Implementation Of User-Centered Design (UCD) Method On The Design Of Real-Time Coffee Shop Reservation Application

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Abstract— **The digitalization of business has changed many aspects of life, including how coffee shops do business. In this context, SMS, WhatsApp, and Instagram technologies have become important tools in helping customers make reservations. Reservations at coffee shops allow customers to ensure a seat when visiting and avoid disappointment due to full coffee shops. At Samanko Coffee Roasters, reservations are made via WhatsApp, with customers contacting the contact listed on Samanko Coffee Roasters' Instagram account. This process involves several steps, including checking the availability of seats according to the customer's wishes and manual recording in a notebook. The problem that arises is the difficulty in identifying real-time seat availability and limitations in recording customer data. This can cause inconvenience and decrease customer satisfaction. The solution to this problem is the development of a Samanko Coffee Roasters reservation website using the User Centered Design (UCD) approach. The UCD approach places the user as the main focus in system design. The website interface can be customized according to user needs by involving users in the development process. Using the UCD method provides an effective solution based on usability evaluation using the SUS method on 20 respondents obtained a score of87, meaning that the acceptance of the design is at level A or excellent.**
Keywords— Reservation,Real-Time, User-Centered Design,SUS Questionnaire, Evaluation Usability

I. INTRODUCTION

The coffee shop is one of the most popular businesses today. In 2023 the number of coffee shops recorded in Indonesia was 4000 outlets and it is predicted that in 2028 there will be 9000 outlets spread throughout Indonesia[1]. The increase in the coffee shop business has encouraged coffee shop entrepreneurs to organize strategies to compete with other coffee shops to continue to exist. Several ways can be done to maintain a coffee shop business such as improving the quality of both services, food and beverage hygiene to providing discounts, all of which aim to increase customer satisfaction[2].

The evolution of the coffee shop business process has undergone many changes because it began to lead to a digital business followed by several services offered. Service facilities are one of the determinants of business success[3]. Some services no longer use conventional methods because they are digital. Improving coffee shop services is one of the strategies that is expected to increase consumer buying interest. One of the services that can be improved is the coffee shop reservation process. Technologies such as SMS, WhatsApp, and Instagram are examples that are used to help consumers make reservations[4].

Samanko Coffee Roasters is one of the coffee shops that implement the reservation process via WhatsApp. Seat availability will be checked according to consumer reservation requests so that there are no clashes with other consumer reservations. Problems often occur when consumers make reservations during peak hours which results in consumers not getting fast service because reservations have not been made in real time. In addition, consumers do not know the available seats at that time. This can certainly reduce consumer interest in visiting.

One of the strategies for improving services is by utilizing computer technology, namely changing real-time reservations. Real-time reservations can make it easier for consumers to ensure the desired seats are available when visiting and avoid disappointment if no more seats are available at the coffee shop because it is full. A poor reservation system can cause inconvenience for consumers and reduce consumer satisfaction with the services provided. Therefore, it is necessary to have a reservation system that is easy, fast, and provides a comfortable experience for consumers. Increased utilization of computer technology will be more promising than the use of human labor. This is due to the automatic nature of computer technology in a job[5].

Reservation design has been mentioned in many previous studies such as reservation design at Cafeteria Sawangan Depok. This research uses the Rapid Application Development (RAD) method in system development which emphasizes fast processing time[6]. The use of the Rapid Application Development (RAD) method does not focus on users because it only emphasizes the speed of time in system development, so user comfort is not so important. Another study of Web-Based Point Of Sales Implementation at Olive

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Café Business discusses reservations but reservations are only made by café admins, not by consumers[7].

In designing the application design, it is necessary to consider the needs and comfort of the user. therefore, an approach that is by this is needed. The user-centered design (UCD) approach is one of the approaches that can be used to design real-time reservation applications. User-centered design (UCD) is a design model that focuses on users, usability, characteristics, and assignments to system workflows[8]. The final stage in User-Centered Design (UCD) will evaluate the application's usability using the System Usability Scale(SUS). Usability is an assessment of the user interface's quality and can determine an application's success [9]. System Usability Scale (SUS) is one of the methods used to evaluate the usability of websites. The advantage of SUS is that it does not require a lot of money because the respondents are not many[10].

II. LITERATURE REVIEW

User Center Design (UCD) is a design concept that focuses on users to make it easier for users to use the application system. The development of applications that use User Center Design (UCD) will produce applications that focus on users and are expected to have a positive impact on the applications built, namely by user expectations. The research entitled User-Centered Design Method in Designing E-commerce Interface Display Sales of Website-Based Sweetbites By Caca Food Products Using Balsamiq Mockups Application produces a design that suits user needs and hopes to increase sales revenue[11]. The use of User Center Design (UCD) in application development can also produce an interface that is easy to understand based on research on the Application of the User-Centered Design Method to the Design of the I-Star Application User Experience[12].

