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Designing User Interface on "HewanKu" Application Using User Centered Design Method

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This research aims to design the user interface of the HewanKu application using the User Centered Design (UCD) method, in order to improve user experience in buying and selling livestock transactions. UCD is applied to ensure that the design of the application interface is in accordance with user needs and preferences. The research method involves the stages of user needs analysis, design, prototype testing, and design iteration based on user feedback. Application testing was conducted using a Black Box Testing approach to ensure that the application functions according to specifications without navigation errors or feature failures. The results showed that the application of UCD succeeded in producing a more intuitive and efficient interface, as well as increasing user trust and satisfaction in transactions. The conclusion of this research is that the combination of UCD and Black Box Testing is effective in creating an application that is easier to use and reliable to support livestock buying and selling transactions.

Keywords: Black Box Testing, Livestock Transactions, Mobile App, User Centered Design, User Interface

INTRODUCTION

The rapid development of digital technology has changed the landscape of various sectors, including livestock. In Indonesia, buying and selling livestock is still often constrained by various challenges, such as limited access to animal health information, complicated transaction processes, and lack of security guarantees (Ifandi & Kusumandyoko, 2023). This inspired the development of the HewanKu mobile application, which is designed to address these issues and provide a more efficient and secure solution for businesses in the livestock sector.

This research aims to improve the quality of the user experience of the HewanKu application through the application of User Centered Design (UCD) principles. By placing user needs and preferences as the top priority, this research seeks to redesign the application's user interface to make it easier to use, efficient, and satisfying (Christofer et al., 2022).

The uniqueness of this research lies in the application of UCD to a specific sector, namely livestock, which is still relatively rarely researched (Pratiwi et al., 2018). Previous studies that examined UCD generally focused on the e-commerce sector in general, such as the sale of electronic products or fashion. In contrast to these studies, this research specifically examines the application of UCD in the context of livestock buying and selling transactions, which have unique characteristics such as the need for animal health information and related regulations (Puspita et al., 2023).

This research supports the findings of previous studies that show the importance of UCD in improving user satisfaction. However, this research expands the scope of UCD by applying it to the livestock sector which has a different social and cultural context. Thus, this research is expected to make a new contribution to the UCD literature and provide practical guidance for the development of similar applications in the livestock sector (Ifandi & Kusumandyoko, 2023).

The urgency of this research is even more pronounced given the huge potential of the livestock sector in Indonesia. By increasing efficiency and transparency in the process of buying and selling livestock, the HewanKu application is expected to contribute to the development of a more modern and sustainable livestock sector (Sulastri et al., 2023).

The specific objectives of this research are to analyze the needs and expectations of users of the HewanKu application, redesign the user interface of the HewanKu application based on UCD principles and evaluate the effectiveness of the redesign on user satisfaction and transaction efficiency. The results of this research are expected to provide optimal design recommendations for the HewanKu application and become a reference for the development of similar applications in the field of livestock.

METHODS

In this section, the research stages used are explained, namely the User Centered Design (UCD) method. This method places the user as the main focus in designing the interface and involves the user directly in the design process which allows the design to meet user needs (Rahma et al., 2024). This research was conducted by involving a number of users selected as key informants, who were identified based on certain criteria in accordance with the objectives of the HewanKu application. Users were involved in the interface development process through information gathering by means of interviews, problem solving, designing usecase diagrams, class diagrams, and wireframes. The data collection phase was conducted over three months, with interviews and usability testing sessions conducted periodically.

Usability testing is done using a black box testing approach by users. Black box testing is a software testing method that focuses on testing the functionality of the application without paying attention to the internal structure or workings behind the application (Fahrezi et al, 2022). In each testing phase, two users were tested to provide feedback on the developed interface design. Although the number of users per testing phase was limited, this was done iteratively to ensure the accuracy of the design results.

To analyze the data collected, this research uses descriptive qualitative data analysis techniques. This technique is used to describe the findings based on the results of interviews and observations, thus providing an in-depth understanding of the needs and challenges faced by users in using the application interface. Descriptive qualitative analysis aims to identify themes and patterns that emerge from the data collected, such as navigation problems experienced by users, accessibility needs, and user perceptions regarding the effectiveness of the design developed. Through this approach, the findings will be mapped to improve the interface design to suit user needs.

Furthermore, the interface system development is tested through usability testing, which is conducted by users using the same method (Wijaya et al., 2023). The evaluation procedure involves testing the functionality of the interface in a real user environment to ensure the design matches the user's needs. Evaluation is conducted using direct observation and interview methods to assess user satisfaction and interface effectiveness.

The stages carried out in implementing the User Centered Design (UCD) method in the HewanKu application with 4 (four) stages, namely determining the user context Understand Context of Use, Specify User Requirements, Design Solutions, and Evaluate Against Requirements (Hermawansyah W and Kusmara E, 2022), which is shown in Figure 1.

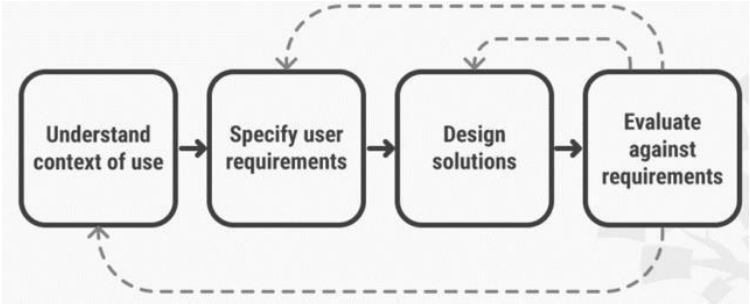

Figure 1 User Centered Design Stages

RESULTS AND DISCUSSION

This research follows the stages of the User Centered Design method, starting with the process of collecting system requirements. The first step taken is to determine the target user to analyze system needs by collecting information through interviews. The information obtained is then analyzed and formulated into system requirements, which will be used to design features and workflows to be developed (Wijaya et al., 2023).

The system requirements identification stage is carried out to understand user needs so that the system is easy to use. This analysis is carried out through four stages, namely:

1. Understand Context of Use

The Understand Context of Use stage is the initial stage in the User Centered Design (UCD) approach which aims to determine the context of use by users. This process involves identifying who the system user is, when the system will be used, and how the user will use the system (Rahma et al, 2024). The result of this stage is an analysis of user needs and user personas, which contains a summary of experiences, obstacles faced, and environmental conditions. This information helps describe user behavior when interacting with the product (Sirait et al, 2022). Therefore, the authors selected potential users who met the criteria as in Table 1.

