

Implementation of Lean UX for Coworking Space Booking Room Application Design

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ABSTRACT

The dense population in Indonesia has potential for business actors, one of which is the business of providing coworking space. Coworking space has several rooms divided into groups and various facilities, so employees must manage and process the container. The problems that arise are the lack of features that support employee performance, the appearance of the application that is too simple, and the unavailability of online ordering from previously used applications. This research identifies how to design and implement new designs to create user-centric coworking space booking applications, where these users are employees and customers. Paying attention to the User Interface and User Experience in manufacturing will produce an interactive display and make it easier for users. This research was developed using the Lean UX method. Lean UX has several stages: observation, interviews, and prototyping methods, where the steps start from declaring an assumption, creating an MVP, running an experiment, and feedback and research.

General Terms

Android, Flutter, NodeJs

Keywords

MobileApplication, CoworkingSpace, User Interface, User Experience, Lean UX

1. INTRODUCTION

Indonesia has great potential to become a developed country. Bappenas stated that Indonesia's economic growth on average every year must reach 6 to 7 percent to become a developed country in 2045 [1]. This is because Indonesia is one of the countries with the fourth largest population [2]. The country's economy is currently driven by various small to medium enterprises run by entrepreneurs from young people. The spread of startups creates something new for the business growth of coworking space providers, commonly called coworking spaces. A coworking space is a coworking space that can be used by individuals or small groups, with facilities that are shared for business or work purposes [3]. Coworking space has several rooms that are divided into various groups and varied facilities, so employees are needed to manage and process the place. Employees are responsible for reporting weekly transaction data to monitor achievement or key performance indicators (KPI), basically to measure work progress and provide a clear picture of completed sales activities [4]. The problems that arise are the lack of features that support employee performance, the appearance of the application that is too simple, and the unavailability of online ordering from previously used applications. This makes coworking space employees must re-record transaction data in the sales book. This can reduce time efficiency and increase the possibility of data loss.

The number of smartphone users in Indonesia is overgrowing every year. This statement is supported by data on Indonesian smartphone market statistics stating that Indonesia is currently the world's fourth-largest smartphone market after China, India, and the United States [5]. Based on the statement, it can be concluded that most Indonesians can operate smartphones, supporting the development of a system that will later assist employees in a coworking space. A mobile app is software that runs on a mobile device, i.e., a smartphone or tablet [6], [7]. Mobile applications have become highly beneficial for individuals in various fields, including business, education, and entertainment. These applications provide significant assistance in completing tasks and participating in various activities. According to [8], mobile applications are designed and developed to perform specific tasks for their potential use. Therefore, mobile smartphone applications are critical to support the functions and displays that have been designed [9].

This research identifies how to design and implement new designs to create user-centric coworking space booking applications, where these users are employees and customers. This research was developed using the Lean UX method. In general, Lean UX is a method that combines two forms, namely agile and design thinking, in designing a user interface (UI) and user experience (UX) [10]. Lean UX focuses on finding the fastest way to achieve the end goal. The Lean UX method has four design stages: Declare Assumption, Create An Minimum Viable Product (MVP), Run an Experiment, and Feedback and Research [11]. This method actively involves users so the resulting design can fully suit their needs. By involving the user in the design process, this method ensures that the resulting product meets the user's expectations, preferences, and needs. One of the keys to UI and UX is user needs and other vital axes: expectations, attributes, and capabilities [12]. Therefore, in designing an optimal design, it is crucial to have a comprehensive understanding and consider various points of view. According to [13], in UX design, understanding the user is crucial in satisfying the user and will continue to use the application.

2. RESEARCH METHOD

This research designed the QSpace application using the Lean UX method. Lean UX methods are like agile or user-centered design methods [14]. The Lean UX method has three essential foundations: Design thinking, Agile Software Development, and Lean StartUp [15]. By combining the elements, the Lean UX method adopts a responsive, iterative, and user-focused approach to creating effective and innovative user experiences in product and service development. This method focuses on finding the fastest way to achieve the final goal by going through four design stages: Declaring an Assumption, creating an MVP, Running an Experiment, and Feedback and Research [11]. Based on this statement, Lean UX makes fundamental changes in making product design different from other methods. Lean UX is used because this research prototype is

based on the author's assumptions and needs validation. In addition to using this method, it is expected to complete a design faster and follow user needs. This research collaborates with two employees of Relation Coworking Space as stakeholders and data sources. Furthermore, three students of Informatics Engineering at the University of Technology Yogyakarta and two employees will be involved in Feedback and Research to test prototypes and provide input and suggestions.