User Center Design (UCD) has 4 stages including: 1.) User identification; 2.) Identification of user needs; 3.) Design design solutions; 4.) Evaluation of design[13]. At the usability evaluation stage of the designed design, an assessment of interface acceptance will be obtained based on the user and can be a reference if the evaluation results are not to user expectations. One method that can be used in usability evaluation is the System Usability Scale (SUS) method. The System Usability Scale (SUS) method has several advantages, namely: 1.) SUS calculations are relatively easy and not complex; 2.) SUS Score Range is easy to use because it is on a score of 0-100; 3.) SUS samples are not large but the method is proven accurate[14].

This research will discuss the design of the Samanko Coffee Roasters real-time reservation application using the User Centered Design (UCD) approach, where the User Center Design (UCD) approach focuses on user needs and user convenience. All stages in UCD (User Centered Design) are proven to make users feel more comfortable with the interface that has been designed, and the information presented is also easier to understand. It is hoped that this application can increase consumer comfort with reservation services and help Samanko Coffee Roasters manage fast, precise, and accurate reservations.

III. METHODOLOGY

This research consists of several stages and is adjusted to the stages contained in the User-Centered Design (UCD) approach. The following are the stages contained in the User Centered Design (UCD) approach :

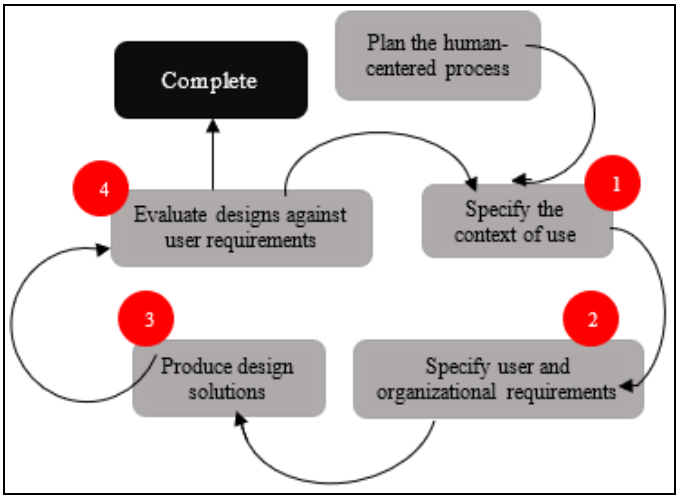

Figure 1. Method User Centered Design (UCD)

This research consists of several stages and is adjusted to the stages contained in the User-Centered Design (UCD) approach. The following are the stages contained in the User Centered Design (UCD) approach: The stages in Figure 1. can be explained as follows:

- Specify the context of use: identifying system users based on system characteristics.
- Specify user and organizational requirements: identify user and organizational needs.
- Produce design solutions: create design solutions
- Evaluate designs against user requirements: evaluate the design if improvements still need to be made, it will repeat stage 1.

In the last stage (evaluate designs against users), a usability evaluation will be carried out on the design that has been designed using the System Usability Scale (SUS) method. System Usability Scale (SUS) is a measurement tool used in evaluating usability based on user perceptions of software. The results of SUS can be used as a reference for software improvement. The number of respondents used in this study amounted to 30 respondents consisting of 3 employees at Samanko Coffee Roasters and 27 respondents from consumers. The questionnaire contains 10 questions according to the items on the SUS. In calculating the SUS score there are several rules[15]:

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- The calculation of questions on odd-numbered items uses the formula x-1, where x is the value given by the sample.
- Calculation of questions on even-numbered items using the formula 5-x, where x is the value given by the sample.
- The SUS score is obtained by accumulating questions on odd and even numbers and then multiplying by 2.5

After that, use the SUS average calculation formula:

$$Average\ Score = \frac{\Sigma x}{n} \quad (1)$$

Where Σn is the number of SUS scores and n is the number of respondents.

The results of the SUS average calculation will be converted into the SUS score table to determine the level position of the software.

