented immediately. These features are still considered because they have quite a significant value, but they can be prioritized after the features are marked in green.
3. Red
   Represents features that have a lower priority. These features can be considered for inclusion if there is time and resources, but are not the primary focus in the early stages of development.

Figure 3. Ideas after the Define Stage

3.4 Prototype

3.4.1 User Flow

User Flow is a series of steps users take when they use a product. This user flow is essential in designing a product's interface and user experience. The better the user flow design from start to finish in a process, the easier the product is to use and the greater the chance of a successful user experience (UX) [18].

User flow is created to show the steps a user takes to complete a task or achieve a goal. Some user flows were made in this research according to the task, for example, the Login User Flow shown in **Figure 4**.

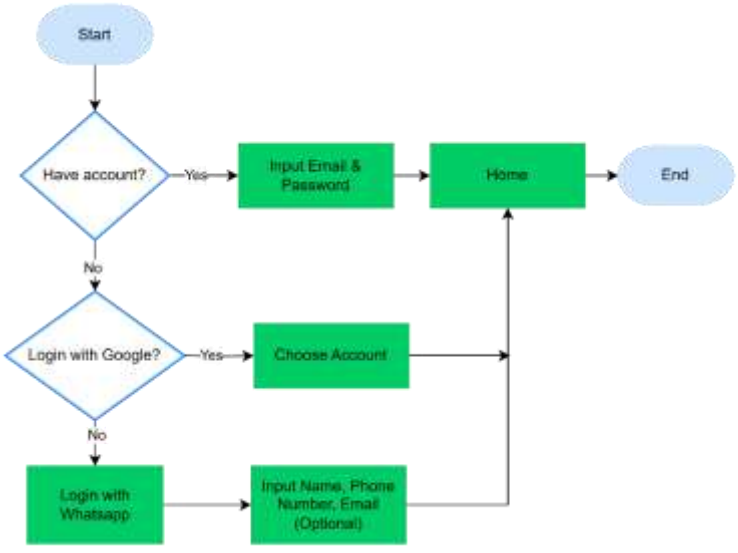

Figure 4. User Flow-Login

3.4.2 Style Guide

A Style Guide is a guiding document that details the visual Design and user interactions within an application. The Style Guide is the main guideline for researchers to ensure that every visual aspect of the application remains consistent and in line with the brand identity. With this guide, researchers can work more efficiently without making repeated adjustments, because the basic rules have been set from the start [19].

In planning the Style Guide for the "Hotel Ascent Premiere" application, the essential elements that were established include: application logo, typography, colour palette, iconography, layout, ui components (buttons, navigation bar, status bar, etc).

The Style Guide is shown in **Figure 5**.

Figure 5. Style Guide

3.4.2 Wireframe

Wireframe design is carried out based on the results of the Empathize and Define stages. This Wireframe serves as a basic reference for creating interface designs and prototypes, which will later be used in the testing stage with users or respondents [20].

High-fidelity wireframes are an advanced stage in user interface (UI) Design that displays more visual details and interactive elements. At this stage, the wireframe design reflects the final appearance of the application by incorporating colours, typography, images, icons, and other graphical elements.

The prototype was developed using Figma [21]. The interface featured a modern, clean layout emphasizing user accessibility. Key screens included login and registration pages, search and filter interface, room listing with image galleries, and booking confirmation page with transaction summary.

Figure 6 shows the Home Page Wireframe designed using figma. All screens were designed for responsiveness and consistency across mobile devices.

Figure 6. Home Page Wireframe Design

3.5 Test

Usability testing was conducted to evaluate how easy and enjoyable a product (such as an app, website, or software) is for users. The main goal is to identify issues that could hinder the user experience and ensure that the product meets their needs well.

Usability testing was conducted with ten users (respondents) to test the prototype design. There are five criteria in usability testing: learnability, efficiency, memorability, errors, and satisfaction [22]. Some questions with a Likert scale were prepared to gather the respondents' responses. **Table 5** shows the list of questions and the results of the questionnaire scores. And the result for each indicator is shown in **Table 6**.

Table 5. Result of the Questionnaire Score

No	Question	Score					Total
		1	2	3	4	5	
Learnability							
1.	I found it easy to understand how to use the UI of the "Hotel Ascent Premiere" app the first time I used it.	0	0	1	6	3	42
2.	I quickly learned the basic functions of the UI of the "Hotel Ascent Premiere" application.	0	0	2	4	4	42
Efficiency							
3.	I can book a hotel room efficiently using the UI of the "Hotel Ascent Premiere" application.	0	0	1	4	5	44
4.	I can quickly find the features I need in the UI of the "Hotel Ascent Premiere" application.	0	0	2	4	4	42
Memorability							
5.	After not using the UI of the "Hotel Ascent Premiere" app for a while, I found it easy to remember how to use it.	0	0	1	5	4	43
6.	I can easily remember the location of the main features in the UI of the "Hotel Ascent Premiere" application.	0	0	1	5	4	43
Errors							
7.	I rarely experience errors when using the "Hotel Ascent Premiere" app UI.	0	0	2	6	2	40