Table 1 Criteria for Potential Users

Category	User Target
Demography	Age 25-55 years old Male or female Farmers, livestock traders, animal distributors, livestock buyers
Geography	Live in Jabodetabek area
Psychography	Interested in animal livestock, animal health, agribusiness, and livestock trading
Behavior	Prefer livestock with official health certificates

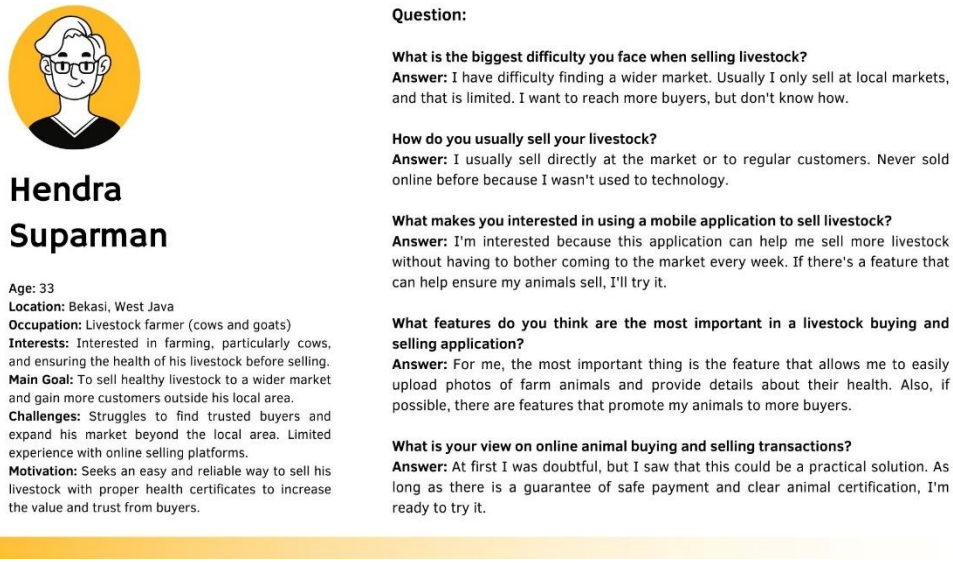

Figure 2 User Persona 1

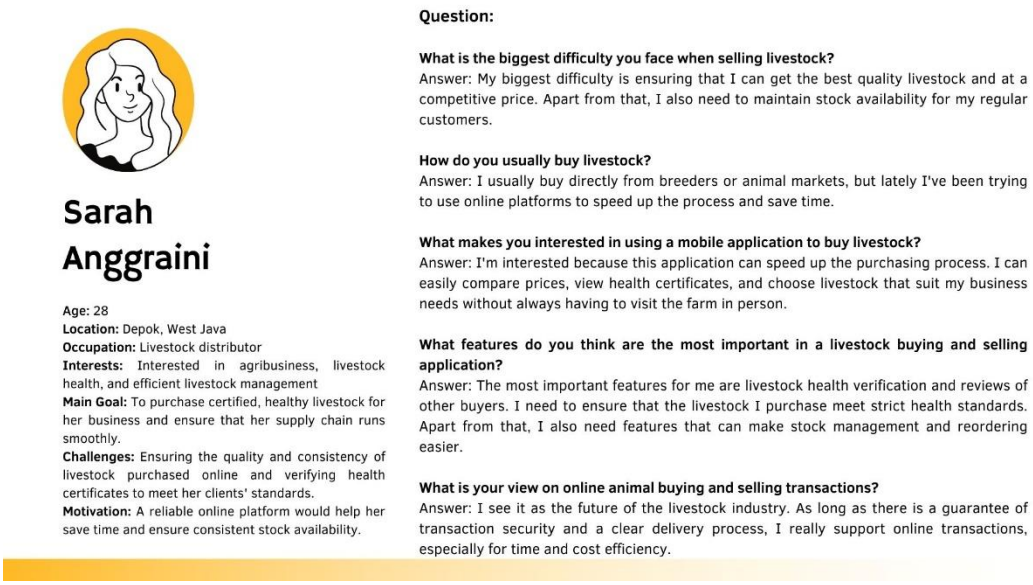

Figure 3 User Persona 2

From the interviews with the target users (user personas) above, it can be concluded that the "HewanKu" application has great potential to be used as the main platform for buying and selling livestock, especially since users prioritize information related to animal health and transaction security. Users also showed high interest in using the app to search for farm animals that have official health certificates, which provides added value for farmers and distributors. In addition, the app is expected to provide easy access and features that support transparency, such as user reviews and verification systems. Users also feel that the app can facilitate the expansion of sales networks, especially for farmers who want to reach buyers outside their area. Based on this, we can proceed to the user requirements structure design stage as shown in Figure 4.

