UI/UX Design Of Mobile-Based Pharmacy Application Using Design Thinking Method

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ABSTRACT

Pharmacy is a public facility that supplies, distributes and serves medicine needs. Based on observations, Rania Farma Pharmacy is one of the pharmacies that still uses conventional methods of medicine management. The Pharmacist Assistant has to write down medicine stocks and transactions in a book, calculate sales with the help of a calculator and monthly reporting by inputting daily sales in the Microsoft Office Excel application which takes quite a long time. This process is very prone to human error, such as calculation and recording errors, which can harm pharmacies and consumers. This research aims to design a mobile-based pharmacy application based on the User Interface (UI) and User Experience (UX) using the Design Thinking method. Then perform prototype analysis using the System Usability Scale (SUS). Design Thinking includes software development methods that focus on finding solutions to human-centered problems. Pharmacy information needs are collected through observation, interviews and literature study. In designing this information system, it is hoped that it can help medicine management at the Rania Farma Pharmacy.

Keywords: *UI, UX, Design Thinking, System Usability Scale, Pharmacy.*

1. INTRODUCTION

According to the Regulation of the Minister of Health of the Republic of Indonesia No.9 of 2017, pharmacies aim to serve the general public's health and provide quality pharmaceutical services. Thus, the drug distribution and transaction process vary greatly every day (MENTERI KESEHATAN REPUBLIK INDONESIA, 2017).

As is the case at the Rania Farma Pharmacy located in Makassar, which plays a role in procuring, receiving, storing, recording and reporting drug preparations. These activities are carried out manually and have not utilized technology such as website systems or mobile applications. The Pharmacist Assistant has to write down drug stocks and transactions in a book, calculate sales with the help of a calculator and do monthly reporting by inputting daily sales in Microsoft Excel, which takes a long time. This manual process is prone to human error, such as calculation and recording errors, which can be detrimental to the pharmacy and the consumer.

Based on that problems, innovation is needed in managing pharmaceutical activities at the Rania Farma Pharmacy, including creating a mobile-based drug management system. Therefore, the researchers created "UI/UX Design for Mobile-Based Pharmacy Applications using the Design Thinking Method" to facilitate work, streamline time and avoid human error within the scope of Rania Farma Pharmacy.

User interface design is one of the factors that determine the number of visitors and users of a system or application. The User Interface requires a Usability Test to check how efficient and effective the User Interface System or application is (Auliaddina et al., 2021). The design emphasizes logical solutions regarding how the system meets requirements (Tangkowit et al., 2021). So, in general, design is designing the appearance of the system/application that is useful for meeting user needs and helping developers see an overview of the system/application to be made.

Application is software that is embedded into a computer that has various commands to be able to carry out forms of work according to instructions carried out by the user (Hasriani et al., 2023). Applications can be interpreted as ready-to-use programs that are designed to carry out a function for other users or applications and can be used by the intended target (Ramadhan et al., 2021). Mobile applications are the most widely used technology among the three platforms: desktop, web and mobile (Yusril et al., 2021).

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The Design Thinking method is an innovation-based software product design method based on finding solutions to certain problems. Problem-solving methods that have not been clearly defined are carried out by understanding the needs of users who will be involved in using the application, gathering lots of ideas in brainstorming sessions and taking a direct approach through prototyping and direct testing (Susanti et al., 2019). Design Thinking is a human-centred approach, more suitable as a frame of mind for solving problems humans face while creating products or services as a solution (Herawan, 2019). This method has five stages which, as a whole, concentrate on finding problems based on human-centred. After the problem is found, focus on needs and find solutions to the problems encountered. The last process is testing the design to the user to get an overview of possible deficiencies or errors..

In designing the appearance of the application, there is much software that can be used. In this study, the application used is Figma which provides prototype features for the testing process. Figma is a popular designing software used to design the appearance of mobile applications, desktops or websites. Figma's strengths can be seen in its ability to work on displays even though it consists of several designers (Muhyidin et al., 2020). Therefore, Figma is widely implemented in making application views that are fast and effective.

There are several previous studies related to the research conducted, namely research conducted by (Rohili & Budi, 2022), in this study, a web-based drug sales information system was built to provide convenience in operational activities at the Khodijah Pharmacy. The method used in making the drug sales information system is a prototype using the CodeIgniter Framework and Bootstrap.

