



Implementation of the User Centered Design Method in Designing UI/UX Prototypes for Traditional Herbal Medicine Sales

Annisa Rusydina Sabila¹, Asmunin²

^{1,2}Manajemen Informatika, Universitas Negeri Surabaya, Indonesia

¹annisa.19004@mhs.unesa.ac.id, ²asmunin@unesa.ac.id

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ABSTRACT

This study aims to design a UI/UX prototype for a traditional herbal medicine sales application using the User-Centered Design (UCD) approach to improve user experience and usability. The study involved 96 respondents who were users or potential users of traditional herbal medicine products. The design process followed four stages of UCD: understanding the context of use, identifying user requirements, designing solutions, and evaluating the prototype. Usability evaluation was conducted using Cognitive Walkthrough (CW) to assess learnability and task efficiency, and the System Usability Scale (SUS) to measure user satisfaction. The results show that the prototype achieved a task completion rate of 92% in the Cognitive Walkthrough evaluation, indicating high learnability and efficiency. In addition, the prototype obtained an average SUS score of 82.3, which falls into the “Excellent” category and indicates a high level of user acceptance. These findings demonstrate that the implementation of the UCD method successfully produced a user-friendly interface that is effective, easy to understand, and aligned with user needs. This research contributes to the development of user-centered digital solutions for traditional herbal medicine commerce and supports the digital transformation of traditional product marketing.

1. INTRODUCTION

The rapid advancement of digital technology has significantly transformed various sectors, including commerce and traditional healthcare. One of Indonesia’s culturally significant products, traditional herbal medicine (jamu), continues to face challenges in accessibility, information dissemination, and user engagement, particularly among younger, digitally oriented users. Although digital platforms offer opportunities to modernize traditional product distribution, many existing systems fail to provide intuitive interfaces and effective user experiences, which are critical factors influencing user adoption and satisfaction. Therefore, the development of user-centered digital solutions is essential to ensure that applications meet user expectations and improve overall interaction quality [1].

In the context of software development, User-Centered Design (UCD) has emerged as a widely adopted approach that emphasizes the active involvement of users throughout the design process. UCD focuses on understanding user needs, behaviors, and contexts to produce systems that are more usable and effective. Previous studies have demonstrated that UCD can significantly enhance usability and user satisfaction in various domains, including e-commerce and healthcare applications. However, many implementations of UCD still lack comprehensive usability evaluation, particularly when integrated with systematic testing methods such as Cognitive Walkthrough (CW) and System Usability Scale (SUS) [2].

Cognitive Walkthrough is a usability inspection method that evaluates how easily new users can learn to use a system by simulating task-based interactions and identifying potential usability issues related to learnability and efficiency. Meanwhile, the System Usability Scale (SUS) is a widely recognized quantitative tool used to measure perceived usability and user satisfaction, providing standardized scoring that enables interpretation across

different systems and studies. The combination of CW and SUS has been shown to provide complementary insights by capturing both qualitative usability problems and quantitative user perceptions, resulting in a more comprehensive evaluation of user experience [3].

Despite the growing number of studies on UI/UX design using UCD, several research gaps remain. First, limited studies focus specifically on the digitization of traditional herbal medicine sales, which has unique characteristics related to cultural context, user trust, and information needs. Second, many previous studies apply only a single usability evaluation method, resulting in less comprehensive insights into system usability. Third, there is still a lack of integration between user-centered design processes and rigorous usability evaluation frameworks in a single study [4].

Therefore, this study aims to address these gaps by designing a UI/UX prototype for a traditional herbal medicine sales application using the User-Centered Design approach, combined with usability evaluation using both Cognitive Walkthrough and System Usability Scale. This research is expected to contribute by providing a more comprehensive evaluation framework and producing a user-centered design that is aligned with user needs, thereby supporting the digital transformation of traditional herbal medicine commerce.