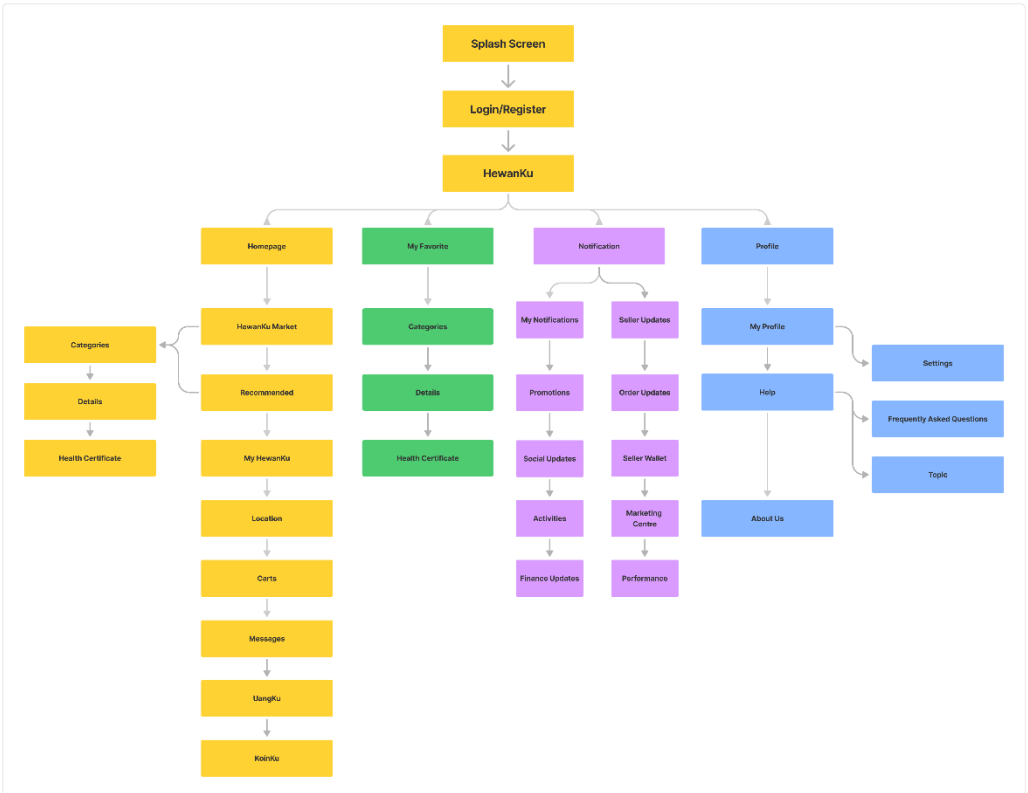

Figure 4 User Program Structure

2. Specify User Requirements

At this stage the author identifies individuals who will use the system and explains the objectives and conditions under which users will use this product (Farah, 2024). The output of this stage is the specification of user requirements that are adjusted to the class diagram and flowchart so that they can be implemented at the system design stage.

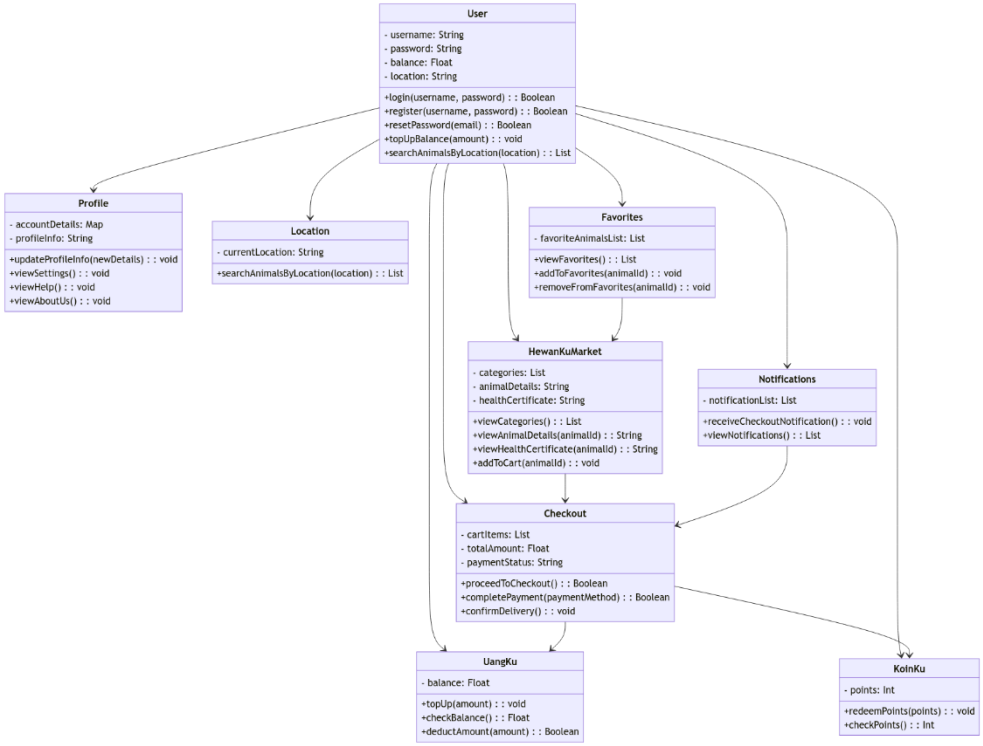

Figure 5 Class Diagram

After creating the class diagram needed to design the features in the application according to user needs, the next step is to create a flowchart. Flowchart is a diagram used to visually describe the flow or stages in a system process (Charis Noija et al, 2023). This flowchart provides an overview of the flow of system processes on features or class diagrams, making it easier to understand the series of information processes in the HewanKu application.

