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User Interface Design of Mobile Based E- Commerce Fasion Application (Shirtly) with Design Thinking Method

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Technological advancements, particularly in the field of the internet, have brought about significant changes in the way people shop. In this context, "Shirtly," a fashion store that provides a variety of products such as clothing, accessories, shoes, and jackets, seeks to develop a mobile-based e-commerce application to improve customers' shopping experience. This research aims to design an effective user interface (UI) by applying the Design Thinking method, which consists of five main steps: Empathize to understand user needs, Define to identify existing problems, Ideate to generate various creative ideas, Prototype to create an initial model of the application, and Test to test the prototype with users to get feedback. The results showed that the Shirtly application successfully met user expectations with a System Usability Scale (SUS) score of 88, which falls into the Excellent category. This finding confirms that the Design Thinking approach is very effective in designing user interfaces that are responsive and in accordance with user needs, so as to increase comfort and satisfaction in the online shopping experience. Thus, the Shirtly app is expected to not only attract more customers but also create a pleasant and efficient shopping experience. In addition, it is important for Shirtly to continuously iterate on the app design based on user feedback after launch. By utilizing user data analysis and regular customer satisfaction surveys, the development team can identify areas that need improvement and new features that users may want. This approach will not only help in maintaining customer loyalty but also enable Shirtly to remain competitive in the ever-evolving e-commerce market. With a focus on continuous innovation and adaptation to market trends and user preferences, the Shirtly app can become a superior and relevant online shopping platform in the eyes of consumers.

Keywords— Design Thinking Method, Mobile Application, System Usability Scale, User Interface Design,

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I. INTRODUCTION

The rapid advancement of technology every year, especially in the field of the internet, not only changes the way people think, but also changes the way they live, everything is influenced by technological advances. starting from how to interact, use social media, and buy goods. One of the technological advances, User Interface (UI) and User Experience (UX) can utilize digital means and the internet to design products that can be seen and used properly while increasing the comfort and convenience of users in using these goods or services. Shopping such as clothes and pants was previously done offline, but with the internet, it can now be done online. With the advancement of technology, shopping can now be done online via the web [1].

The main factor that influences the success of a mobile application, apart from the system that has been implemented, is the User Interface (UI) design. This is due to the UI's role as a link between the user and the system, which serves to visualize the system and allow direct interaction with the user. In this research [2] the design thinking method is used as an approach in designing the application interface. This method is known to be effective in solving problems with a human-centered approach, starting from the empathy stage to understand user problems. This approach aims to produce sustainable innovations that are based on the needs and problems faced by users.

User Interface (UI) is the knowledge related to the visual layout of a website or application. The scope of UI includes elements such as clickable buttons, text, images, text input fields, and all items that the user interacts with. It also includes aspects such as layout, animations, transitions, as well as other small interactions. UI design aims to create all the visual elements that allow users to interact with web pages and determine what is displayed on the screen. In other words, UI focuses not only on the aesthetic appearance, but also on how users can easily navigate and use the application or website [3].

Today's fashion industry is developing quickly, and many designers are creating items that appeal to customers. Fashion stores offer a wide selection of prices, ranging from cheap to expensive. Clothing manufacturers and retailers use various approaches to gain market share amidst intense competition. These strategies include innovations in production and marketing processes. While some stores try to keep up with the latest trends and developments to boost their sales, others dare to give deep discounts [4].

Shirtly is the name of a shop outlet or commonly called the name of fashion shopping among young people that provides various products such as clothes, accessories, shoes, jackets and other fashion. However, with the many products sold, Shirtly itself does not yet have an e-commerce prototype design design, let alone an online shop application, so it must have a User Interface and an online application shop, it must have a good User Interface and User Experience so that there is no difficulty in operating the product that has been designed and getting an impressive experience by the user after using the prototype.