2. LITERATURE REVIEW

A. Previous Research and Research Gap

Several previous studies have explored the application of UCD combined with usability evaluation methods. For instance, recent research has demonstrated that integrating UCD with SUS and Cognitive Walkthrough can significantly improve usability and user satisfaction in digital systems [6]. Other studies have also highlighted the importance of combining qualitative and quantitative evaluation methods to obtain a comprehensive understanding of user experience [5]. In addition, recent works report that hybrid evaluation strategies (e.g., SUS combined with task-based inspections) provide more reliable diagnostics of usability issues than single-method approaches, particularly for mobile and e-commerce interfaces [7]. Furthermore, studies in domain-specific applications emphasize that context-aware design (e.g., health-related content and trust cues) critically affects user adoption and perceived usefulness, suggesting that generic UI/UX patterns are insufficient for culturally rooted products such as traditional herbal medicine [8].

However, several limitations remain. First, most studies focus on general applications such as educational platforms and information systems, with limited attention to culturally specific domains such as traditional herbal medicine. Second, many studies rely on a single usability evaluation method, which limits the depth of usability analysis. Third, there is still a lack of integration between UCD processes and combined usability evaluation frameworks in a single study.

Therefore, this research addresses these gaps by integrating the User-Centered Design approach with both Cognitive Walkthrough and System Usability Scale in designing a traditional herbal medicine sales application. This approach is expected to provide a more comprehensive usability evaluation while addressing domain-specific user needs.

B. User-Centered Design (UCD)

User-Centered Design (UCD) is an approach that emphasizes the involvement of users throughout the system development lifecycle to ensure that the resulting system aligns with user needs, context, and usability requirements. UCD is widely recognized as an effective approach in improving interaction quality and system acceptance, particularly in digital applications where user experience plays a critical role. The application of UCD has been shown to improve usability outcomes by incorporating iterative feedback and user participation during the design process [1]. Furthermore, recent studies highlight that UCD contributes significantly to improving system effectiveness and user satisfaction, especially when integrated with evaluation techniques that validate usability outcomes [2].

However, despite its advantages, the implementation of UCD often lacks systematic validation through both qualitative and quantitative usability evaluation methods. This limitation may result in designs that are user-oriented but not fully validated in terms of usability performance. Therefore, integrating UCD with structured usability evaluation methods becomes essential.

C. System Usability Scale (SUS)

System Usability Scale (SUS) is a standardized usability evaluation method that provides a quick and reliable measure of perceived system usability. SUS consists of ten questionnaire items that produce a usability score ranging from 0 to 100, which can be interpreted using grading scales and adjective ratings. It is widely used due to its simplicity, efficiency, and reliability across various domains, including web and mobile applications.

Recent research confirms that SUS remains one of the most robust tools for usability measurement, as it allows researchers to quantify user satisfaction and compare usability performance across systems. In addition, SUS is often combined with other evaluation methods to provide a more comprehensive understanding of user experience, particularly in UI/UX studies [3].

However, SUS primarily captures overall user perception and does not provide detailed insights into specific usability issues. Therefore, it is often complemented by qualitative evaluation methods such as Cognitive Walkthrough.

D. Cognitive Walkthrough (CW)

Cognitive Walkthrough (CW) is a usability evaluation method that focuses on assessing the learnability of a system by simulating user interactions step-by-step. This method evaluates how easily users can complete tasks without prior experience and identifies potential usability problems related to navigation, feedback, and task completion.

CW is particularly effective in early-stage design evaluation, especially for prototypes, as it helps identify usability issues before system implementation. Research shows that CW can provide detailed insights into user interaction problems and significantly improve system usability when applied iteratively [4]. Additionally, CW has been widely used in combination with other evaluation methods to enhance the comprehensiveness of usability assessment [5].

Despite its strengths, CW relies on evaluator expertise and does not directly measure user satisfaction, which makes it necessary to combine it with quantitative methods such as SUS.