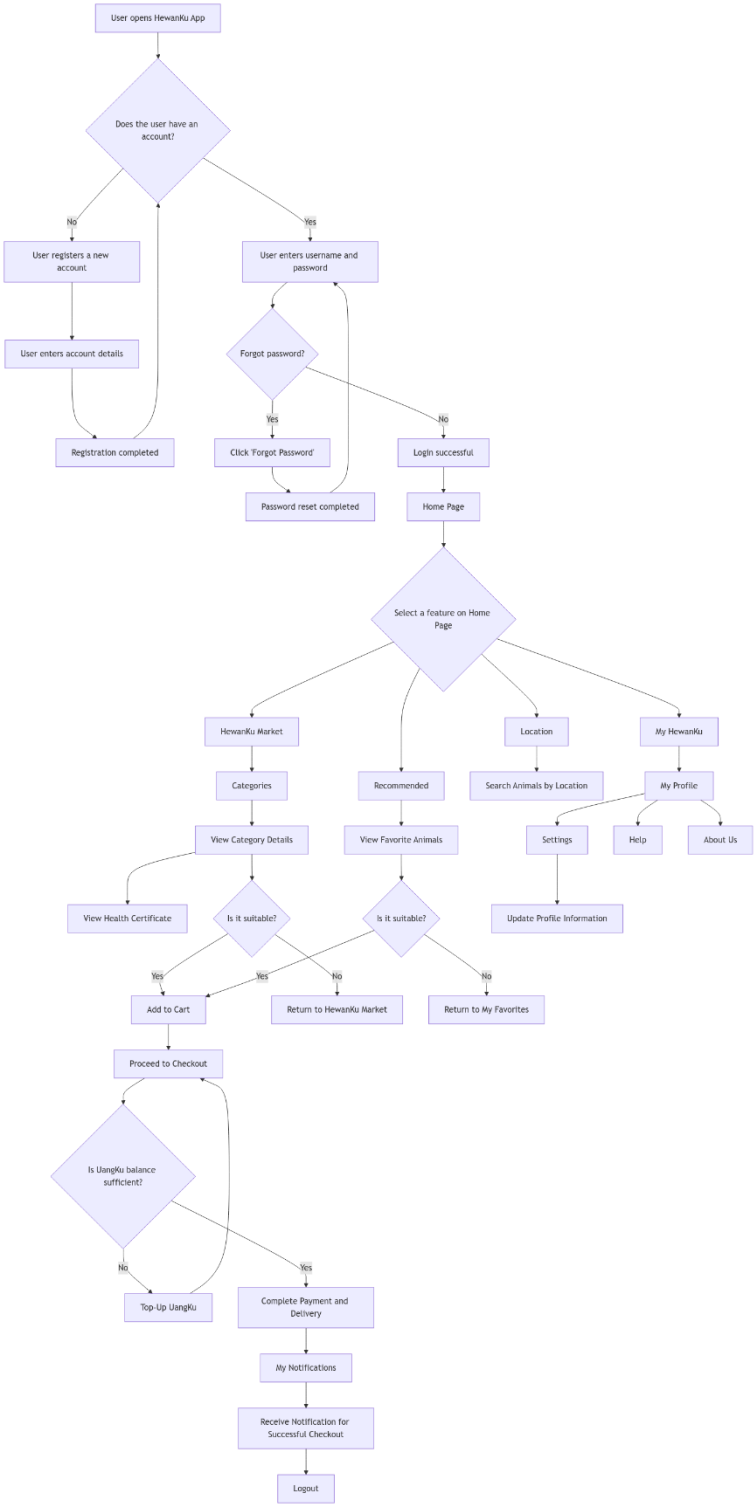

Figure 6 Flowchart

3. Design Solution

At this stage, the design process is carried out in the form of preliminary design, including system design and wireframes. Wireframes can be created using Figma software. The design system consists of design components that can be reused consistently. It includes visual elements such as icons, colors, typography, and patterns, as well as functional guidelines such as interaction and navigation (Kholmatova, 2017). This approach aims to create consistency in the appearance and interaction of the user interface (Rahma et al, 2024).