Another research is (Krismonika et al., 2021), in this research, a drug inventory system program was created, so that drug inventory management is more accurate and orderly and makes it easier to search drug stock data. The research method is the waterfall method, while system testing uses black-box testing.

Related research was carried out by developing a Hospital Management Information System (SIMRS) in a hospital (Paramadani et al., 2020). UI and UX development so that the SIMRS used is in accordance with business processes, is easier for users to use, and has a more attractive appearance. UI development in this study used the User Centered Design (UCD) method, the UI design results were tested with SUS to get 78 results which can be categorized as good. As for testing the user experience, the results are good and above average.

Research on the development of user interfaces and user experience using the design thinking method was carried out by (Herfandi et al., 2022). Metode design thinking terbukti mampu memberikan solusi dalam melakukan design user interface berdasarkan pendekatan (user experience). The design thinking method is proven to provide solutions in designing user interfaces based on an approach (user experience). This study applied the design thinking method to analyze and develop the user interface and user experience on the BPR Sumbawa website. The results of the UI/UX website development are in the form of user empathy maps, user personas, user interface designs based on defined stages, wireframes and responsive prototypes made using Figma.

Another related research that carries out interface and user experience development is (Yohanes et al., 2018), developing interfaces and user experience using the Goal-Directed Design method to determine the needs and goals of using the application. The initial evaluation of the website uses the WEBUSE (Website Usability Evaluation) questionnaire. Development is carried out with the Research, Modeling, Requirements, Framework, and Improvement phases. The research results are design recommendations with increased value criteria: Content, Organization and Readability 0.19, Navigation and Links 0.14, User Interface Design 0.18, Performance and Effectiveness 0.09, and an average of all indicators of 0. 75 then it is included in the rating scale good.

Another related research was carried out by (Albert et al., 2021), redesigning the UI/UX website with a better information structure at PT Interbat, one of Indonesia's largest pharmaceutical companies. The website was deemed unattractive from a visual standpoint, so a company website was developed or redesigned to distribute information about the company widely and make it an attractive internet-based media promotion tool.

Based on several previous studies, the research carried out applied aspects of the user interface and user experience in application design using the Design Thinking method and evaluating prototypes with SUS analysis. Previous research has been carried out, namely analyzing the UI/UX in pharmacy website design using the HCD and SUS methods to get an average score of 77.6 which is included in the Good category. This study is expected to provide solutions by developing based on user needs and creating displays that prioritize or focus on users.

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2. METHOD

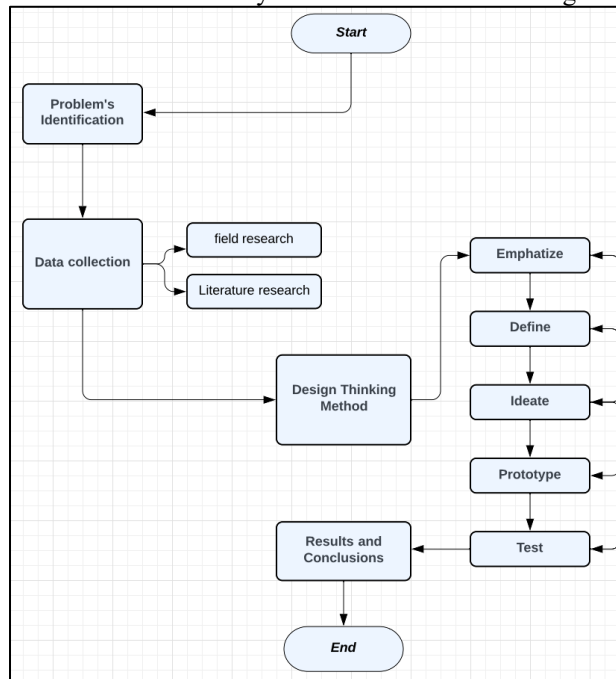The research method used in this study can be seen in the following flow chart in Figure 1:

Figure 1. Flow Chart

As shown in Figure 1 above, the research began with problem identification, followed by data collection. The data collection method used in this study are field research and literature research. Field research includes observation activities, namely direct observation and recording related to the procurement, reception, distribution and reporting of pharmaceuticals at Rania Farma Pharmacy. In addition to conducting interviews with the Pharmacist Assistant regarding data on drug supplies, suppliers and constraints faced at the Rania Farma Pharmacy, valid data is obtained. Literature Research is collecting data and information from electronic books and journals as a reference to support the research process.

