DIGITAL DINING INNOVATION: UI/UX DESIGN OF THE REST-O MOBILE APPLICATION USING DESIGN THINKING METHOD

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Abstract

The culinary sector plays a significant role in Indonesia's growing creative economy, driven by changing consumer behavior among Generation Z and Millennials. Despite the increasing preference for dine-in experiences, long waiting times and inefficient reservation processes remain major challenges that negatively affect customer satisfaction. These issues highlight the need for user-centered digital solutions that improve efficiency and convenience in restaurant services. This study aims to design the user interface (UI) and user experience (UX) of *Rest-O*, a mobile restaurant reservation application developed using the Design Thinking methodology. The research follows five iterative stages: empathize, define, ideate, prototype, and test, enabling the design to be based on real user needs and insights. The proposed application integrates features such as table reservations, pre-arrival menu ordering, and a 360-degree virtual restaurant tour to reduce waiting time and enhance the overall dining experience. Usability evaluation was conducted using the System Usability Scale (SUS) with five participants, resulting in an average score of 88, which falls into the "Excellent" category. These results indicate that the Rest-O UI/UX design is intuitive, efficient, and well-aligned with user expectations. The study concludes that a user-centered design approach can significantly improve service efficiency and user satisfaction in the culinary industry.

Keywords: UI/UX Design, Design Thinking, System Usability Scale

1. INTRODUCTION

Recent studies show that the creative economy in Indonesia continues to grow significantly, contributing to national GDP, employment, and export performance, highlighting its role as a major economic driver powered by human creativity and innovation (Syafitri & Nisa, 2024). Among the 16 subsectors of the creative economy, the culinary sector has become one of the most influential, transforming food from a basic necessity into an integral part of lifestyle and cultural expression. This development has positioned the culinary industry as a key driver capable of stimulating growthin other creative economy sectors.

Changes in consumer behavior, particularly among Generation Z and Millennials, have further strengthened the importance of the culinary sector. Survey results show that 46% of Gen Z and Millennial consumers prefer dining in at restaurants (Populix, 2023). In choosing dining destinations, this group considers factors such as price, menu variety, type of cuisine, and service quality. In addition, promotional offers, location proximity, popularity ratings, and best-selling menus play a crucial role in shaping dining decisions. Previous studies also indicate that

Millennials allocate a larger portion of their discretionary spending to food compared to other consumption categories, emphasizing the growing value of dining experiences.

Despite the increasing demand for dine-in services, waiting time remains a major challenge for restaurants, as perceived waiting time has been shown to significantly influence customer satisfaction in restaurant contexts, indicating that longer waits can reduce satisfaction and negatively impact customer experience (Lahap et al., 2018). Long waiting times negatively affect customer satisfaction and significantly reduce the likelihood of repeat visits, as negative experiences tend to be remembered more strongly than positive ones.

To address these challenges, digital solutions that prioritize usability and efficiency are increasingly required in the culinary industry. Rest-O is proposed as a restaurant reservation application designed to streamline table reservations, provide real-time menu availability, and deliver reliable information about restaurant ambiance. From a system development perspective, effective user interface (UI) and user experience (UX) design are essential to ensure smooth interaction between users and the application (Suratno & Shafira, 2022). Intuitive and user-friendly systems can improve operational efficiency and customer satisfaction, while poorly designed systems may lead to frustration and inefficiencies.

Therefore, a user-centered design approach is crucial in developing a reservation system that aligns with real user needs (Nigata et al., 2024). This research adopts the Design Thinking method, an iterative approach that emphasizes empathy toward users, problem definition, idea generation, prototyping, and testing (Sinaga et al., 2024). The Design Thinking method enables designers to identify core user problems and generate appropriate design solutions based on user insights. This study aims to design the UI/UX of the Rest-O application to enhance the dine-in experience by minimizing waiting time, enabling advance table and menu reservations, and improving overall customer convenience in the culinary industry.

2. METHODOLOGY

This study employs the Design Thinking approach to design the User Interface (UI) and User Experience (UX) of the REST-O mobile application. REST-O is a digital dining platform designed to improve the dine-in experience by enabling efficient table reservations and menu pre-ordering. The Design Thinking methodology was selected because it emphasizes a human-centered process and ensures that the resulting design aligns with real user needs and expectations.