Therefore, the purpose of this paper is to create a User Interface design model by innovating in the form of mobile e-commerce using the Design Thinking method. The Design Thinking method has each step designed to identify user problems and generate concepts for interface design [5]. This method is proven to be able to provide solutions in designing user interfaces based on user experience, emotions, and situations [6].

This journal discusses the steps used in the design of an e-commerce application, which starts with conducting a user expectation analysis to find out what users want, then designing a user interface that is easy to use and attractive. This entire process creates a continuous development cycle that allows the e-commerce application to adapt to changing market needs. Initial results show satisfactory performance in terms of response time and user satisfaction, and the data obtained provides valuable insights for future development and improvement of the application.

II. THEORETICAL FOUNDATION

Research [7] with the title Development of Android-Based Mobile Fasion E-Commerce Applications with a waterfall model that results in the development of applications that can offer an efficient and user-friendly online transaction platform. Users can easily order products, delete and update their orders.

Research [8] with the title Designing UI / UX Game Environment Crime Case with the Design Thinking method which produces a criminal case game environment with the theme of environmental damage and is relaxed which asks players to understand the implied meaning of the game so that they can participate in protecting the environment in accordance with the theme.

Research [9] with the title Application of Design Thinking Principles to UI / UX Renas Mobile Application Fasion with the Design Thinking method. This study shows that the Design Thinking method was successfully applied in designing the UI/UX of the Renas Fashion mobile application. The result is a design that is responsive and in accordance with user needs with a high level of usability (score 93, Excellent category).

Research [10] with the title UI/UX Design with the Design Thinking Method on Mobile-Based Shoekuna Shoe Laundry with the Design Thinking method which shows that the testing method carried out can help in making prototype product displays that suit customers who want to use Shoekuna Shoe Laundry.

Research [11] with the title Designing User Interface for Helfa Store E-Commerce Website Using Design Thinking Method which produces UX and UI model output that is easy to use and in accordance with the needs of Helfa Store users through website mock-ups.*Text Font of Entire Document*

III. METHOD

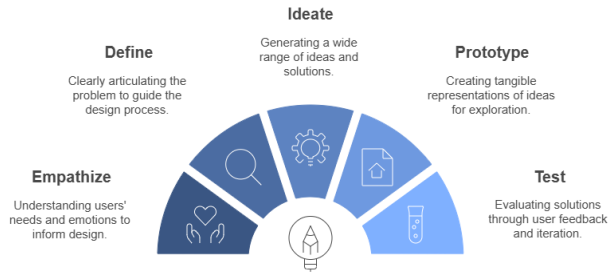

Fig 1. Design Thinking Process

Design Thinking is a solution-based problem-solving method that focuses solely on the user's iterative experience. Emphatize, Define, Ideate, Prototype, and Test are the five steps in the method [12].

A. *Empathize*

Empathy is the ability to understand and feel the emotions of others. It allows us to understand how they feel about problems, situations and circumstances. Through empathy we can feel how they feel about problems, situations, and circumstances [13].

B. *Define*

Define is a stage where the designer defines the problems faced by users, and sees opportunities through user desires based on research at the empathize stage. As well as creating user personas which will later become a basic foundation for designing products or applications [14].

C. *Ideate*

This ideate stage utilizes a creative mindset to determine innovative solutions. This process is a depiction of a solution from various ideas then described through brainstorming [15].

D. *Prototype*

At this point, the author will create a prototype design to display or project UI and UX for players or users. At the prototype stage where the design of a mobile display will be made and implement ideas to produce a visual display prototype [16].

E. *Test*

In the last stage, the author conducted a product trial made at the previous prototype stage to test the "Shirtly"

application. This is done in two stages, namely through trials, namely with digital prototyping and questionnaires [17].

IV. RESULTS AND DISCUSSION

A. *Empathize*

Gaining a thorough understanding of the user experience and the problem that needs to be solved is the main goal of this first stage of the Design Thinking methodology [18]. Direct observation or interviews with users are used in this stage to gather information and develop a deeper understanding of empathy. To find a business strategy based on users' needs and feelings, researchers use a questionnaire distribution process [19].