8.	I found it easy to fix the errors that occurred while using the UI of the "Hotel Ascent Premiere" application.	0	0	3	4	3	40
Satisfaction							
9.	I am satisfied with the overall experience of using the "Hotel Ascent Premiere" app UI.	0	0	1	3	6	45
10.	The UI design of the "Hotel Ascent Premiere" application helped me book the hotel room I wanted.	0	0	1	2	7	48

Table 6. Result for Each Indicator

No	Indicator	Total Score x Likert Score	Maximum Score	Result
1.	*Learnability*	94	110	(94/110) x 100% = 85,4%
2.	*Efficiency*	96	110	(96/110) x 100% = 87,2%
3.	*Memorability*	95	110	(95/110) x 100% = 86,3%
4.	*Errors*	91	110	(91/110) x 100% = 82,7%
5.	*Satisfaction*	101	110	(101/110) x 100% = 91,8%
Total		477	550	(477/550) x 100% = 86,7%

Learnability measures how easy it is for users to learn how to use an app when they first use it. With a score of 85.4%, the results show that most users found the app easy to learn. Efficiency measures how quickly and efficiently users can complete their app tasks. A score of 87.2% indicates that the app allows users to complete tasks quickly and without significant obstacles. Memorability measures the ability of users to remember how to use an app after not using it for some time. With a score of 86.3%, users indicated they could easily remember how to use the app. Errors measure the frequency and seriousness of errors users make and the ease of correcting those errors. A score of 82.7% indicates that users rarely experience serious errors and can correct errors that occur easily. Satisfaction measures user satisfaction with the overall experience of using the app. A high score of 91.8% indicates that users are delighted with the app.

The results show that the final user satisfaction score was 86.7% and was in the excellent category because the value was more than 81% [23]. The application of the Design Thinking methodology in this study demonstrated its effectiveness in guiding a user-centred design process for a mobile hotel reservation application. Each stage of the method contributed valuable insights that shaped the prototype's functionality, structure, and visual Design.

4. CONCLUSION

This study demonstrates the potential of the Design Thinking methodology in guiding the development of a user-centred mobile application for hotel reservations. Through the structured stages of Empathize, Define, Ideate, Prototype, and Test, the design process was able to simulate a realistic and user-focused interface tailored to the needs of hypothetical users of a fictional hotel, Ascent Premiere. The usability test results, with an overall score of 86.7%, show that this application is easy to use, efficient, easy to remember, has minimal errors, and is very satisfying for users.

In conclusion, Design Thinking proves to be a valuable approach in UI/UX design, particularly in contexts where understanding user needs and delivering intuitive digital experiences are crucial. In future research, involving actual users in the Empathize and Test stages is recommended to strengthen the relevance of findings. Furthermore, implementing the prototype into a functional system, followed by field testing, could offer deeper insights into user satisfaction and business impact.

REFERENCES

[1] F. A. Anwar and D. Deliana, "IJMSIT Digital Transformation in the Hospitality Industry : Improving Efficiency and Guest Experience," *Int. J. Manag. Sci. Inf. Technol.*, vol. 4, no. December, pp. 428–437, 2024, doi: https://doi.org/10.35870/ijmsit.v4i2.3201.

[2] S. Sun, R. Law, and S. S. Hyun, "Exploration of Hotel Reservation Through Mobile Online Travel Agencies," *Int. J. Tour. Res.*, vol. 26, no. 4, pp. 1–14, 2024, doi: 10.1002/jtr.2734.

[3] S. F. Elsayed and M. A. E.-A. Abed, "Studying the Effectiveness of Using Smartphone's Apps on Raising Hotels' Occupancy and Operation's Efficiency," *J. Assoc. Arab Univ. Tour. Hosp.*, vol. 15, no. 3, pp. 111–116, 2018, doi: 10.21608/jaauth.2018.54014.

[4] M. Nurfalaq, N. Wahyuni, M. M. Prasetyo, Sitti Wirda, and N. Nurhidayah, "Penerapan Model Pembelajaran Menyenangkan (Joyfull Learning) dalam Meningkatkan Hasil Belajar IPA," *J. Biotek*, vol. 10, no. 1, pp. 102–116, 2022, doi: 10.24252/jb.v10i1.29297.

[5] W. S. L. Nasution and P. Nusa, "UI/UX Design Web-Based Learning Application Using Design Thinking Method," *ARRUS J. Eng. Technol.*, vol. 1, no. 1, pp. 18–27, 2021, doi: 10.35877/jetech532.