The Design Thinking method is a human-centred or human-centric design approach to solving problems and presenting new innovations. The use of the Design Thinking method is expected to be able to meet user needs and be able to solve user problems when using the application (Shirvanadi & Idris, 2021). The stages of the method namely:

1. Empathize, This stage is the main reference in human-centred design and tries to understand the user in its designed context (Candra Wardana & Gusti Lanang Putra Eka Prismana, 2022) In this stage, the author conducts direct interviews and observes the needs at the Rania Farma Pharmacy.
2. Define is the phase of finding the point of view of the core of the problem (Febriansari et al., 2022). In this stage, the authors define and conclude the problem and list the needs at Rania Farma Pharmacy.
3. Ideate is to focus on finding ideas/solutions to the conclusions that have been made from the previous stage (Wijaya et al., 2022). In this stage, the author focuses on finding ideas/solutions from the prior stage to serve as the basis for prototyping.
4. The prototype can be interpreted as an initial product used to test existing design ideas and as an example for the final product that will be released later (Azmi et al., 2019). In this stage, the author designs the pharmacy application based on the user interface/user experience.
5. The test is a trial technique for evaluating prototypes to get user input regarding the feasibility of the design for use and fixing problems that arise (Herfandi et al., 2022). In this stage, the author collects feedback from Rania Pharmacy to improve the design that has been made.

While the analytical method to assist in the evaluation of application testing is the SUS method. SUS is an analytical method to assist in evaluating the usability of a user-oriented system/prototype. This method has 10

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questions with five answer scales. There are rules for calculating the average number of scores obtained (Damayanti et al., 2022):

1. From 10 questions, the user's score is reduced by one for odd questions.
2. From 10 questions, the final score is obtained from the value of five minus the score given by the user.
3. The average score on the sum of all numbers is multiplied by 2.5.

Interpretation On SUS Value can be seen in table 1 below:

Table 1. Interpretation On SUS Value

SUS Score	Grade	Adjective Rating
>80.3	A	Excellent
68.1 – 80.3	B	Good
68	C	Okay
51 – 67.9	D	Poor
<51	E	Awful

As seen in table 1 above, SUS scores can be interpreted using a Grades and Adjectives Rating approach. For grades, raw SUS scores can be grouped into A to E, where A means excellent and E means very awful. Raw SUS scores can also be compared with one of six existing adjectives. SUS scores above 80.3 are considered Excellent, values from 68.1 to 80.3 fall into the Good category, 68 is Okay, values from 51 to 67.9 are Poor, and less than 51 is Awful.

3. RESULT

In this section, the researcher will explain the results of the research obtained. Researchers can also use images, tables, and curves to explain the results of the study. These results should present the raw data or the results after applying the techniques outlined in the methods section. The results are simply results; they do not conclude.

The UI/UX design process begins with implementing each stage in the design thinking approach following established procedures (Haryuda Putra et al., 2021). This method enables problem analysis and idea discovery to reach user-oriented solutions. The results of this study are in the form of a pharmacy application design prototype that has gone through development, evaluation and improvement that supports the appearance and usability of the application. The process of implementing the design thinking method includes the following.

1. *Empathize*, This stage is the first step in the design thinking approach to find out the problems and needs of users through observation and interviews from three respondents (Owner, Pharmacist and Assistant Pharmacist). The observation results found that the system running at the Rania Farma pharmacy was still conventional, where all drug management activities relied on manual recording, which was prone to human error. Drug management activities in question are selling and purchasing drugs, recording drug stocks, ordering and invoicing, and monthly reporting. Meanwhile, based on interviews, respondents claimed that the manual system that was run was inefficient, draining a lot of energy and extra precision. The following is a list of problems in conventional drug management at the Rania Farma pharmacy:

Table 2. Running System Problems

No.	Problems
1	Inequality of daily sales results by recording in the manual book.
2	It is difficult to update drug stocks every day.
3	The recording of drug expiration dates is still manual, so errors can occur.
4	Respondents found it difficult to process invoices, as manual price calculations took a lot of time.
5	Respondents sometimes have difficulty with the location of the drug.
6	Supplier bills do not match the due date.
7	Monthly sales and purchase reports based on the manual.