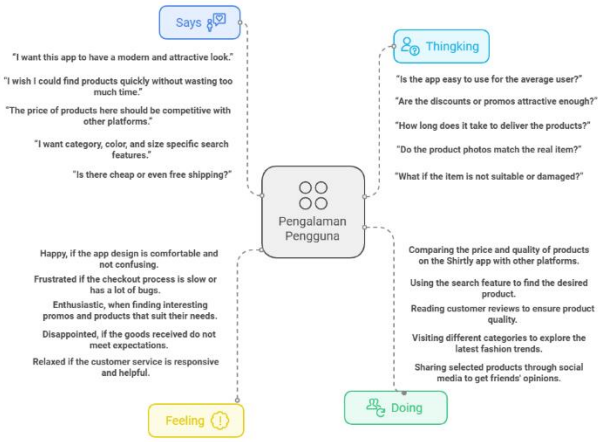

Fig 2. Empathy Map

B. *Define*

The information gathering stage derived from the empathize process involves analyzing the observations to synthesize the data that has been obtained, with the aim of identifying the core issues that arise [20]. This process helps the UI Designer gather the ideas needed to design features, functions, and elements that can address the problems that users may experience. Such information is usually obtained through the creation of an empathy map, which provides deep insights into the user's experiences, needs, and motivations. By doing so, designers can formulate user-focused problem statements, making the resulting solutions more relevant and effective in meeting their needs.

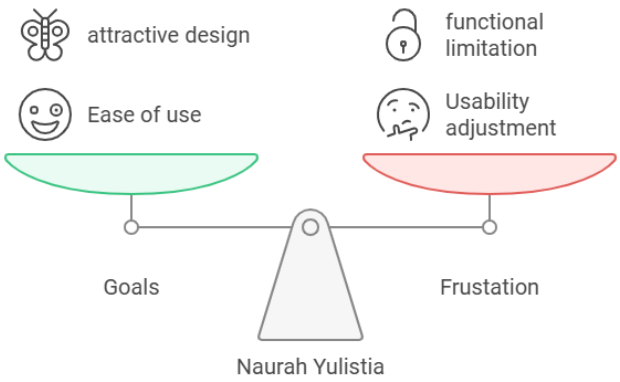

Fig 3. User Persona

C. *Ideate*

At the ideate stage is the process of a designing a solution that will be offered from the various ideas that have been collected, here is the solution that is designed in Figure 3.

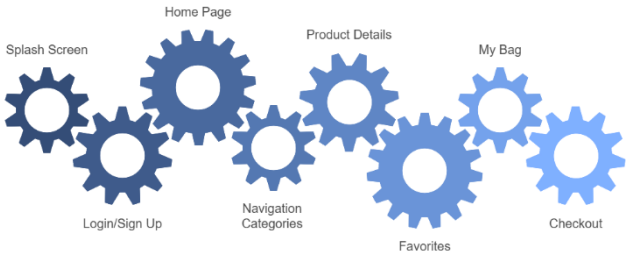

Fig 4. User Flow

D. *Prototype*

Prototype is a stage where a display design is made for an application so that it can be implemented and the concept applied to create a prototype in the form of a High Fidelity High visual display [21]. Fidelity is a type of prototype that is closer to solution design in terms of detail and completeness [22]. Here are the results of the High Fidelity design of the Shirtly:

Fig 5. Splash Screen

In Figure 5, the application homepage, users can see the Shirtly Fashion logo. Next, users will be directed to a page that offers the option to log in or sign up.