Design Thinking consists of five main stages: Empathize, Define, Ideate, Prototype, and Testing. The Empathize and Define stages were used to identify user problems and formulate problem statements based on user research. This study focuses on the Ideate and design development stages, which translate identified user

needs into concrete design solutions. Design Thinking method enables systematic design progression from understanding user needs to prototyping actionable UI/UX solutions that are validated through usability evaluation (Salam et al., 2024). The stages of the design thinking method applied in this study are shown in Fig. 1

Figure 1. Design Thinking Method

2.1 Empathize

The Empathize phase focuses on understanding user behaviors, needs, and challenges through qualitative data collection such as observation and interviews to identify real user problems (Salam et al., 2024). This stage serves as the foundation of the Design Thinking process by ensuring that subsequent design decisions are grounded in actual user experiences.

2.2 Define

The Define phase aims to synthesize insights from the Empathize stage by identifying key user problems and recurring pain points that affect the user experience. These insights are formulated into clear problem statements and How Might We (HMW) questions to maintain alignment between user needs and system objectives.

2.3 Ideate

The Ideate phase facilitates the generation of solution alternatives by translating defined user problems into preliminary design ideas (Wati et al., 2025). This stage emphasizes exploring multiple solution possibilities to identify the most relevant and feasible features aligned with user expectations and application goals.

2.4 Prototype

The Prototype phase involves developing interactive representations of selected design ideas to simulate user interaction with the REST-O application. Prototyping enables early usability evaluation and supports iterative refinement before formal testing.

2.5 Test

The Test phase evaluates the usability and effectiveness of the prototype through direct user interaction and feedback collection. Usability evaluation results provide empirical evidence for refining the design to ensure it meets user expectations and system objectives.

3. FINDINGS AND DISCUSSION

This section presents the results obtained from each stage of the research process and discusses the findings in relation to the research objectives. The discussion focuses on interpreting the results of the Design Thinking implementation,

including user insights, design outcomes, and usability evaluation. Each subsection explains the significance of the findings and how they address the identified problems, supported by relevant literature and empirical data.

3.1 Empathize

The empathize phase aims to understand users needs, behaviors, and challenges related to dine-in restaurant experiences. Data are collected through interviews, observations, and literature review to identify key pain points, such as long waiting times and limited reservation information. The insights obtained form the basis for defining user problems in the next phase, as detailed in Table 1 in the form of an Empathy Map.

Table 1. Empathize Map

Category	Description
Say.	-“Is there a way to reserve a table at a restaurant without waiting in line?” -“How can the menu and the restaurant atmosphere be known before visiting?” -“Is the menu item still available to order?" -“How can table availability at the restaurant be checked?”
Think	-“Is it necessary to keep waiting in line at restaurants that are consistently crowded?” -“Is there an effective way to plan a dining visit in advance?” -“How can it be ensured that the selected menu matches personal - preferences?” -“Choosing the appropriate menu can be confusing.”
Feel	-“Feeling exhausted due to long waiting times at the restaurant.” -“Feeling uncertain about the offerings of a restaurant that has not been visited before.” -“Feeling that time is wasted when tables are full and menu items are unavailable after a long wait.” -“Feeling disappointed with the quality of restaurant service.”
Do	-“Searching for ways to reserve a table before arriving at the restaurant.” -“Seeking detailed information about the restaurant before deciding to visit.” -“Contacting the restaurant in advance to confirm menu availability.”

3.2 Define

The data and insights gathered during the empathize phase are analyzed in the define phase to synthesize the user’s Point of View (POV) and transform the identified problems into design challenges. The outcome of the define phase is a set of How

Might We (HMW) statements derived from the established POV, as presented in Table 2.

Table 2. How Might We Statement

POV	How Might We
User needs an effective way to book a table at a restaurant without having to queue, as she has a tight schedule.	How might we create a system that allows User to reserve a table efficiently, eliminating the need to wait in line?
User needs a reliable source to access accurate information about the restaurant's menu and ambiance, so her expectations match the actual experience.	How might we develop a platform that provides detailed and trustworthy information about restaurant menus and ambiance?
User needs assurance that her desired menu items will be available before she arrives at the restaurant, allowing her to save time.	How might we implement a real-time menu update system to ensure User can confirm the availability of her preferred dishes?
User needs a way to check table availability at the restaurant to avoid uncertainty.	How might we design a feature that enables User to check and book available tables at a restaurant?

