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UI/UX Design Web-Based Livestock Sale Using Design Thinking to Rapid Prototyping

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ABSTRACT: The livestock sector is one of the income sources for people in Laupakam Village who are engaged in poultry farming, goats, buffaloes and other types of livestock planning to sell and market online but are constrained by website-based application information systems to sell and market various livestock products. In addition, the sale of livestock that is commonly done is also still traditionally done such as selling around the village using a freight car or marketing in traditional markets which slows down sales and does not guarantee sales. Based on the above problems, the author provides a solution by designing a user interface user experience website for livestock sales that creates the final result in the form of a prototype and can be used directly to users for the testing stage. So that with this design it can make it easier for people to sell and buy livestock products and easily and to improve the economy in Laupakam Village. This design process uses the design thinking method which includes five stages, namely empathize, define, ideate, prototype, and test. Then testing in this study includes aspects of effectiveness, efficiency and user satisfaction using the usability testing method. Based on these tests, the effectiveness aspect obtained a value of 78.9%, the efficiency aspect obtained a value of 85% and the user satisfaction aspect obtained a value of 82.7%. So, the design of the livestock sales website solution gets a value of 81.78%, this value is included in the very good category.

KEYWORDS: User Interface, User Experience, Design Thinking, Prototype, Usability Testing

I. INTRODUCTION

Indonesia has a fairly large scope of livestock farming and affects the national economy, the cultivation, processing and trading of livestock to other farmers and to consumers is the most important part of the livestock sector. The livestock sector plays a very important role in terms of economic development in Indonesia, especially in rural areas. Laupakam Village is one of the villages geographically located in Mardinding District, Karo Regency. Laupakam Village is one of the villages in Karo Regency whose residents earn income from the livestock sector, such as cows, goats, chickens and buffaloes. However, in reality there are still many people who have not exploited their livestock and have not been able to optimally carry out a strategic role. This is due to the fact that most livestock businesses are still managed traditionally, so they have not been able to provide welfare that can be obtained by the community.

In response to current technological advances, the livestock sector's seller or buyer groups should have developed rapidly because they have used technology as a medium for buying and selling transactions to facilitate and improve the economy.

So, by looking at the above phenomenon, this research was carried out to solve the problems that occurred in Laupakam Village as one of the community associations engaged in animal husbandry and planning to sell and market online but constrained by a website-based application information system to sell and market various livestock products. In addition, based on initial observations made by researchers, the people of Laupakam Village still sell their livestock traditionally, such as traveling around the hamlet to sell livestock and transporting them using a freight car with a long distance without a guarantee of being sold, then livestock products are also often sold in traditional markets, buying and selling livestock traditionally like this often occurs buying livestock at relatively cheap prices but reselling them at quite high prices. This is due to the lack of market price information between sellers and buyers of livestock. Therefore, it is necessary to design an application for buying and selling livestock with an ideal standardized selling price that is appropriate so as not to harm the seller or buyer of livestock. In addition, the price that has been set is in accordance with the standardized selling price of livestock so that the price is fixed in the sense that there is no bargaining.

In the solution of designing a livestock buying and selling website, a website-based livestock sales User Interface User Experience design will be carried out which applies the design thinking method as a reference in designing this website. This

UI/UX Design is because if the website is implemented, it can meet the needs of the target users. To meet these criteria, there are five stages that will be carried out, namely: Emphatize, Define, Ideate, Prototype, Test. This method is done because it prioritizes user centric and easy to use.

It is hoped that the UI/UX Design of the livestock sales website using the design thinking method can make it easier for people to process the business of buying and selling livestock via the internet by doing good and attractive documentation so that buyers are interested in the products being marketed.

II. METHODS

In carrying out this research took place from December 2022 to January 2023 in Laupakam Village. Kec. Mardinding. Kab. Karo.

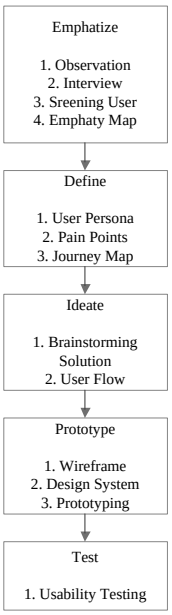

Fig 1. Research Method

The stages carried out in this study can be seen in Figure 1.