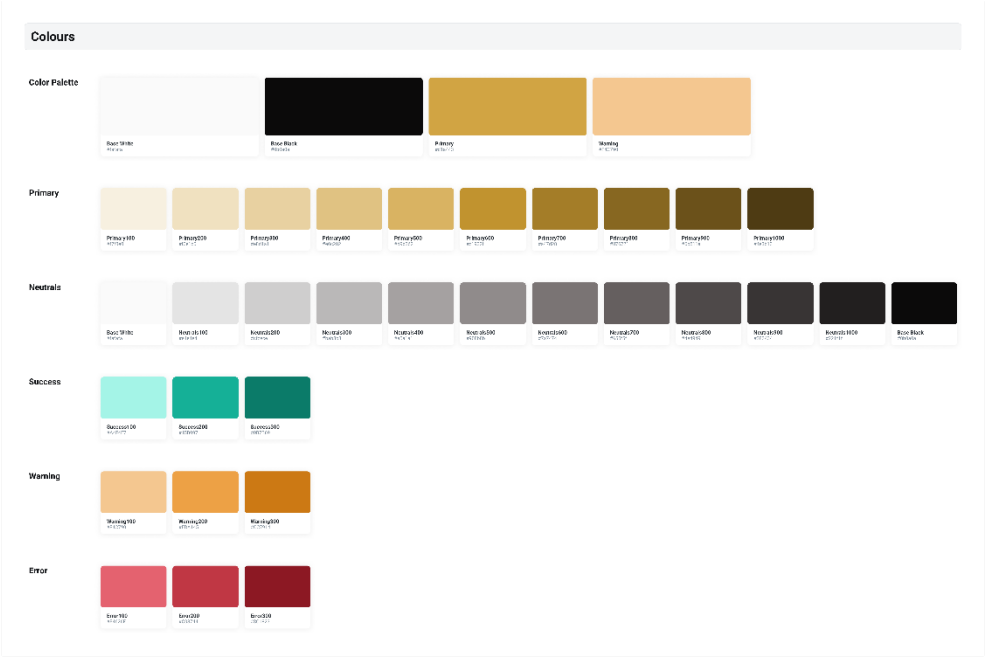

Figure 7 Color System

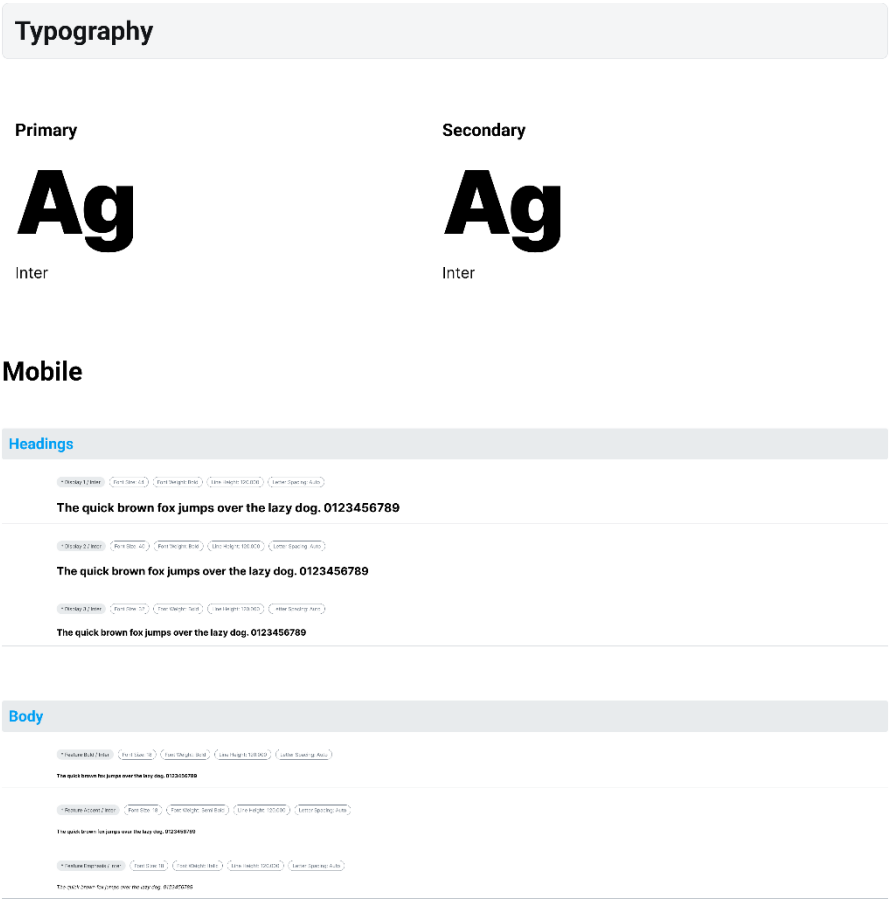

Figure 8 Typography

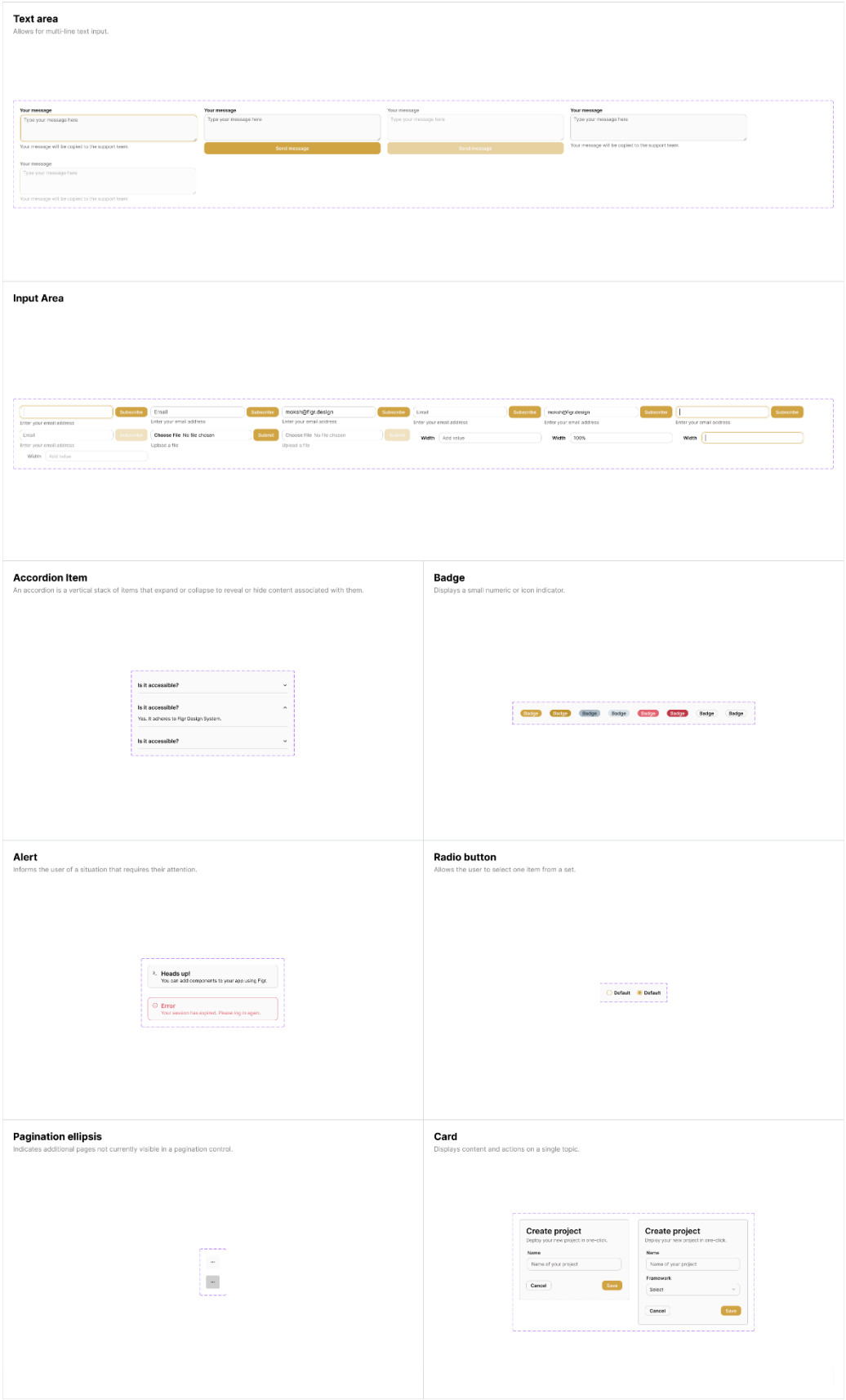

Figure 9 Components

Next comes the wireframe design stage. A wireframe is a three-dimensional outline. Wireframe creation can be done by various methods, but generally involves rendering the boundaries of the region in sections and then connecting the rendered polygons. The wireframe

creation process may vary depending on the software used. Ultimately, the volume formed by the blocks within the wireframe should match the volume of the overall framework (Hendrawan et al, 2022).

After doing the wireframe, proceed with designing the application design using figma software by adjusting the functional data elements. In realizing the framework and user needs, this process uses a prototype for testing the application interface design to be made.

3.1 Splash Screen Page

The splash screen is the initial display when the application is opened. The following design displays the logo and brief information before the user enters the main page or login. This display comes with “skip” and “get started” options.

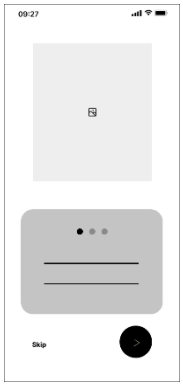

Figure 10 Splash Screen Wireframe

Figure 11 Splash Screen Display

Figure 12 Get Started Wireframe

Figure 13 Get Started Display

3.2 Login & Register Page

On the login page, users can input their username and password to enter the HewanKu application.

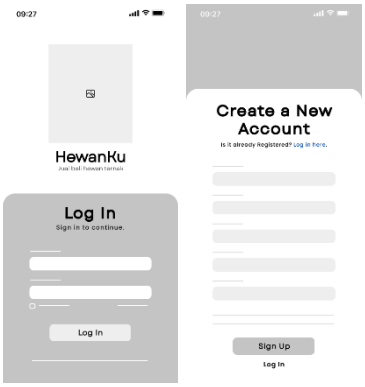

Figure 14 Login & Register Wireframe

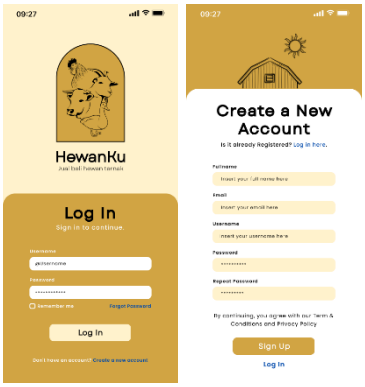

Figure 15 Login & Register Display

3.3 Forgot Password Page

This page is needed for users who forget their password and want to change their password with a new one. On this page users can input email, code verification, new password and re-input the new password. The verification code is obtained after the user enters the email. Users can also click the login button if they do not want to change their password.