TABLE 1. SUS SCORE[16]

SUS Score	Grade	Adjective Rating
>80.3	A	Excellent
68-80.3	B	Good
68	C	Ok
51-67	D	Poor
<51	E	Awful

IV. RESULT AND DISCUSSION

1. Specify the context of use
   This section will determine the context of system users according to the criteria. Based on the results of interviews with Samanko Coffee Roasters, it is known that the system users are:
   a) Consumers, as users of the real-time reservation system who carry out the reservation process
   b) Samanko Coffee Roasters Admin, as a user who approves consumer reservations.
   c) Manager, as the person in charge of the real-time reservation system
2. Specify user and organizational requirements. Based on the results of the interviews, conclusions were obtained about user needs:

TABLE 2. SYSTEM REQUIREMENTS

No	Requirement	Specification
1	Home Menu	Contains general information about Samanko Coffee Roasters
2	Coffee Menu	Contains coffee menu information
3	Bakery Menu	Contains bread menu information
4	Our Menu	Contains a display of the entire menu provided along with the price
5	Customer ReservationMenu	Contains a page used by consumers for reservations. Features provided include users being able to view tables that have been reserved by others. Users can see empty tables and make reservations according to the desired hours. In addition, users can make reservation payments using several methods including QRIS, E-Money, Credit Cards, and virtual accounts.
6	Admin Reservation Menu	Contains pages used by admin/manager to view reservation data, change reservation status, and view reservation revenue.
7	Manager ReservationMenu	Contains pages used by admin/manager to view reservation data, change reservation status, download reservation data, and view reservation revenue
8	About UsMenu	Contains address, social media, and contact information

3. Produce design solutions.
   Design solutions are made based on the results of finding problems during interviews which are then made into system designs.

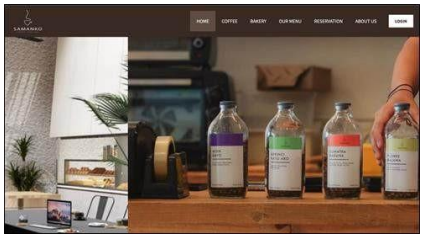

Figure2. Home Menu Design

Figure3. Coffee Menu Design

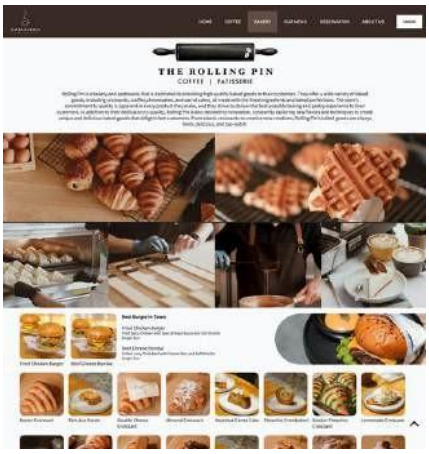

Figure 4. Bakery Menu Design

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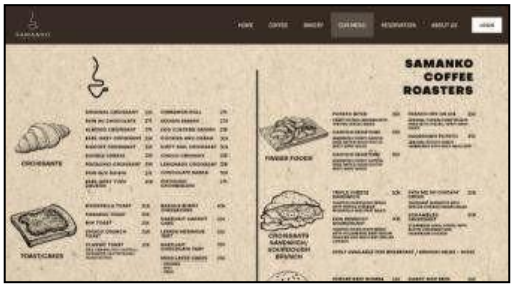

Figure 5. Our Menu Design

Customer Reservation Menu :