A. Emphatize

The first stage in this process is centered on user-focused design and in this stage the designer conducts observations, interviews and audience studies to gain an understanding of the activities and characteristics of potential users and identify problems experienced by potential users.

B. *Define*

The define stage aims to build ideas and ideas as a foundation in designing the prototype to be made. This process is a transition from formulated problems to solving user problems.

C. *Ideate*

The ideate process is the process of collecting ideas through brainstorming with the aim of getting ideas after problem solving.

D. *Prototype*

The prototype stage is a process in designing the design of a website or android-based application that will be made and ready to be tested on users. In designing this design is done using figma software.

E. *Test*

The last stage is the testing stage which is carried out to obtain feedback from potential users according to the results of the prototype that has been designed to determine whether the solution made has answered and overcome the problems experienced by users. This testing stage uses the usability testing method by emphasizing aspects of effectiveness, efficiency, and user satisfaction. These four aspects will be tested one by one to obtain the solution design.

III. RESULT AND DISCUSSION

A. Emphatize Result

In the empathize stage which is the basis of this design thinking method which aims to explore the problem, understand who the target users of the livestock sales website are and who plays a role in design and development.

Table I. User Roles in the System

Users Group	Role in System
Parents/Common People	As a user who will order livestock products that will be made in a web-based sales application
Student	As a user who will order livestock products that will be made in a web-based sales application
Breeders	As a user who will sell their livestock products on the application

B. Define Result

Based on the data that has been obtained and the role of the user group in the system that has been determined, the next stage is the creation of a user person. The information needed in creating a user persona is the persona group, what problems are faced, and what expectations are desired by the persona. One of the buyer and seller personas that have been created based on the data that has been studied can be seen in Figure II.

Table II. User Persona

User Persona		
Persona	***Frustrations***	***Goals***
Buyer	Limited livestock booking places	Purchasing livestock can be done easily
Seller	The number of livestock that must be sold out of town because there are still people who do not know where to buy livestock.	The existence of an application or website service that can help market livestock products

Furthermore, making pain points is a problem definition process that is carried out by describing every possible problem experienced by users when using this livestock sales website based on testing and user interviews. The results of the problem definition process until a clear information is obtained. Pain points made consist of two based on persona groups, namely buyers and sellers, which can be seen in Figure 2 and Figure 3.

Fig 2. Buyer Pain Points

Fig 3. Seller Pain Points

After the pain points of sellers and buyers are made, then the next step is to determine the pain point solution which aims to group the problem and make what is needed by users and what solutions can be offered. Participants are involved in finding solutions so that the solution is right in solving the problems experienced by participants. Below is one of the pain point solutions made by researchers based on the problems experienced by users can be seen in table III.

Table III, Pain Point Solution

Problem	User Needs	Functional	Respondents' Suggestions
The sale and purchase of livestock is still traditional.	Need a web-based application that offers sales and purchases farm animals	The livestock sales website is easy to reach or see and easy to use.	The design results are designed to meet the needs of respondents

C. Ideate Result

After grouping a problem and looking for solutions to the problem, the next process is to brainstorm solutions. This stage is a process of collecting ideas through brainstorming which aims to get ideas for solving existing problems. The number of ideas is not limited and the results of the brainstorming process will be processed and sorted according to aspects of user interests and aspects of livestock sales website development. The results of brainstorming can be seen in Figure 4.

Fig 4. Brainstorming Solution

After the brainstorming is complete, the next step is to create a user flow in the form of a flow diagram that explains the flow of the process or activities of prospective users in operating the designed application design. The buyer's user flow starts when the user logs in on the login page. If the user is a new user, the registration process is carried out first. If the user has logged in using his account, the user will be displayed on the home page. On the home page, users can select a destination page such as livestock product search, basket, notification, menu, view user profile, search history, scroll down to see contact person and social media from the application.