Figure 16 Forgot Password Wireframe

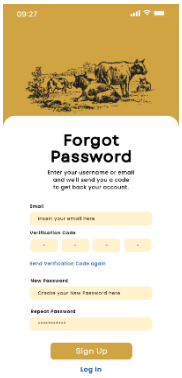

Figure 17 Forgot Password Display

3.4 Home page

On the home page, users can see the main menus or features, namely My Animal Market and Recommendations. The My Animal Market menu contains animal categories and some information about the livestock to be sold, as well as the health certificate of the animal you want to buy. While the Recommendation menu is for recommendations of some of the best animals in accordance with applicable terms and conditions. On the home page there is also a Search feature to search using the desired keywords, a Basket feature for baskets, Messanges for chatting with sellers, UangKu and KoinKu features for information about finance and coins that can be exchanged for promos.

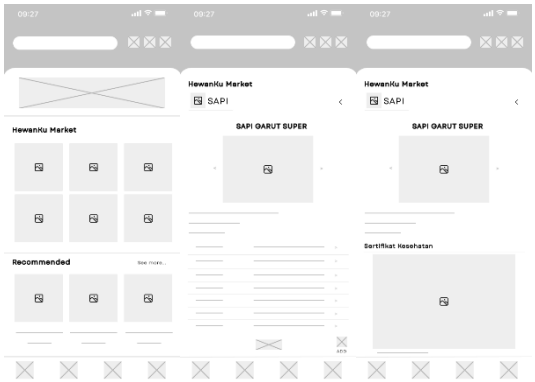

Figure 18 Homepage & HewanKu Market Wireframe

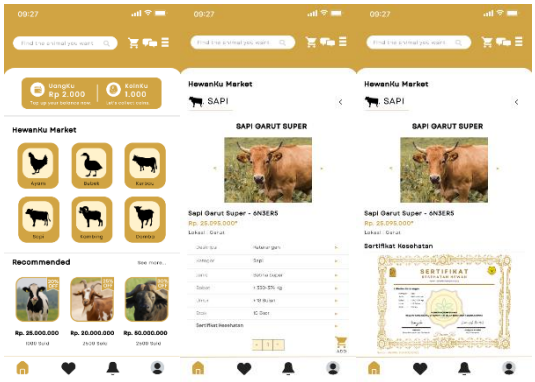

Figure 19 Homepage & HewanKu Market Display

3.5 My Favorite Page

On the My Favorite page, users can view and save various animals they like according to their category.

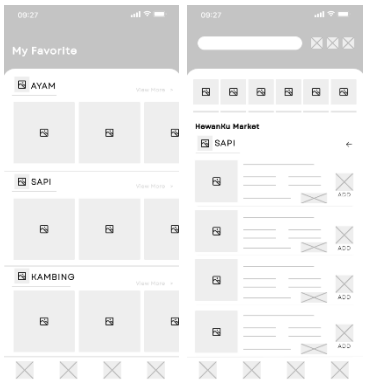

Figure 20 My Favorite & Carts Wireframe

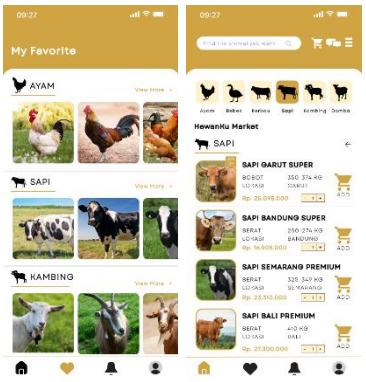

Figure 21 My Favorite & Carts Display

3.6 Notification Page

On the notification page, users can view notifications according to their category, namely My Notification and Seller Updates. My Notification is for the user's own notifications while seller updates is for notifications about the seller.

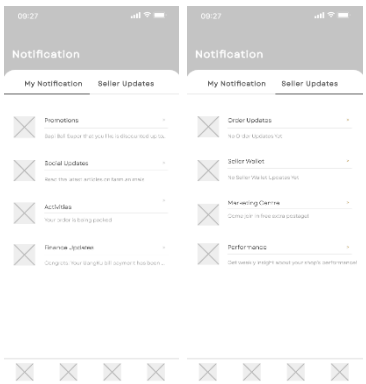

Figure 22 Notification Wireframe

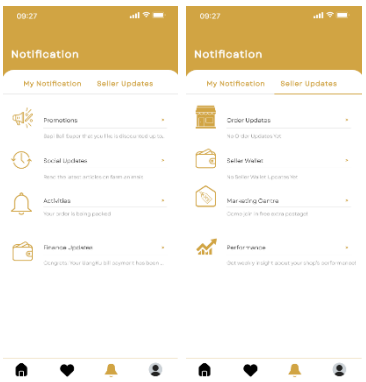

Figure 23 Notification Display

3.7 Profile Page

On the profile page there are several features. The My Account feature allows users to view and reset their profile photo, name, email, and phone number. The Help feature is

for viewing some of the FAQs listed on this feature, and can select the topic you want to ask. In this Help feature users can also use the chat now feature for more advanced questions. Then the About Us feature, for users to view company information. At the bottom center there is a Sign Out button for users to exit the HewanKu application.

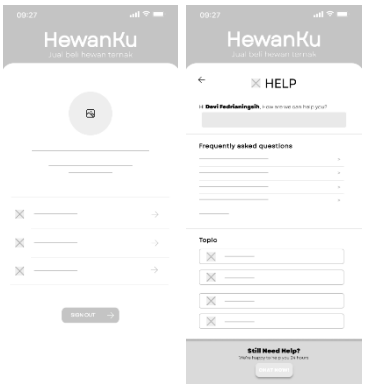

Figure 24 Profile & Help Wireframe

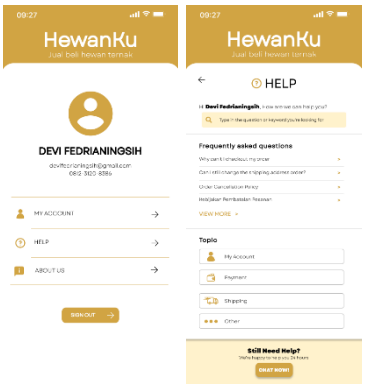

Figure 25 Profile & Help Display

3.8 Prototype of the Application HewanKu

Once all the designs are created, the next step is to design a prototype to visualize the concept and functionality of the design. This prototype will be used as an interactive model that allows further testing by users to ensure that the design meets their needs and expectations before final implementation.