2. *Define,* This stage is compiling and unifying information to analyze user needs. Because the current system is conventional, the pharmacy requires a mobile-based automated system that makes it easy for users. The results of the requirements obtained in the define stage can be seen as follows:

Table 3. The needs of the Rania Farma Pharmacy

No.	Needs
1	Cashier system that manages transactions, stock and location of drugs.
2	A system that allows marking the expiration date

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	of drugs.
3	Electronic invoice management system and automatic medicine price calculator.
4	Reminder system for supplier payment due dates.
5	Reports Sales System, purchases and monthly profits automatically.

3. *Ideate,* This stage aims to develop ideas to overcome problems and meet user needs. The main vulnerability problem is human error, so the Rania Farma pharmacy needs a mobile application designed based on real-time UI/UX. The ideate results are as follows:

Table 4. Problem Solutions

No.	Solutions
1	Application with a cashier feature that manages transactions.
2	Applications with drug stock management features.
3	Applications that allow marking drug expiration dates.
4	Applications with electronic invoicing features and it is able to calculate drug prices automatically.
5	Applications that contain notes regarding data and drug location.
6	Applications with the Reminder feature for supplier payment due dates.
7	Applications with reports on sales, purchases and pharmacy monthly profits.

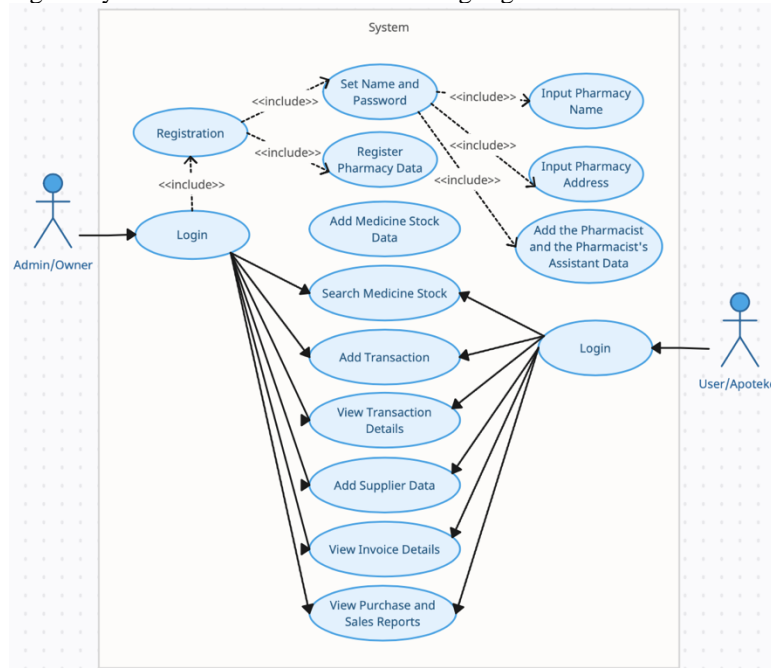A Use-case diagram system can be seen in the following Figure 2:

Figure 2. Use-case Diagram System

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Based on the use case diagram in figure 2 above, the system is designed with two access levels, Admin and User. The Admin is the pharmacy owner who has full access rights to the system, including adding or deleting users if there are changes in pharmacy staff over time. The pharmacy owner must first register by inputting personal data, including username and password. They also need to input pharmacy data, including the pharmacy's name and address, and add pharmacist data, along with assistant pharmacists to whom the pharmacy owner gives access rights to the pharmacy system or application. After registering, actors can log in and enter the system. The available menus that actors can access include a drug stock menu (actors can add and search for drugs), a transaction menu (actors can add, delete, and view transaction details), a supplier menu (actors can add and view invoice details), and a report menu (actors can see detailed sales reports and monthly drug purchases at pharmacies). For user level as personal data including username and password inputted by Admin, they can log in. Users can check drug stock availability by searching for drugs of interest to customers in the drug stock menu. In addition, Users can access transaction menus, adding transactions according to drug transactions at pharmacies.