3.3 Ideate

Several solution concepts were developed during the Ideate phase based on the problem statements and user needs found in earlier phases can be seen in Table 3. In order to improve the whole eating and reservation experience, these concepts were converted into important aspects of the REST-O mobile application, which focuses on reservation efficiency, ordering flow, tailored recommendations, real-time information, and user feedback.

Table 3. REST-O Mobile Application Features

No.	Solution Idea
1.	Creates an online table reservation mechanism integrated with secure payment processing.
2.	Provides location-based information and navigation guidance to support restaurant discovery.
3.	Builds a structured ordering flow to compile and manage selected menu items prior to confirmation.

4.	Delivers personalized restaurant recommendations based on user preferences and interaction history.
5.	Supports the exploration and contribution of restaurant reviews as part of user-generated content.
6.	Presents immersive virtual representations of restaurant environments to enhance user exploration.
7.	Displays real-time updates on ongoing order and reservation status.
8.	Collects and manages user feedback to evaluate and improve the overall dining and reservation experience.

3.4 Prototype

The prototype phase functions as a bridge between conceptual ideation and tangible user evaluation. These high-fidelity designs are developed to verify whether the proposed UI/UX solutions effectively mitigate the specific pain points identified in the earlier research stages, as illustrated in Fig. 1 and Fig. 2. By offering interactive functionality that mimics the final system, the prototype allows for a realistic assessment of the application's navigation and user flow. The following sections visualize the resulting interface designs and core features of the REST-O mobile application.

Figure 2. Reservation Booking Workflow Interface Mockup

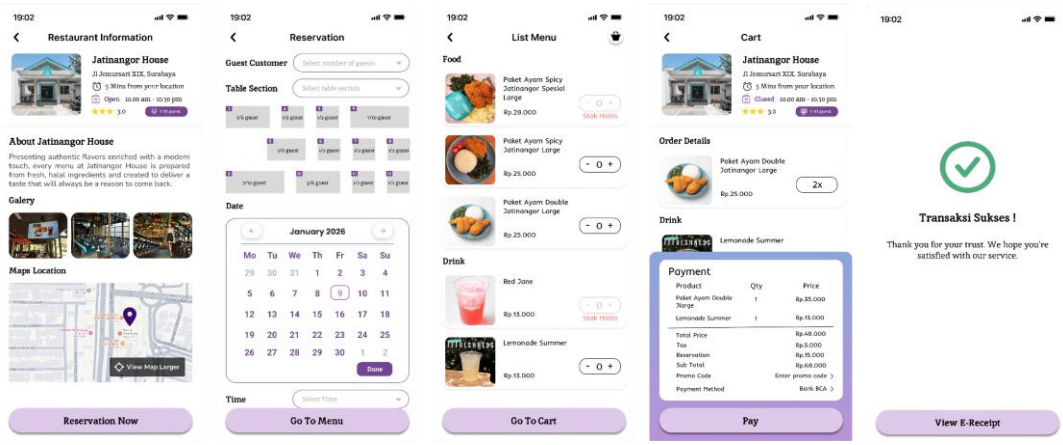
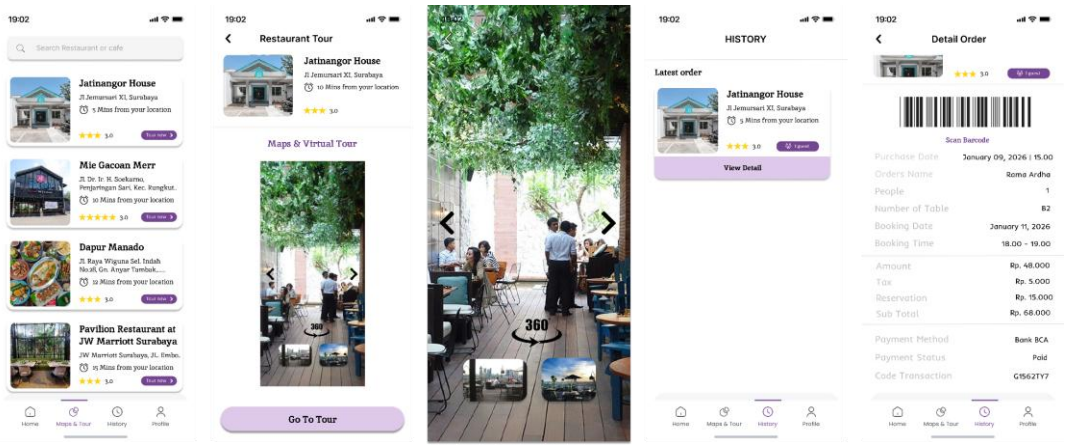