[6] Rizdania, Y. A. B. Whiharja, P. U. Rakhmawati, S. H. Riono, E. S. Sintiya, and A. S. Afrah, "Implementation of Design Thinking in Student Organization Profile UI/UX Website Design at the University of PGRI Wiranegara," *Innov. Informatics Artif. Intell. Res.*, vol. 1, no. 1, pp. 1–11, 2025, doi: https://doi.org/10.278/iiair.

[7] R. Bender-Salazar, "Design thinking as an effective method for problem-setting and needfinding for entrepreneurial teams addressing wicked problems," *J. Innov. Entrep.*, vol. 12, no. 1, pp. 1–23, 2023, doi: 10.1186/s13731-023-00291-2.

[8] Ramadhan Ardi Lestyanto, A Dani Paska, Y.P Nugraha Sahna Emmanuel, P Pundi Trianggulo, and Widiati Sholihah Ina, "Perancangan UI/UX di dalam Aplikasi Reservasi Hotel Menggunakan Metode Design Thinking," *J. Ilmu Komput. dan Inf. Formosa*, vol. 2, no. 2, pp. 209–222, 2023.

[9] R. F. Dam, "The 5 Stages in the Design Thinking Process," Interaction Design Foundation. Accessed: Apr. 20, 2025. [Online]. Available: https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process

[10] T. Dibimbing.id, "Wajib tahu! Ini 5 Tahapan Design Thinking dan Penerapannya," dibimbing.id. [Online]. Available: https://dibimbing.id/blog/detail/5-tahapan-design-thinking-2022

[11] L. Anastasia, "Empathize dalam Design Thinking," Medium. Accessed: Apr. 24, 2025. [Online]. Available: https://medium.com/@lilyanastasia75/empathize-dalam-design-thinking-3c1c84fdcc21

[12] R. F. Dam and T. Y. Siang, "Stage 2 in the Design Thinking Process: Define the Problem and Interpret the Results," Interaction Design Foundation. Accessed: Apr. 06, 2025. [Online]. Available: https://www.interaction-design.org/literature/article/stage-2-in-the-design-thinking-process-define-the-problem-and-interpret-the-results

[13] R. F. Dam and T. Y. Siang, "What is Ideation – and How to Prepare for Ideation Sessions," Interaction Design Foundation. [Online]. Available: https://www.interaction-design.org/literature/article/what-is-ideation-and-how-to-prepare-for-ideation-sessions

[14] Simplilearn, "Prototyping In Design Thinking: Definition, Types & Benefits," Simplilearn. [Online]. Available: https://www.simplilearn.com/prototyping-in-design-thinking-article

[15] B. Kitch, "Testing: A Guide to the 5th Stage of Design Thinking," Mural. Accessed: Apr. 30, 2025. [Online]. Available: https://www.mural.co/blog/design-thinking-testing

[16] S. Gibbons, "Empathy Mapping: The First Step in Design Thinking," Nielsen Norman Group. Accessed: Apr. 22, 2025. [Online]. Available: https://www.nngroup.com/articles/empathy-mapping/

[17] D. Siemon, F. Becker, and S. Robra-Bissantz, "How Might We? From Design Challenges to Business Innovation," *J. Creat. Bus. Innov.*, vol. 4, no. January 2019, pp. 96–110, 2018, [Online]. Available: www.journalcbi.comhttp://www.journalcbi.com/from-design-challenges-to-business-innovation.html

[18] Figma, "What is a user flow? Why it's important in UX design," Figma. [Online]. Available: https://www.figma.com/resource-library/user-flow/

[19] tim MySkill, "Apa Itu Style Guide: Definisi, Peran Penting & Hal yang Harus Diperhatikan," Blog MySkill. [Online]. Available: https://blog.myskill.id/istilah-dan-tutorial/style-guide-fondasi-konsistensi-visual-dalam-desain/

[20] Y. A. S. Pratama and S. Suprihadi, "Pengembangan UI/UX Berbasis Metode Design Thinking

Fitur Send Your Waste Perusahaan Waste4change," *J. Pendidik. Teknol. Inf.*, vol. 5, no. 2, pp. 99–110, 2022, doi: 10.37792/jukanti.v5i2.554.

[21] P. J. McGrenere, D. L. Aflatoony, P. K. MacLean, J. Dawson, and P. N. Mahyar, "Prototyping : Low To High Fidelity," 2006.

[22] R. Dermawi, H. Tolle, and I. Aknuranda, "Design and Usability Evaluation of Communication Board for Deaf People with User-Centered Design Approach," *Int. J. Interact. Mob.*, vol. 12, no. 2, pp. 197–206, 2018.

[23] S. Ernawati and S. Rahayu, "Analisa Usability Pada Aplikasi Identitas Kependudukan Digital Menggunakan Metode Usability Testing," *BIOS J. Teknol. Inf. dan Rekayasa Komput.*, vol. 5, no. 1, pp. 12–19, 2023, doi: 10.37148/bios.v5i1.87.