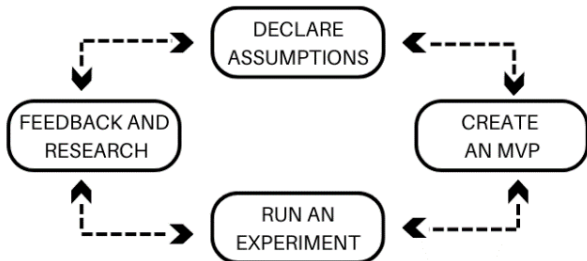


Fig. 1 Lean UX Stages

2.1 Declare Assumption

This stage consists of collecting theory as a research guide, making observations to analyze data needed for user interface (UI) and user experience (UX) design, making questionnaires to identify problems, and making a list of assumptions in the form of information elaboration. In addition, observation also seeks to understand what people do like, their roles, actions, and behaviors, and how they can change in response to situations and times [16]. Then the results of the observations are used as the basis for the hypothesis to determine the achievements that have been achieved. This result is needed as a benchmark for solutions to existing problems [15].

2.2 Create a Minimum Viable Product (MVP)

At this stage, it is to create a Minimum viable product (MVP) or a product description. MVP creation is used in testing to get immediate feedback from users [17]. These MVPs can be paper-like prototypes or clickable wireframes. The prototyping process is divided into two types: low-fidelity, which is a simpler prototype, and high-fidelity prototyping, which is closer to the appearance and interaction of the actual product [11]. Both types of prototyping are used to validate ideas, test functionality, and gather initial feedback before a more complete and mature product is developed.

Wireframes present the layout, structure, and navigation of an application or website without paying attention to visual aspects such as colors, images, or fonts. According to [18], wireframes are used early in application development and are essential to the user experience (UX) design process. In this study, wireframe-based prototypes were made using Figma, and low fidelity was made using Procreate. This application will be intended for Android smartphone users.

2.3 Run an Experiment

At this stage, testing is carried out on the MVP or prototype that has been made to ensure that the prototype has met the user's needs. Testing is done through demos and previews to coworking space employees as stakeholders. After the demo and preview are complete, a question-and-answer session is held to get input and suggestions to be applied to the prototype in the next iteration.

There are two ways to collect feedback from customers [14].

1. Customer service, by talking directly to customers regarding problems experienced by customers.
2. Feedback surveys allow for collecting customer thoughts using simple email formulas, customer support forums, and third-party community sites.

2.4 Feedback and Research

This stage is a process of validating the assumptions from the previous step. The study used only five participants to evaluate the results and usability of the app. Participants are defined as future system users, namely coworking space employees who will become potential users of the application and students of Informatics Engineering at the University of Technology Yogyakarta, who will become potential customers of coworking space booking applications.

The participants tested the prototype using the think-aloud method. The think-aloud protocol used in this study is concurrent think-aloud. The participant tests while articulating his actions, thoughts, and feelings [19]. At the end of the trial, a question-and-answer session was conducted for each participant to get suggestions on each display that would be used in the second iteration. Besides, the answers would be material for evaluating the design's success at the success rate stage. The think-aloud method can also determine the difference in problem-solving between that user and the task assigned to him [20]. The success rate stage is carried out after getting the test results from the think-aloud method. This stage measures the user's success in completing tasks or achieving certain goals using the product or system being tested. The success rate is calculated based on the percentage of users who successfully achieve goals or complete tasks. The success rate is one of the most straightforward usability metrics [11]. The success rate provides an idea of whether any improvement has been achieved. Here's how the success rate is calculated:

$$\text{Success Rate 1} = \frac{\text{Success Task} + (\text{Partial Success} \times \text{Presentase})}{\text{Total task} \times \text{Total Users}} \times 100\%$$

3. RESULT AND DISCUSSION

3.1 Assumptions

Application users are coworking space employees aged 20 to 30 years, high school graduates to undergraduates, and Android smartphone users. Employees serve customers who book rooms and prepare additional orders such as food and drinks.