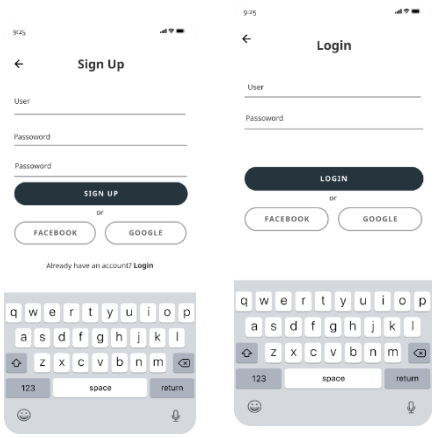

Fig 6. Register and Login

In the next image after Figure 6 is the Register and Login page. Here, users are expected to register by entering information such as name, email, and password. After successfully registering, users can log-in using the account that has been created.

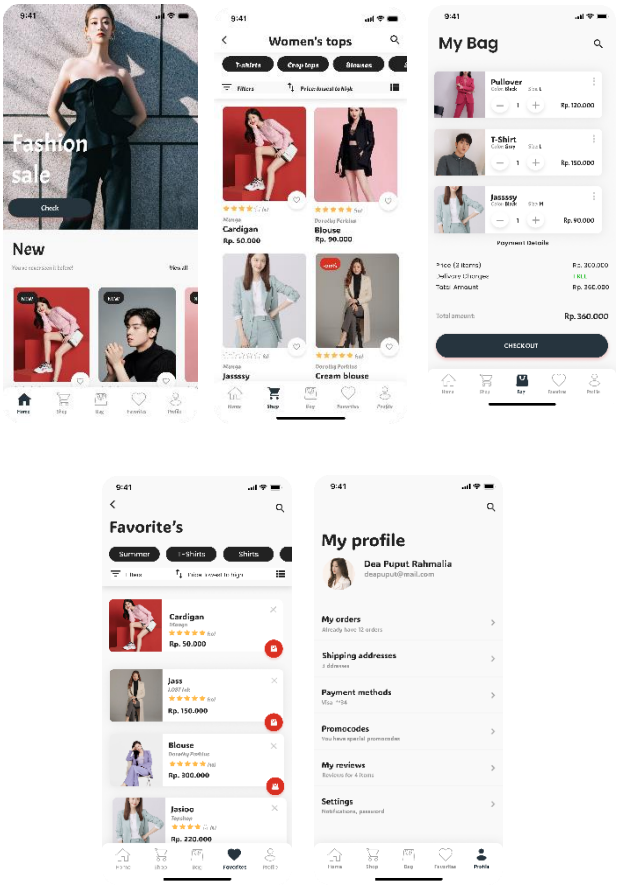

Fig 7. Main Page

In Figure 7 the Shirtly Fashion mobile application is designed with five main pages that aim to provide an optimal shopping experience for its users.

a. Home page: Here, users can view various features and featured products, including special offers, popular products, and personalized recommendations based on their preferences. This page serves as an exciting starting point for exploring products.
b. Shop Page: This page allows users to browse product categories in greater depth and find the items they want easily. With intuitive navigation, users can quickly find items that suit their needs.
c. Cart Page: Users can save their favorite products on this page for future purchase. This feature makes it easy for users to organize their purchases without having to re-search for products they have previously selected.
d. Favorites Page (Wishlist): Users can save a wish list of products that they would like to purchase in the future. This makes it easy for users to keep track of items that catch their eye without having to add them to the shopping cart.
e. Profile Page: This page gives users the control to manage their personal information and preferences, such as shipping address and payment method. With this feature, the shopping experience becomes more personalized and convenient, as users can easily access and update their information as needed. With a design that focuses on ease of use and personalization, the Shirtly app not only enhances the convenience of online shopping but also creates a more enjoyable experience for its users.