3. RESEARCH METHOD

This study applies the User-Centered Design (UCD) approach to design a UI/UX prototype for a traditional herbal medicine sales application. UCD is selected because it emphasizes user involvement throughout the system development process, ensuring that the resulting system meets user needs, preferences, and context of use. The research process consists of four main stages: understanding the context of use, specifying user requirements, designing solutions, and evaluation [1]. The research stages include problem identification, data collection, system design, and testing and evaluation. In general, the research flow starts from understanding the problems that occur in the traditional herbal medicine sales process, then continues with user data collection, prototype design, and testing of design results.

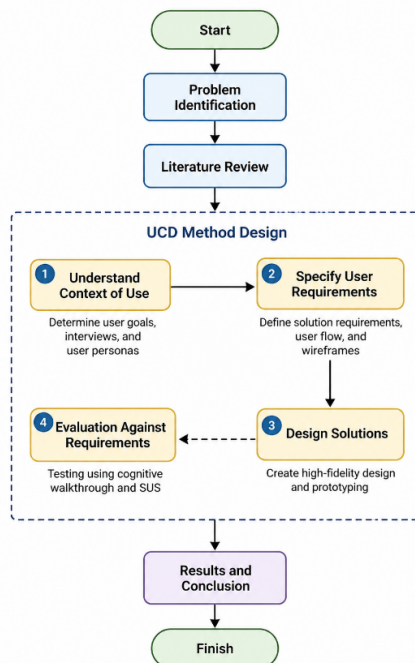


Figure 1. Research Process

A. Problem Identification

The problem identification stage is carried out to find out the obstacles in the process of selling traditional herbal medicine that is still carried out conventionally. Based on the results of observations, it was found that

limited access to product information, lack of digital media, and inefficient transaction processes are the main problems. In addition, users also experience difficulties in finding herbal products that suit their health needs. These problems show that a digital-based solution is needed that is able to improve the ease of access to information, transaction efficiency, and the quality of user interaction. Therefore, UI/UX-based application design is carried out that focuses on user needs.

B. Population and Sampling

The population of this study consists of users who have experience or interest in purchasing traditional herbal medicine products. A total of 96 respondents participated in this study. The sampling technique used is purposive sampling, where respondents are selected based on specific criteria, such as familiarity with mobile applications and interest in herbal products. This approach ensures that the collected data is relevant to the research objectives [2].

C. Data Collection

This stage is carried out to obtain accurate information and in accordance with the needs of users. The methods used in this study include interviews, observations, and literature studies. Interviews are conducted in a semi-structured manner to prospective users of traditional herbal medicine to find out information about the needs, habits of use, and problems faced in the process of purchasing herbal medicine products. The results of the interviews show that users need a system that is able to provide product information clearly, facilitate the search process, and provide ease of making transactions. In addition, users also expect a simple and easy-to-use look to the app. Observations were carried out to find out the ongoing herbal medicine sales process, including the flow of transactions and interactions between sellers and buyers. The results of observations show that the sales process is still carried out conventionally, so it is less efficient and has limitations in delivering product information to users. The literature study was conducted by examining various scientific sources such as journals and books related to UI/UX, the User Centered Design (UCD) method, and usability evaluation techniques such as Cognitive Walkthrough and System Usability Scale (SUS). The results of the literature study are used as a theoretical basis in this study as well as a reference in the design and evaluation of the system.