4. *The Prototype,* This stage executes the idea into a simulated display, the same as when the application is used. At this stage, the researcher uses Figma Digital Prototyping as a reference for the application simulation design process.

The UI/UX design of the pharmacy that was built using Figma software with a design that refers to user needs and problem-solving at Rania Farma Pharmacy can be seen in the following figure 3 to 8 below:
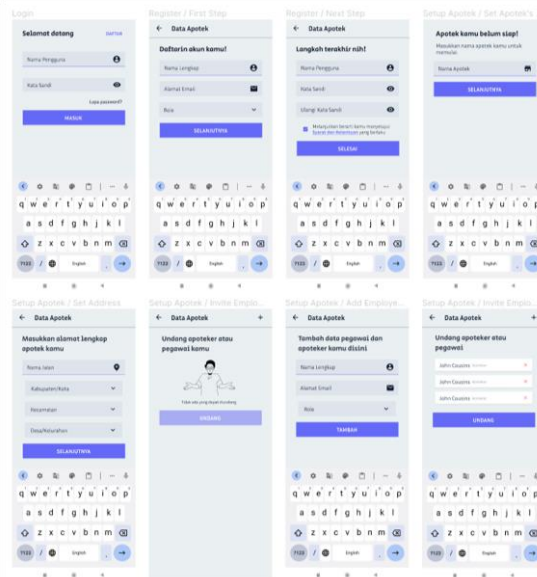

Figure 3. Login and Register

As seen in figure 3 above, figma prototype has the Login form. To be able to access and use other design features, users must first register or login (if they already have an account). Then the user can enter the name, address and other employees in the pharmacy. Based on previous interviews, the pharmacy consists of Owner, Pharmacist and Assistant Pharmacist. So that one pharmacy can have more than one user.

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Figure 4. Home screen

As seen in figure 4 above, the design of the home screen and the top view shows the username and pharmacy, and notification and setting icons are located on the right for easy access. Other views also allow users quick access to important features and sales history. Researchers also added access to Reminders of upcoming payments and last processed transactions. Based on interviews, this display has met the needs of users at Rania Farma Pharmacy.
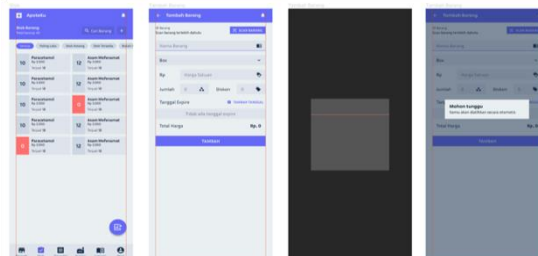

Figure 5. Stock Interface

As seen in figure 5 above, The Stock display presents all the drugs that have been inputted and arranged alphabetically. The researcher added a filter to make users easier to find drugs with certain criteria based on the problems faced by respondents, such as the lack of time efficiency in checking out-of-stock drugs, and there was no estimate of the most sought-after drugs by pharmacy visitors. Thus, the feature is relevant for solving user-oriented problems
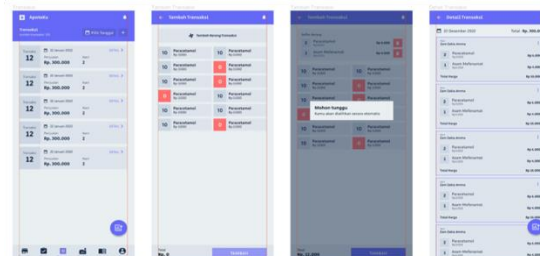