Employees have plenty of mobile internet access at work. By using the tablet that has been provided, one person oversees checking whether there is room available and is responsible for payment.

Working time starts at 09.00 WIB until 22.00 WIB. After working hours end, employees are tasked with recording transaction data for that day.

Customers are public, from students to employees and entrepreneurs. Customers can choose rooms with different features and facilities as they wish.

3.2 Hypothesis

This hypothesis is based on assumptions obtained and proven in the feedback and research stages. This study hypothesizes that the "QSpace Application can make it easier for coworking space employees to support their performance and customers to place orders online."

3.3 User Persona

A user persona is a description of the future product user obtained based on assumptions. Fig 2 shows the user persona in this study.


<p>NAME</p>  <p>Chusnul Employee</p>	<p>BEHAVIORS</p> <ul style="list-style-type: none"> • Android User • Do a room Check • Cashier and record transaction data • Love the simple things to use
<p>DEMOGRAPHICS</p> <ul style="list-style-type: none"> • 20 years old • High school graduate • Yogyakarta, Indonesia 	<p>WISH/SOLUTION</p> <ul style="list-style-type: none"> • Has an app for online ordering • Want a simple display that is easy for staff to understand • Do not do data recap manually

Fig. 2 User Persona of QSpace

3.4 Feature

There are several features in the QSpace application created. These features are designed based on user personas and other needs collected from customers. Here are some parts of the QSpace application:

Table 1 List of Feature QSpace Applications

No	Actor	Description
1	Customer	log in, register, forgot password, room reservation, invoice, profile.
2	Employee	log in, register, forgot password, manage room, manage food and drink, transaction data, profile.

3.5 Minimum Viable Product (MVP)

The QSpace application wireframe was developed using Figma and Procreate to create low fidelity. Fig 3 shows some of the QSpace application interfaces from the first iteration.

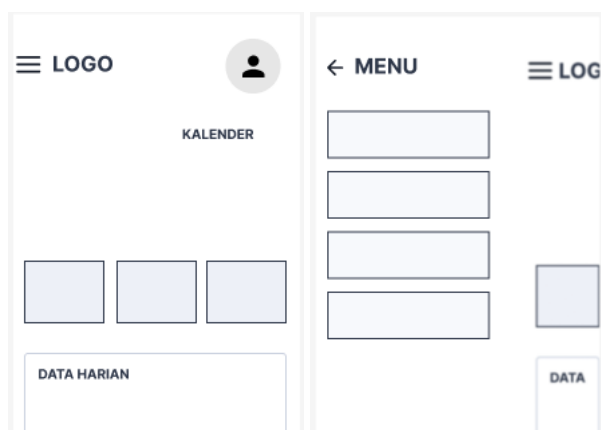


Fig. 3 QSpace Wireframe on the first iteration

3.6 Run an Experiment

After the wireframe is successfully created, then coding the application according to the design using Visual Studio Code with the Dart programming language utilizing the Flutter framework. Furthermore, testing was carried out on coworking space employees. The employee oversees serving room reservations and payments. After the demo and preview

sessions, a question-and-answer session was held to get negative feedback and suggestions from team members.

The suggestions obtained are the lack of features to enter the number of rooms available and the slicing features to display promos or vouchers.

3.7 Feedback and Research

Feedback given by 5 participants from coworking space employees and students of Informatics Engineering, the University of Technology Yogyakarta, was analyzed by thinking-aloud testing and then evaluated with success rate.

1. Think aloud by operating the QSpace application while expressing opinions. Participants were asked to control the application, from entering and browsing the available features to exiting it. Various buttons can move between pages. Users continue to express their opinions in every view on the page that is being run. Each participant's progress will be recorded until the end of the test. The ideas and suggestions from participants will be recorded to analyze application improvements.