D. System Design

The system design is carried out using the User Centered Design (UCD) method which consists of four main stages, namely understand the context of use, specify user requirements, design solution, and evaluation. This method is used to ensure that the system is designed to focus on the needs of the user and is able to provide an optimal user experience. At the understand context of use stage, an analysis was carried out on user characteristics, application usage objectives, and system usage environment. This analysis includes the identification of user profiles, habits in using digital applications, and the main needs in finding and buying herbal products. This stage aims to understand the context of the use thoroughly so that the designed system can be in accordance with the real conditions of the user. The specify user requirements stage produces user needs consisting of functional and non-functional needs. Functional needs include key features such as product search, herbal medicine detail, shopping cart, and the ordering process. The non-functional needs include usability, system speed, and attractive and responsive interface design. This need is formulated based on data that has been previously collected. At the solution design stage, solution design is carried out in the form of a prototype using Figma tools. This process includes creating user personas to represent user characteristics, user flow to describe the flow of user interaction in the system, and information architecture to structure information structures in the application. Next, the design of the interface (user interface) in the form of a high-fidelity prototype that resembles a real application so that it can be tested directly by the user. To illustrate the interaction between users and the system, use case diagrams are used that show the main functions available in the application, such as viewing products, searching for products, and placing orders. This diagram provides an overview of the relationship between the user and the system and helps in understanding the functional flow of the application.

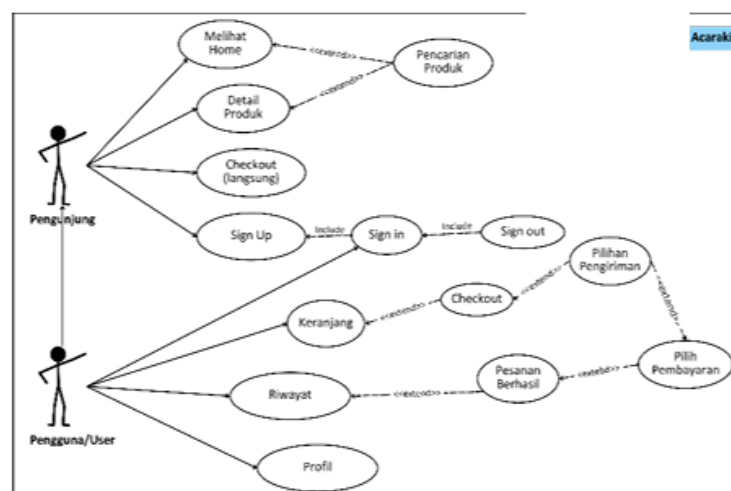


Figure 2. Use Case Diagram

At the evaluation stage, an evaluation of the prototype that has been designed is carried out to ensure compatibility with user needs. Evaluation is carried out iteratively so that the design results can be improved and refined based on feedback obtained from users.

E. Usability Testing Methods

This study uses two usability evaluation methods: Cognitive Walkthrough (CW) and System Usability Scale (SUS).

a. Cognitive Walkthrough (CW)

Cognitive Walkthrough is used to evaluate system learnability by simulating user interaction through predefined task scenarios. Respondents are asked to complete specific tasks such as searching for products, viewing details, and making purchases. The evaluation focuses on task success rate and user difficulties encountered during interaction [3].

b. System Usability Scale (SUS)

SUS is used to measure overall user satisfaction. It consists of 10 statements with a Likert scale (1–5). The SUS score is calculated using the following formula:

- For odd-numbered questions: Score = (X - 1)
- For even-numbered questions: Score = (5 - X)
- Total score is multiplied by 2.5 to obtain a value between 0–100

The final SUS score is interpreted based on usability standards, including grade scale and adjective rating such as “Good” or “Excellent” [4].

F. Data Analysis

Data analysis is performed by calculating:

- Task success rate from Cognitive Walkthrough
- Time-based efficiency
- Average SUS score

The SUS score is then interpreted using standard usability benchmarks to determine the level of system usability. Descriptive statistical analysis such as mean values is used to summarize the results [4].

G. Testing and Evaluation

Testing is carried out to measure the usability level of the prototype that has been designed. The methods used in this study are Cognitive Walkthrough and System Usability Scale (SUS). The Cognitive Walkthrough method is used to evaluate the learnability and efficiency of the system by providing users with several task scenarios. Users are asked to complete a specific task, then the success rate and time required are observed. Meanwhile, the System Usability Scale (SUS) method is used to measure the level of user satisfaction with the system as a whole. This method uses a questionnaire with a certain rating scale that is then processed to produce a usability score. The test was carried out on 96 respondents who were users of traditional herbal medicine. The data obtained was

analyzed using the calculation of success rate, time-based efficiency, and SUS score to determine the quality of user experience of the developed prototype.