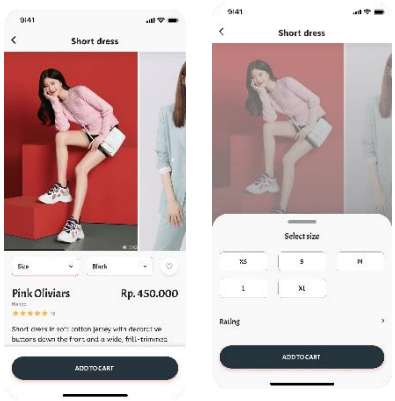

Fig 8. Product Detail

In Figure 8 Detail Product on Agri Mart provides users with complete and detailed information about each product offered. On this page, users can view a full description that includes product features and benefits, as well as important information such as price, size, and color options. In addition, there are high-quality product images that allow users to see the visual details clearly. Users also have the option to add products to their bag or wishlist, easing the purchasing process at a later date. To enhance social interaction, the page is equipped with a sharing feature that allows users to share the products through various social media, thus expanding marketing reach and increasing community engagement.

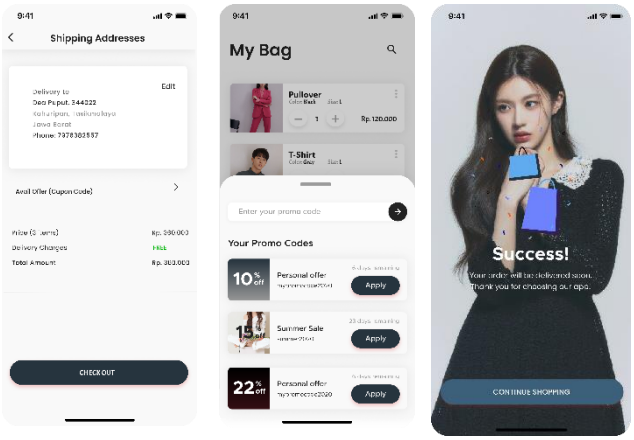

Fig 9. Checkout

In Figure 9, Order Status page users have to fulfill a few important steps before ordering. They are required to enter the correct shipping address, choose the appropriate order method, and use the discount coupon to get a discount if the user has one. The final step is to confirm the order to ensure a successful transaction. Once the order is confirmed, users will instantly receive an "Order Successful"

notification, indicating that the ordering process has been completed successfully.

E. *Test*

The research phase has now reached the final stage in the Design Thinking method process, which is the testing phase. At this stage, we used the System Usability Scale (SUS) method to evaluate the Shirtly Fashion mobile application. The SUS method consists of ten questions designed with a linear response scale from 1 to 5. In this scale, 1 indicates "strongly disagree," while 5 means "strongly agree."[23] Using this approach, we can measure the extent to which users are comfortable and satisfied with the application that has been developed. Each question in this questionnaire aims to explore various aspects of usability, including ease of use and overall satisfaction. The results of this test will provide valuable insights into how the app is received by users and which areas may need to be improved to enhance the user experience in the future.

After the research collected data from respondents, the data was calculated. To use the System Usabiity Scale (SUS) has its own rules in calculating SUS scores. The following are the rules when calculating the score on the questionnaire:

1. For each odd-numbered question, the score obtained from the user's assessment will be reduced by 1. This means that if a user assigns a certain score to these questions, the final score recorded will be lower by subtracting one point from the original score assigned.

2. For each question that has an even number, the final score will be calculated by subtracting the score given by the user from the initial score of the question. In other words, the final score for these even-numbered questions is obtained through the process of subtracting between the score received and the pre-set score.

3. The SUS score is obtained from the sum of the scores of each question which is then multiplied by 2.5

Score calculation rues to apply to 1 respondent. Here is the formua for calculating SUS score :

$$\bar{x} = \frac{\sum x}{n}$$

$\bar{x} = Average\ Score$

$\sum x = Sum\ of\ SUS\ Scores$

$n = Number\ of\ Respondents$

The testers who will test the prototype are respondents who have previously filled out a questionnaire. There are 10 questions which are the total measurements in this test, here are 2 tables of evaluation results scores with the System Usabiity Scale (SUS) method:

TABLE 1. QUESTIONNAIRE SCORE RESULT

Tester	Question									
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
T1	5	2	5	2	4	2	4	2	4	2
T2	5	2	5	1	5	1	5	1	5	3
T3	5	1	5	2	5	1	5	1	5	3
T4	5	1	5	3	4	2	5	2	5	2
T5	5	2	5	2	5	1	5	2	5	2