Figure6. Schedule Reservation Design

Figure7. Payment Option Design

Figure8. QRIS Payment Design

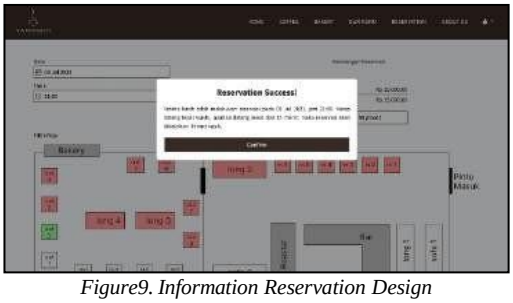

Figure9. Information Reservation Design

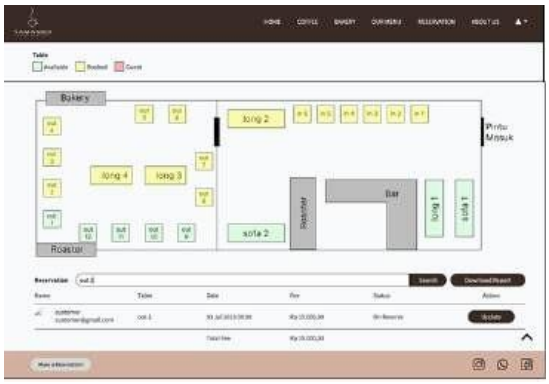

Figure10. Admin Reservation Design

Figure11. Manager Reservation Design

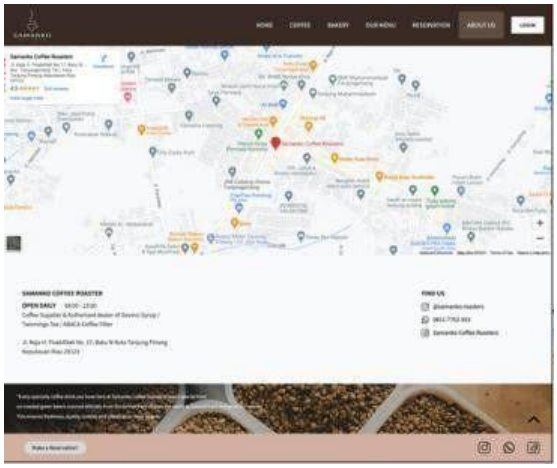

Figure12. About Us Menu Design

4. Evaluate designs against user requirements:
   The evaluation uses the SUS questionnaire and is distributed to 20 respondents who will use the real- time reservation system.

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TABLE 4. SUS QUESTIONNAIRE

No	Statement	Strongly Disagree				Strongly Agree
		1	2	3	4	5
Q1	I think that I would like to use this system frequently					
Q2	I found the system unnecessarily complex					
Q3	I thought the system was easy to use					
Q4	I think that I would need the support of a technical person tobe able to use thissystem					
Q5	I found the various functions in this system were well-integrated					
Q6	I thought there was too much inconsistency in this system					
Q7	I would imagine that most people would learn to use this system very quickly					
Q8	I found the system very cumbersome touse					
Q9	I felt very confident using the system					
Q10	I needed to learn a lot of things before I could get going with this system					

TABLE 5. RESULT SUS QUESTIONNAIRE

Sample	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
S1	3	3	2	4	2	4	2	4	4	2
S2	3	4	2	3	3	4	3	4	3	2
S3	2	3	3	4	3	4	3	4	4	1
S4	4	4	3	3	3	4	2	4	3	3
S5	4	4	4	3	4	4	4	4	2	4
S6	3	4	4	4	3	4	4	4	3	3
S7	3	4	3	4	4	3	3	4	3	4
S8	3	4	3	4	4	4	3	4	4	3
S9	4	3	4	4	4	3	4	4	4	4
S10	4	3	4	4	3	4	3	4	4	4
S11	2	4	3	4	4	4	4	3	3	4
S12	4	4	4	4	4	4	2	3	4	4
S13	3	4	3	3	3	4	3	4	3	3
S14	4	4	4	3	4	4	4	4	4	3
S15	4	4	4	3	3	4	4	1	4	4
S16	4	3	4	4	3	4	4	4	4	4
S17	4	3	3	4	3	4	3	3	3	4
S18	3	2	3	4	4	4	4	2	4	2
S19	3	4	4	4	4	4	4	4	4	3
S20	3	4	4	4	4	4	4	2	4	2

TABLE 6. FINAL RESULT SUS QUESTIONNAIRE

Sample	Amount	Score (Amount X 2.5)
S1	30	75
S2	31	78
S3	31	78
S4	33	83
S5	37	93
S6	36	90
S7	35	88
S8	36	90
S9	38	95
S10	37	93
S11	35	88
S12	37	93
S13	33	83
S14	38	95
S15	35	88
S16	38	95
S17	34	85
S18	32	80
S19	38	95
S20	35	88
FINAL RESULT (AVG)		**87**

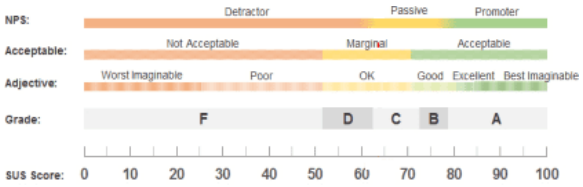

Figure 13. SUS Usability Level[17]

Based on the calculations in Table 6:

1. Grade Scale A, is at a score of 87 which means theadjective rating is excellent.
2. Acceptability Ranges, is at an acceptable level witha score of 87
3. Net Promoter Score (NPS), helpful in seeing customer loyalty about user satisfaction. In this study, NPS is at a score of 87, so it is at the promoter level, meaning that users can accept thissystem and are satisfied using it.

A good and attractive design can help users when using the application[18]. Overall, the SUS assessment results indicate a good level of usability.

V. CONCLUSIONS

The design of the real-time reservation system design using the user-centered design (UCD) resulted in very good acceptance by user usability. This is evidenced by the usability evaluation results using the SUS questionnaire which resulted in a score of 87. These results prove that the design is by user needs. It is hoped that the real-time reservation system can increase sales at the Coffee Shop because of the fast reservation service.

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