4. RESULT AND DISCUSSION

This section presents the results of the prototype design and usability evaluation of a traditional herbal medicine sales application developed using the User Centered Design (UCD) approach. The discussion integrates findings from Cognitive Walkthrough (CW) and System Usability Scale (SUS) to provide both qualitative and quantitative insights into system usability.

A. Prototype Design Results

Based on the data collection process (interviews, observations, and literature study), several key user needs were identified, including ease of product search, clarity of product information, and simplicity of the transaction process. These needs became the foundation for designing the application prototype.

The prototype was developed using a high-fidelity approach to closely resemble a real application. The main features include login, registration, homepage, product detail, and booking/ordering page.

1. Login Page

The login interface is designed with a minimalist layout and clear input fields to reduce cognitive load. This design aligns with user needs for quick and simple access, supporting usability principles such as efficiency and learnability.

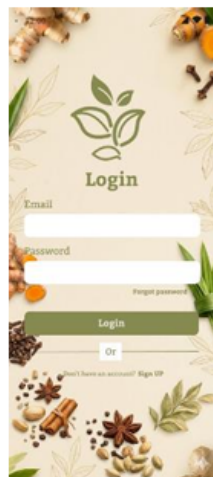


Figure 3. Login Page

2. Registration Page

The registration process is structured in a linear and intuitive flow, minimizing user confusion. Clear labeling and input guidance help users complete the process quickly, which is consistent with the UCD principle of user-centered interaction.

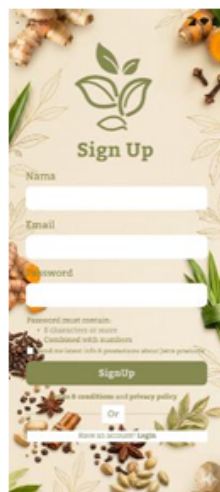


Figure 4. Registration Page

3. Homepage

The homepage presents herbal products in a structured and visually organized layout. The use of simple navigation and categorized product display helps users quickly find relevant items, improving navigation efficiency.



Figure 5. Homepage

4. Product Detail Page

This page provides detailed information such as product description, benefits, and pricing. The completeness of information supports informed decision-making and reduces user uncertainty before purchasing.



Figure 6. Product Detail Page

5. Booking Page

The booking process is designed to be simple and efficient, minimizing the number of steps required to complete a transaction. This supports task completion efficiency and enhances overall user experience.



Figure 7. Booking Page

B. Cognitive Walkthrough Test Results

Testing using the Cognitive Walkthrough method was carried out to evaluate the learnability and efficiency of the prototype. Testing is done through several task scenarios, such as searching for products, viewing details, and placing orders. The results show that most users can complete the task well without significant difficulty.

Table 1. SUS Test Results

No	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total	SUS Score
1	4	2	4	2	4	2	4	2	4	3	29	72.5
2	4	2	4	2	4	2	4	2	4	3	29	72.5
3	4	2	4	2	4	2	4	2	4	2	30	75
4	5	1	4	2	5	3	4	2	5	1	34	85
5	4	1	5	2	4	2	5	1	4	2	34	85
6	5	2	4	2	5	1	4	2	5	3	33	82.5
7	4	1	4	1	5	2	5	2	4	1	35	87.5
8	5	1	4	2	5	1	4	2	5	2	35	87.5
9	5	1	4	1	5	2	4	1	4	2	35	87.5
10	4	2	4	2	4	2	4	2	4	3	29	72.5
...
96	4	2	5	1	4	1	4	2	4	1	34	85

Referring to the results of the System Usability Scale (SUS) calculation, a value is obtained that indicates the level of usability good system. To make it easier to interpret the results, the SUS score is visualized in the form of a graph.