2. Success Rate, conducted to observe users' success in doing tasks. The following is a list of success rate evaluation tasks that can be seen in Table 2

Table 2 List of Task QSpace Applications

No	Task
1	Register and Log in QSpace Application
2	Open Order Page
3	Add Orders
4	Viewing and Deleting Transaction Data
5	Open Profil Page
6	Viewing and Deleting Food and Drink Menu
7	Log Out QSpace Application

The following is task success data for evaluating Think Aloud test results using Success Rate. 5 participants carried out this evaluation to perform seven tasks according to the task list. Next, an analysis of the percentage of tasks will be carried out as below:

Table 3 List of First Iteration Success Rate Result

	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7
User 1	S	S	S	S	S	S	S
User 2	S	S	S	S	S	S	S
User 3	S	S	S	F	S	S	S
User 4	S	S	S	S	S	S	S
User 5	S	S	S	S	S	F	S
Explanation: S = Success, F = False, P = Partial Success							

The results of the first success rate evaluation of 35 attempts to perform the task obtained 33 successes and two failures. The user is declared a failure in the assessment if he does not run the task according to the task list. The effort is successful if it can complete the task according to the list. The following is the calculation of the success rate in the first iteration:

$$\text{Success Rate 1} = \frac{33 + (0 \times 2)}{7 \times 5} \times 100\%$$

$$\text{Success Rate 1} = \frac{33 + 0}{35} \times 100\%$$

$$\text{Success Rate 1} = 94\%$$

The result of the first success rate evaluation is 94% as the percentage of tasks completed correctly. The results are used to measure so that a design will be better in the future. Furthermore, the stage 2 iteration process will be carried out. Later, the paste results will be compared with iteration 1 so that the presentation can be seen whether there is an increase or decrease.

3.8 Second Iteration

The additional assumptions of iteration 1 resulted in adding two new features: finding out how many rooms are available and elements for promo banners. In addition, some design adjustments were also made from the first iteration stage. After making the necessary adjustments, here is the design of the QSpace application.

3.8.1 Login Page View

This page is a sign-in feature for users who are already registered or have a previous account. On the login page, there is also a forgotten password feature.



Fig. 4 Login Page View QSpace Application

3.8.2 Profile Menu Page View

This page displays user data such as first name, last name, phone number, and address. Users can also modify that data.



Fig. 5 Profile Page View QSpace Application

3.8.3 Home Page View

This page is an employee home view, which displays data on the number of existing employees, daily customers, and filled rooms. In addition, there is a daily customer recap.



Fig. 6 Home Page View QSpace Application

3.8.4 Room Menu Page View

This page allows employees to add room lists, edit, and delete. This menu also provides search and list features based on.

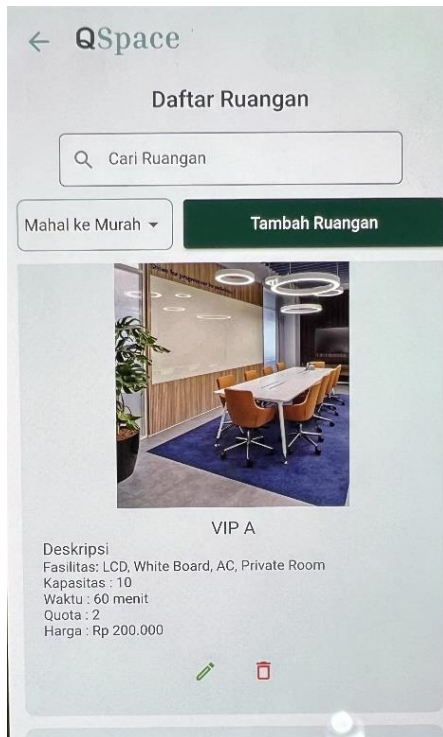


Fig. 7 Room Page View QSpace Application

3.8.5 Booking Menu Page View

On this page, employees can see a list of incoming orders from customers. Besides that, employees can also add orders for customers who order through the cashier, and the data will later appear on the list.

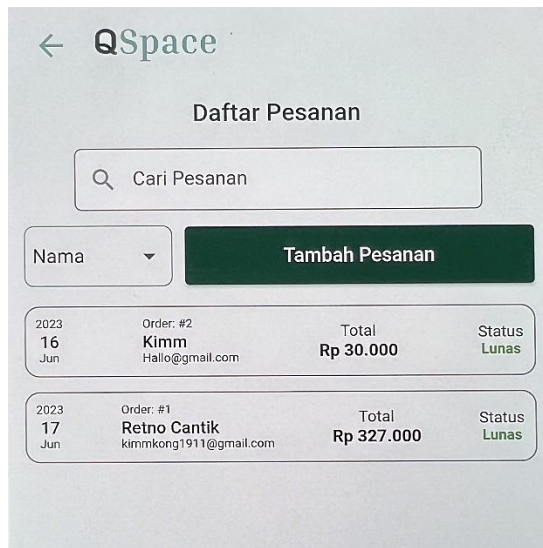


Fig. 8 Booking Page View QSpace Application

3.8.6 Transaction Data Page View

This page will display a list of all transactions that occur. Employees can also delete the list of transactions that do not match.