Figure 6. Transactions interface

As seen in figure 6 above, the transaction display is arranged by date, which contains details of all sales on that date. Researchers added a transaction search feature based on date, making it easier for users to find the transaction they want.
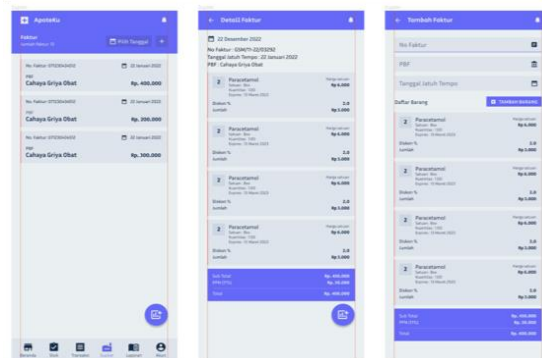
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Figure 7. Supplier interface

As seen in figure 7 above, the supplier contains invoices from related PBFs arranged by invoice entry date. In this invoice, researchers offer an automatic drug price calculator feature that aims to solve human error, sometimes resulting in drug price errors or expired date discrepancies.
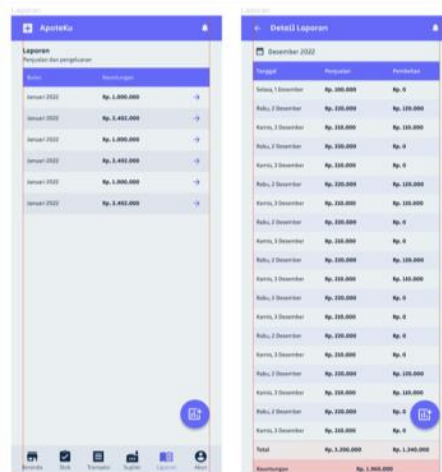

Figure 8. Report interface

As seen in figure 8 above, the report contains a list of sales and purchases made within a month, and profits are calculated automatically. Researchers also added details for sales and purchases that allow pharmacy owners to access monthly reports more accurately and time efficiently.

5. *The Test,* At this stage, a test was carried out to test the prototype to the user then the response to the prototype testing was carried out through a questionnaire to get an overview of the user experience. The questionnaire was given online and distributed via a link containing 10 questions according to the provisions of the SUS analysis. In the case study at the Rania Farma pharmacy, researchers took a total sample of 6 pharmacists who filled out a survey on a scale of 1-5. Display testing was carried out based on a questionnaire following the SUS analysis involving 6 respondents with detailed results for each as follows:

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Table 5. Results of Respondents' Assessment of Prototype Testing

Respondent	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
R1	5	1	4	3	4	1	5	2	4	3
R2	5	1	4	1	4	1	5	1	4	2
R3	4	2	4	1	3	1	5	3	3	1
R4	5	2	4	4	3	4	5	3	2	3
R5	5	1	5	1	5	1	5	1	5	1
R6	5	3	3	2	3	1	5	3	3	1

Table 5 displays the respondents' answers to the questionnaire given. The value is obtained based on the range used, namely 1 (strongly disagree), 2 (disagree), 3 (neither agree nor disagree), 4 (agree) and 5 (strongly agree). Based on the results above, the SUS analysis was carried out by transforming the respondents' answers into SUS scores according to the provisions so that the following results were obtained:

Table 6. SUS Value

Responent	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Jumlah	Nilai
R1	4	4	3	2	3	4	4	3	3	2	32	80
R2	4	4	3	4	3	4	4	4	3	3	36	90
R3	3	3	3	4	2	4	4	2	2	4	31	77,5
R4	4	3	3	1	2	1	4	2	1	2	23	57,5
R5	4	4	4	4	4	4	4	4	4	4	40	100
R6	4	2	2	3	2	4	4	2	2	4	29	72,5
Rata-Rata Nilai SUS												79,5

Based on table 6, the average SUS score is 79.5, which is included in the 'Good' category. Based on SUS analysis, system testing can provide an overview of the need to use the system correctly and systematically.

4. CONCLUSION

After carrying out a series of studies, including literature and field studies at Rania Farma Pharmacy, from the analysis process to the results, we can conclude that UI/UX design of a mobile-based pharmacy application using the design thinking method is successful. The design process includes 5 stages of design thinking, making it easier for researchers to explore problems and needs and find user-oriented solutions. In testing the prototype, the analysis used is the System Usability Scale (SUS). And the results of the SUS value were 79.5, which was included in the Good category. Therefore the design of the Pharmacy application can be used and developed to become a better and more useful system for pharmacies.

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