Figure 3. Interface Mockup of Restaurant Tour and Booking History



3.5 Test

In the final stage of the Design Thinking framework, the REST-O mobile application prototype underwent a rigorous evaluation to measure its usability and user satisfaction. The primary objective was to validate whether the digital dining solution effectively met the needs of the target audience through direct user feedback. Following the methodology outlined by Brooke, this study employed the System Usability Scale (SUS) as a reliable tool for measuring the usability of digital products(Brooke, 1996). The SUS instrument consists of 10 standardized statements that alternate between positive and negative sentiments to ensure respondent focus. These specific statements used to evaluate the REST-O interface are detailed in Table 4.

Table 4. User Statement

No.	Statement
3.	I think that I would use this system frequently.
4.	I found the system unnecessarily complex.
5.	I thought the system was easy to use.
4.	I think that I would need the support of a technical person to be able to use this system.
5.	I found the various functions in this system were well integrated.
6.	I thought there was too much inconsistency in this system.
7.	I would imagine that most people would learn to use this system very quickly.
8.	I found the system very cumbersome to use.
9.	I felt very confident using the system.
10.	I needed to learn a lot of things before I could get going with this system.

Participants rated their agreement with each statement using a five-point Likert scale to provide a nuanced view of their experience. In this measurement system, a score of 1 represents "*Strongly Disagree*," while a score of 5 represents "*Strongly Agree*," allowing for a balanced assessment of both positive and negative attributes. The testing involved five selected respondents who represented the primary end-users of the REST-O app to ensure relevant data collection. These users were tasked with navigating the application's core features, such as menu browsing, seat reservation, and the digital ordering process. Following the simulation, respondents completed the SUS questionnaire based on their real-time interaction with the prototype. The raw data collected from these five respondents for each of the ten statements is displayed in Table 5.

Table 5. Questionnaire Result

Resp.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
R1	5	1	3	2	5	1	5	1	4	1
R2	4	3	5	2	5	2	4	1	5	3
R3	5	2	5	2	5	1	4	1	5	2
R4	5	3	4	1	5	1	4	2	5	1
R5	5	2	5	1	4	2	5	2	5	2

To arrive at the final usability score, the raw data underwent a specific normalization process:

1. For odd-numbered (positive) statements: The score was calculated by subtracting 1 from the user's raw rating.
2. For even-numbered (negative) statements: The score was calculated by subtracting the user's raw rating from 5.

The sum of these adjusted scores was then multiplied by 2.5 to convert the results into a standardized scale ranging from 0 to 100.

Table 6. SUS Score

Resp.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Normalization (Score*2.5)
R1	4	4	2	3	4	4	4	4	3	4	90
R2	3	2	4	3	4	3	3	4	4	2	80
R3	4	3	4	3	4	4	3	4	4	3	90
R4	4	2	4	4	4	4	3	3	4	4	90
R5	4	3	4	4	3	3	4	3	4	3	88
SUS Score											88

The data in Table 6 shows that the cumulative calculation from the five

respondents yielded an average SUS Score of 88. According to the industry-standard SUS feasibility adjectives, a score of 88 falls into the "*Excellent*" category. This high score indicates that the UI/UX design of REST-O is highly intuitive, easy to learn, and provides a seamless experience for users looking to innovate their dining activities. These findings suggest that the Design Thinking approach successfully addressed user pain points, resulting in a high level of user acceptance and system efficiency. Consequently, the prototype is deemed ready for further development and potential implementation in a real-world dining environment.