Fig. 9 Transaction Page view QSpace Application

3.8.7 Banner Display

This page adds ads for promotions, discounts, or other information.

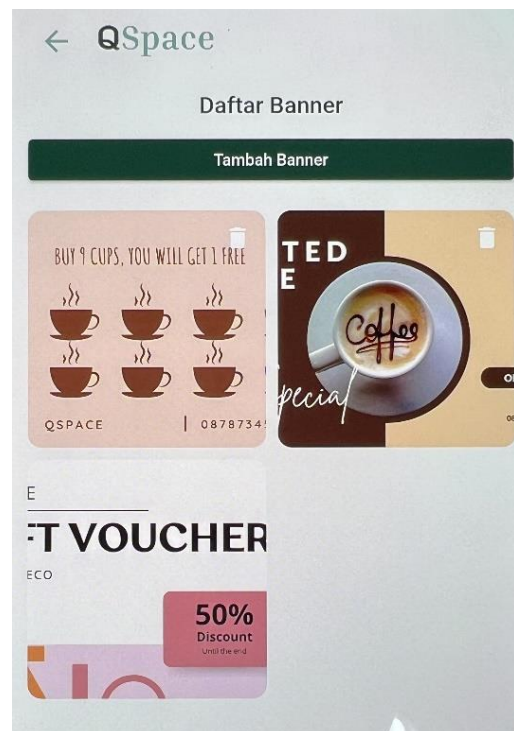


Fig. 10 Banner Display View QSpace Application

This stage is the final stage in the second iteration. The test was conducted on the same 5 participants, namely coworking space employees and Informatics Engineering students, the University of Technology Yogyakarta, which was analyzed with success rate.

1. Success Rate, participants will be asked to operate the results of the QSpace Application for booking coworking space to evaluate any increase or decrease in success in carrying out tasks. The following shows data for the success of 5 participants' tasks.

Table 4 List of Second Iteration Success Rate Result

	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7
User 1	S	S	S	S	S	S	S
User 2	S	S	S	S	S	S	S
User 3	S	S	S	S	S	S	S
User 4	S	S	S	S	S	S	S
User 5	S	S	S	S	S	S	S
Explanation: S = Success, F = False, P = Partial Success							

The results of the second success rate evaluation of 35 attempts to perform the task obtained 35 successes and 0 failures. The following is the calculation of the success rate in the second iteration:

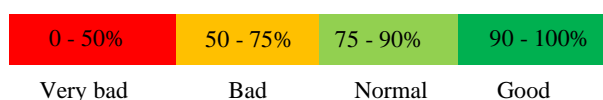
$$\text{Success Rate 2} = \frac{35 + (0 \times 0)}{7 \times 5} \times 100\%$$

$$\text{Success Rate 2} = \frac{35 + 0}{35} \times 100\%$$

$$\text{Success Rate 2} = 100\%$$

The result of the second success rate evaluation is 100% as a percentage of tasks completed correctly. Compared to the results in the first iteration, it obtained a percentage value of 94%, while in the second iteration, it obtained a percentage value of 100%. This shows an increase in success rate from the first iteration.

The percentage diagram of classification division can be seen below:



Based on the diagram, the percentage weight reaches 100%, which is included in the good category so that these results can prove that users can use the application well and understand the design applied to the Space application.

4. CONCLUSION

The problems experienced by employees can be resolved with the features in the QSpace application, such as data orders, data transactions, and automatic room checking. In addition, applying the Lean UX method to designing coworking space ordering applications can improve the design of the previous system. From the results of the usability calculation, at the first iteration level, it was successfully tested on 5 participants as future users. The first iteration obtained a success rate of 94%. Then in the second iteration, the design was improved and adapted to the suggestions from the participants, then tested again on the participants and got a 100% success rate. Based on the percentage value diagram, it is in a good category, which means that users can use the application well and understand the design applied to the QSpace application. For future

development, it is hoped that the QSpace application will be developed even better by adding several features and making it a web or iOS version.

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