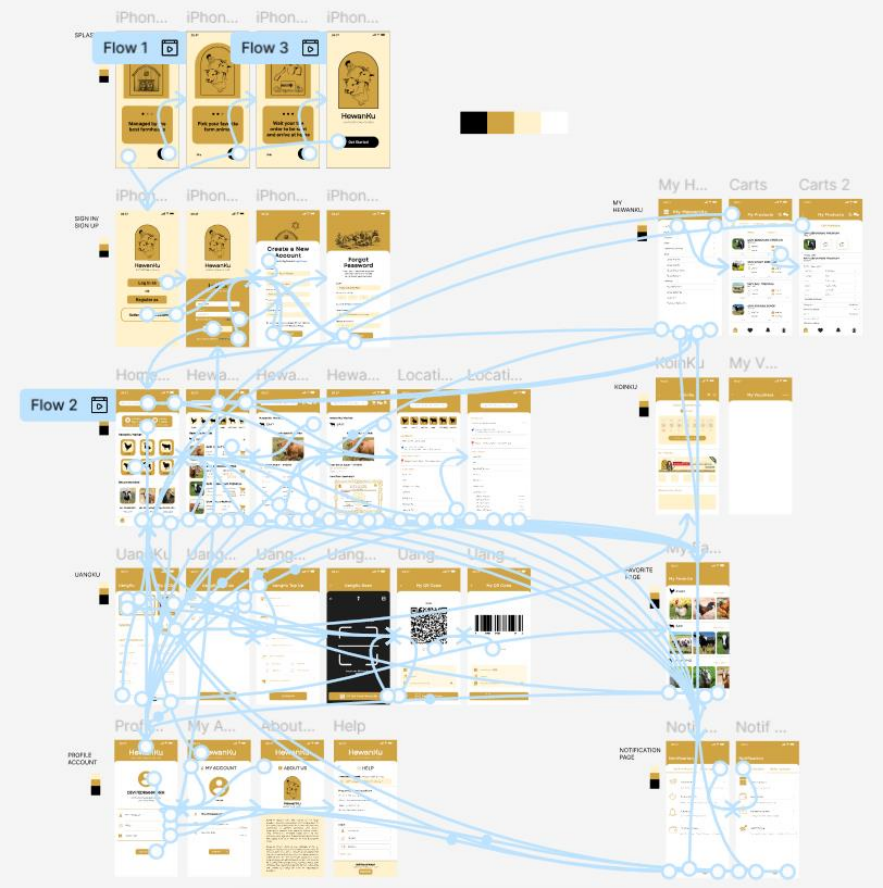

Figure 26 HewanKu Prototype

4. Evaluate Design Against User Requirements

After the Design Solutions stage is complete, the next stage is Evaluate Against Requirements which serves to evaluate the design and determine the level of conformity of the interface design design with user needs (Kuncahyo et al., 2023). At this stage, users test the prototype to ensure the design is in accordance with their needs and expectations. Testing is done using the Black Box Testing method. The results of the interface design are given to prospective users to evaluate whether they have met the system's functionality needs according to user expectations or not (Salsabil et al., 2023). This process ensures that the designed solution can be implemented effectively in supporting the process of buying and selling livestock in the HewanKu application.

4.1 Register Function Test Results

Table 2Register Functional Testing

Test Case Name	Case Description	Initial Conditions	Tester
Register Function	Register function – Normal condition, complete fields	The user is on the register page with the fields still empty.	Denasyah Ma'arief and Sugiat Bagja
Scenario			
Test procedure steps for test cases 1. The homepage will be displayed with *the Sign Up button* and *fields* for full name, *email* , *username, password* and *repeat password.* 2. If the user clicks the *Sign Up button* but has not filled in *the fields* completely, a notification will appear. 3. By filling in all *the fields* and continuing to click the *Sign Up button,* the user automatically agrees to the terms and conditions above the *Sign Up button.* 4. There is *a Log in here* to *sign in* if you already have an account			
Results			
Which are expected		**Observation**	**Results**
1. Displaying the register page 2. Successfully registered account 3. After registering, users will be immediately directed to the homepage.		Testing was successful after performing the above mentioned procedures.	Succeed

4.2 Login Function Test Results

Table 3Login Functional Testing

Test Case Name	Case Description	Initial Conditions	Tester
Login Function	*Login* function – Normal condition, complete *fields*	The user is on the login page with the fields still empty	Denasyah Ma'arief and Sugiat Bagja
Scenario			
Test procedure steps for test cases 1. The homepage will be displayed with username and password field buttons. 2. The login button will be displayed 3. There is a remember me checkbox above the login button. 4. If the data is correct then go to the home page 5. If the data is incorrect or incomplete, there is a notification to complete the fields			

Results		
Which are expected	**Observation**	**Results**
1. If the username and password entered match, the user has successfully logged in and will be directed to the home page. 2. If the username and password do not match, the login will fail.	Testing was successful after performing the above mentioned procedures.	Succeed

4.3 Forgot Password Function Test Results

Table 4Forgot Password Functional Testing

Test Case Name	Case Description	Initial Conditions	Tester
Forgot Password Function	*Forgot password* function – Normal condition, complete fields	The user is on the forgot password page with the fields still empty	Denasyah Ma'arief and Sugiat Bagja
Scenario			
Test procedure steps for test cases 1. The homepage will be displayed with email field buttons, verification code, new password and repeat password. 2. A sign up or log in button will appear at the bottom center of the page. 3. There is a send verification code above the new password field 4. Click send verification code and there will be a code notification to continue creating a new password. 5. If the email used is incorrect or incomplete, there will be a notification			
Results			
Which are expected	**Observation**	**Results**	
1. If the email used matches, the user will receive a verification code and create a new password, then be directed to the login page. 2. If the email does not match, then you will not receive a verification code, so the forgot password will fail.	Testing was successful after performing the above mentioned procedures.	Succeed	