In Table 1, we perform data calculations based on the System Usability Scale (SUS) scoring rules listed in three specific questions. This process starts by collecting and summing up the scores given by each respondent for all questions, i.e. from Question 1 to Question 10. After obtaining the total score from all respondents, the next step is to multiply the sum by 2.5. This multiplication is done to convert the raw score into a more representative SUS final score. The final results of this calculation provide a clear picture of the level of application usability based on user perceptions. The data obtained can be seen below, and the results will provide insight into how well the application meets the needs and expectations of users in the context of usability.

TABLE 2. SCORE CALCULATION SYSTEM USABILITY

Question											Amount	Value
Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10			
4	3	4	3	3	3	3	3	3	3		32	80
4	3	4	4	4	4	4	4	4	2		37	93
4	4	4	2	3	3	4	3	4	3		37	93
4	4	4	2	3	3	4	3	4	3		34	85
4	3	4	3	4	4	4	3	4	3		36	90
Average score (Final Result)												88

Table 2 shows the results of the calculations done in the previous stage, where we used a formula to calculate the System Usability Scale (SUS) score to get the average value. This process is done in a similar way to the previous calculation, which is to add up all the scores given by the participants. Once the total score is obtained, the next step is to divide the sum by the number of participants who participated in the assessment. Based on the data collected, the average SUS score obtained was 88.

This score gives a strong indication of the usability of the app based on user experience. With an average score of 88, the app is in the excellent category according to the SUS scale. To provide further context, the results of this assessment can be summarized in the terms shown in the figure, which depicts the value range and interpretation of the SUS score. The figure will help in understanding where the app stands in terms of usability and provide guidance for developers to maintain or improve the user experience in the future. Thus, the results of this analysis not only provide an overview of the current user satisfaction but also form the basis for continuous

improvement in the design and functionality of the application.

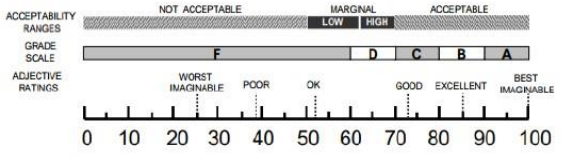

Fig 10. System Usability Scale Score

Based on the data results displayed in Figure 10, the total score obtained is 88. This score is placed in the EXCELLENT category, which corresponds to scale B. This category indicates that the assessment of the application is acceptable and considered feasible for use [24]. The score of 88 reflects a high level of user satisfaction with the app's user interface. In this context, the category of EXCELLENT indicates that most respondents felt that the app met or even exceeded their expectations in terms of ease of use, navigation, and functionality [25]. This rating is very important as it indicates that the app is not only well-designed, but also optimized to provide users with a pleasant shopping experience.With a score that falls into this category, developers can feel confident that the app has been successful in meeting users' needs. However, even if the results are positive, it is important to continue to monitor user feedback and make continuous improvements [26]. This will help ensure that the app remains relevant and competitive in the ever-changing e-commerce market. Thus, achieving a score of 88 is not only an achievement, but also the first step towards improving the quality of service and user experience in the future [27].

V. CONCLUSION

This research applies the Design Thinking method in designing the user interface (UI) and user experience (UX) for a fashion e-commerce application called “Shirtly.” The stages include Empathize to understand user needs, Define to formulate key problems, Ideate to come up with creative solutions, Prototype to create the visual design of the application, and Test using the System Usability Scale (SUS) which recorded a score of 88 in the “Excellent” category. The app offers an optimal shopping experience with features such as product catalog, shopping cart, favorites list, and informative product detail pages. The results showed that the Design Thinking method was effective in creating a responsive and engaging user interface design. By focusing on user needs, the Shirtly app successfully provides an efficient experience and supports interaction and marketing through innovative design elements. This approach also opens up opportunities for adaptation to dynamic market needs in the future.

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