4. CONCLUSION

This research successfully developed the Rest-O mobile application through the five-stage Design Thinking methodology to modernize the culinary experience. The design offers innovative UI/UX features such as integrated table reservations, pre-arrival menu ordering, and a 360-degree virtual tour of the restaurant's interior. These features were specifically designed to solve common industry problems like queuing delays and booking overlaps. By prioritizing a user-centered approach, the application provides a highly efficient and transparent interface for modern diners.

The usability of the Rest-O prototype was validated using the System Usability Scale (SUS) with five representative participants. Following the testing of core navigation and booking flows, the evaluation yielded an average SUS score of 88. This result places the application in the "*Excellent*" category, proving that the interface is intuitive and accessible for its target audience. The high score confirms that the UI/UX design successfully meets the functional requirements and aesthetic expectations of the users.

In summary, the implementation of Design Thinking for Rest-O has produced a seamless and high-performing digital dining solution. The iterative process ensured that complex features, such as the scheduling system and virtual visualization, remained easy to navigate. This study demonstrates that focused UI/UX innovation can significantly improve service efficiency and user satisfaction within the foods and beverages industry. Future work should focus on integrating live payment systems to further complete the digital customer journey.

REFERENCES

Brooke, J. (1996). *SUS: A Quick and Dirty Usability Scale BT - Usability Evaluation in Industry*.

Lahap, J., Azlan, R. I., Bahri, K. A., Mohd Said, N., Abdullah, D., & Zain, R. A. (2018). The Effect of Perceived Waiting Time on Customer's Satisfaction: A Focus on Fast Food Restaurant. *International Journal of Supply Chain Management*, *7*(5), 1–9. https://doi.org/10.59160/ijscm.v7i5.2057

Nigata, Q. A. D., Ana, W. S. F., & Kartika, D. S. Y. (2024). MentalMate: Desain UI/UX

Aplikasi Konsultasi Kesehatan Mental untuk Mahasiswa di Surabaya Menggunakan Metode User Centered Design. *Jurnal Teknologi Informasi Dan Terapan*, *11*(1), 43–50. https://doi.org/10.25047/jtit.v11i1.372

Populix. (2023). *Survei Populix: Perilaku Konsumsi Makanan Gen Z dan Milenial*. Populix. https://mediaasuransinews.co.id/hot-topic/survei-populix-mayoritas-gen-z-dan-milenial-lebih-suka-membeli-makan-daripada-memasak-sendiri/

Salam, M. I., Setiawan, A., & Sukmasetya, P. (2024). Perancangan UI/UX Pada Sistem Perpustakaan dengan Pendekatan Design Thinking. *Journal of Information System Research*, *5*(2), 676–685. https://doi.org/10.47065/josh.v5i2.4654

Sinaga, I., Wati, S. F. A., & Fitri, A. S. (2024). Perancangan Ulang UI/UX Website D'Coffee Cup ke Aplikasi Mobile dengan Metode Design Thinking. *Jurnal Teknik Informasi Dan Komputer*, *7*(1), 512–520. https://doi.org/10.37600/tekinkom.v7i1.1466

Suratno, B., & Shafira, J. (2022). Development of User Interface/User Experience using Design Thinking Approach for GMS Service Company. *Journal of Information Systems and Informatics*, *4*(2), 469–494. https://doi.org/10.51519/journalisi.v4i2.344

Syafitri, A. D. A., & Nisa, F. L. (2024). Perkembangan serta Peran Ekonomi Kreatif di Indonesia dari Masa ke Masa. *JURNAL EKONOMI BISNIS DAN MANAJEMEN*, *2*(3), 189–198. https://doi.org/10.59024/jise.v2i3.810

Wati, S. F. A., Wulansari, A., Fitri, A. S., Najaf, A. R. E., & Pratama, V. S. P. (2025). UI/UX Design Internship Management Information System Using Design Thinking Method. *Nusantara Science and Technology Proceedings*, *2024*(47), 517–528. https://doi.org/10.11594/nstp.2025.4776