4.4 Homepage Function Test Results

Table 5Homepage Functional Testing

Test Case Name	Case Description	Initial Conditions	Tester
Homepage Function	*Homepage* function – Normal condition, complete fields	Homepage function – Normal condition, complete fields	Denasyah Ma'arief and Sugiat Bagja
Scenario			
Test procedure steps for test cases 1. There is a search feature to search using certain keywords			

2. There are UangKu and KoinKu features, if you click on them, information about UangKu and KoinKu will appear.
3. There is a feature of HewanKu Market. If you click it, you will go to the detailed HewanKu Market feature which contains some information about the livestock that will be sold. If you click on the certificate, a health certificate will appear from the animal we choose.
4. There is a Recommended feature, if you click on it, several recommendations for the best animals will appear.
5. There is a carts feature, if you click it it will display the stored shopping basket
6. There is a messages feature, if you click it it will display a chat to ask customers/buyers.
7. There is a My Favorite feature, to save information related to favorite livestock.
8. There is a Notification feature, to see notifications
9. There is a Profile, to set up an account, information about the company, help and sign out.

Results

Which are expected	Observation	Results
1. On the homepage, if we click on the search feature, it will automatically search according to the keyword written. 2. UangKu and KoinKu features, if you click on them you will find information about UangKu mutations, and how to top up and so on. 3. There is a feature of HewanKu Market. If you click it, you will go to the detailed HewanKu Market feature which contains some information about the livestock that will be sold. If you click on the certificate, a health certificate will appear from the animal we choose. 4. There is a Recommended feature, if you click on it, several recommendations for the best animals will appear. 5. There is a carts feature, if you click it it will display the stored shopping basket 6. There is a messages feature, if you click it it will display a chat to ask customers/buyers. 7. There is a My Favorite feature, to save information related to favorite livestock. 8. There is a Notification feature, to see notifications 9. There is a Profile, to set up an account, information about the company, help and sign out.	Testing was successful after performing the above mentioned procedures.	Succeed

4.5 HewanKu Market Function Test Results

Table 6AnimalKu Market Functional Testing

Test Case Name	Case Description	Initial Conditions	Tester

HewanKu Market Functions	*HewanKu Market* function – normal condition, the HewanKu Market display appears	Display of table list along with supporting images for HewanKu Market	Denasyah Ma'arief and Sugiat Bagja

Scenario

Test procedure steps for test cases

1. Will be displayed on the homepage
2. There are several categories, if you click on the image in the category, it will continue to the list display for one of the selected categories.
3. Then from the list you can choose one of the livestock you want to choose, if you click on it you will go to a more complete explanation of the animal.
4. We can also see the animal health certificate which is in the animal details.

Results

Which are expected	Observation	Results
1. Users can view and select various animals according to their category. 2. Users can view the health certificate of the selected animal.	Testing was successful after performing the above mentioned procedures.	Succeed

4.6 My Favorite Function Test Results

Table 7My Favorite Functional Testing

Test Case Name	Case Description	Initial Conditions	Tester
My Favorite Function	My Favorite function — normal condition, to view favorite animals	Display of the animal category table list along with supporting images for My Favorite	Denasyah Ma'arief and Sugiat Bagja

Scenario

Test procedure steps for test cases

1. Will be displayed on My Favorite page
2. There are several categories of animals that are liked, if you click on the image in the category, it will continue to the list display of one of the selected categories.

Results

Which are expected	Observation	Results
1. Users can view and save various animals they like according to their category.	Testing was successful after performing the above mentioned procedures.	Succeed

4.7 Notification Function Test Results

Table 8Notification Functional Testing

Test Case Name	Case Description	Initial Conditions	Tester
Notification Function	Notification function to view notifications	View multiple categories of notifications	Denasyah Ma'arief and Sugiat Bagja

Scenario
Test procedure steps for test cases 1. Will be displayed on the notification page 2. There are several notification categories such as My Notification and Seller Updates.

Results		
Which are expected	**Observation**	**Results**
1. Users can view various notifications according to their category.	Testing was successful after performing the above mentioned procedures.	Succeed

4.8 Profile Function Test Results

Table 9Functional Testing Profile

Test Case Name	Case Description	Initial Conditions	Tester
Profile Function	Profile function for account settings and company information	View profile photo, My Account, Help and About Us	Denasyah Ma'arief and Sugiat Bagja

Scenario
Test procedure steps for test cases 1. Will be displayed on the Profile page 2. There is some information such as profile photo, e-mail, telephone number, My Account settings, Help and About Us.

Results		
Which are expected	**Observation**	**Results**
1. Users can view and reset their profile photo, name, email and phone number. 2. Users can see the Help feature, there are several FAQs listed in this feature, and can choose the topic they want to ask about. 3. Users can use the chat now feature for further questions. 4. Users can view company information listed in the About Us feature.	Testing was successful after performing the above mentioned procedures.	Succeed

4.9 Logout Function Test Results

Table 10Logout Functional Testing

Test Case Name	Case Description	Initial Conditions	Tester
Logout Function	Logout function – normal condition	The user has logged in first	Denasyah Ma'arief and Sugiat Bagja

Scenario
Test procedure steps for test cases 1. Will be displayed on the profile page with several features 2. In the bottom center, a sign out button will be displayed.

3. Click the sign out button

Results		
Which are expected	**Observation**	**Results**
1. Can logout and return to login form	Testing was successful after performing the above mentioned procedures.	Succeed

Testing the interface of the AnimalKu application using Black Box Testing above shows that all functional features in the system have operated properly and in accordance with user needs.

CONCLUSION

The results of this research show that the application of the User Centered Design (UCD) method combined with Black Box Testing effectively improves the user interface of the HewanKu application. UCD allows the interface design to be tailored to the needs and preferences of users, and helps identify the main problems faced by users and provide more appropriate design solutions. Meanwhile, Black Box Testing ensures that the application runs according to specifications without any errors in navigation or transaction features. This test proves that the HewanKu application can increase user trust and satisfaction, while meeting the expected functional standards.

Overall, this research makes a significant contribution to the development of mobile applications in the livestock sector by emphasizing the importance of user-focused design and proper functional testing. The HewanKu application is now not only more user-friendly, but also more reliable in facilitating livestock buying and selling transactions.

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