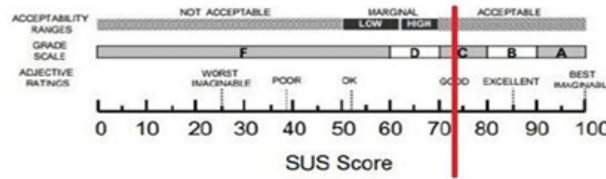


Figure 8. Grade of SUS Questionnaire Assessment Results

Based on the graph, it can be seen that the average SUS score is 82.3, which falls into the Excellent (Grade A) category, which indicates that the system is acceptable to the user. These results show that the designed prototype has a high level of usability and is able to provide a satisfactory user experience. Based on the results of the research that has been conducted, it can be seen that the application of the User Centered Design (UCD) method in designing prototypes of traditional herbal medicine sales applications has given good results. This is shown by the results of the Cognitive Walkthrough test which shows that the success rate of users in completing tasks is quite high. In addition, the results of tests using the SUS method show that the system has a good level of user satisfaction. The results show that the designed design meets the needs of users and has a high level of usability. Simplicity of interface design, clarity of navigation, and completeness of product information are key factors in the success of the system. Thus, the application of the UCD method has proven to be effective in improving the quality of user experience.

C. Data Analysis and Discussion

The integration of CW and SUS results provides a comprehensive evaluation of the system. The high task completion rate from CW indicates that the system is easy to learn and efficient to use, while the high SUS score reflects strong user satisfaction.

The findings show that the application of the UCD method significantly contributes to improving user experience. By involving users throughout the design process, the resulting interface aligns closely with user expectations and needs.

Compared to other design approaches such as Lean UX and Design Thinking, UCD offers a more structured and iterative process that emphasizes continuous user involvement. This makes UCD particularly suitable for applications that require high usability, such as e-commerce systems for herbal products.

However, unlike Lean UX which focuses on rapid iteration, UCD requires more structured stages, which may increase development time. Despite this limitation, the results of this study demonstrate that UCD provides strong outcomes in terms of usability and user satisfaction.

The success of the system can be attributed to several key factors:

- Simplicity of interface design
- Clear navigation structure
- Completeness of product information
- Efficient transaction flow

These factors align with established usability principles and confirm that the designed prototype meets user expectations effectively.

5. CONCLUSION

This study developed and evaluated a UI/UX prototype for a traditional herbal medicine sales application using the User-Centered Design (UCD) approach. The results indicate that the prototype successfully addresses user needs in terms of ease of use, clarity of information, and efficiency of the transaction process.

The usability evaluation demonstrates strong system performance. The Cognitive Walkthrough results show a task completion rate of 92%, indicating high learnability and efficiency. In addition, the System Usability Scale (SUS) evaluation produced an average score of 82.3, which falls into the “Excellent” category and is considered acceptable. These findings confirm that the application of the UCD method is effective in producing user-friendly interfaces with a high level of usability.

This study contributes by demonstrating the integration of UCD with both qualitative (Cognitive Walkthrough) and quantitative (SUS) evaluation methods in the context of herbal product e-commerce. The findings provide practical insights for the development of user-centered digital applications, particularly in supporting the digitalization of traditional product markets.

However, this study has several limitations, including the limited number of respondents (96 participants) and the use of a prototype that has not yet been implemented in a real-world environment. Future research is recommended to implement the system in real conditions and involve a broader range of users to obtain more comprehensive evaluation results.

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AUTHOR BIOGRAPHY

	<p>Annisa Rusydina Sabila is a student of the Informatics Management Study Program, Faculty of Vocational Studies, Surabaya State University.</p>
	<p>Asmunin is a lecturer at the Department of Informatics Management, Surabaya State University, Indonesia.</p>