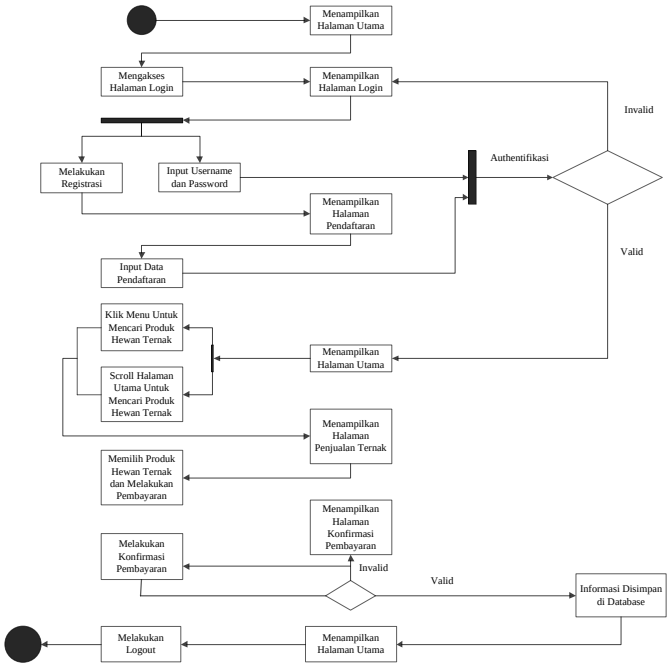

Fig 5. Buyer User Flow

While the seller's user flow starts with the user logging in on the login page. If the user does not yet have an account to log in, then first register a new user on the registration page. On the home page, users can select the profile menu to view statistics and user details as a seller and can list livestock products that they want to sell. In addition, on the profile page there are several menus that can be run such as edit profile, settings, sales status, transaction details.

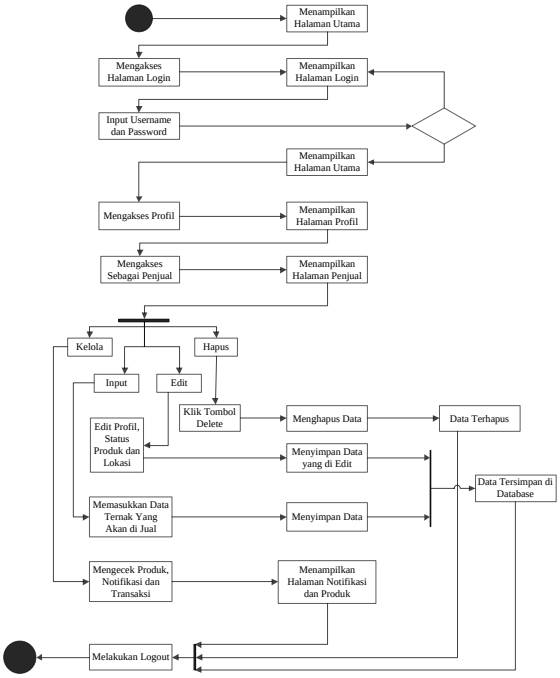

Fig 6. Seller User Flow

D. Prototype Result

In the prototype process, the first step is to design a wireframe design. Wireframe design is an initial design to meet the needs of livestock sellers and buyers. The wireframe design can be seen in Figure 7.

Fig 7. Wireframe

After knowing the layout of the website design that will be made, then determine the colors, writing and features of the website to be designed. The results of the design will be a mockup that has been thoroughly designed and is ready to be tested. The results of the design or mockup can be seen in Figure 8.

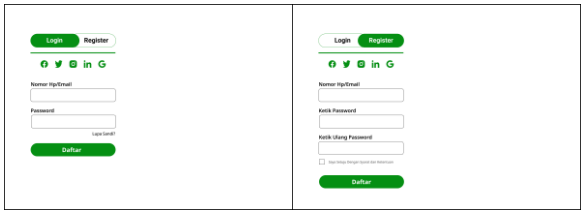

Fig 8. Registration and Login

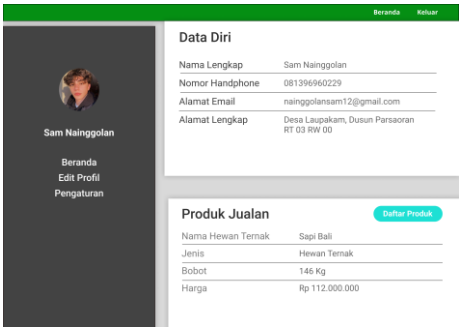

Fig 9. User Profile

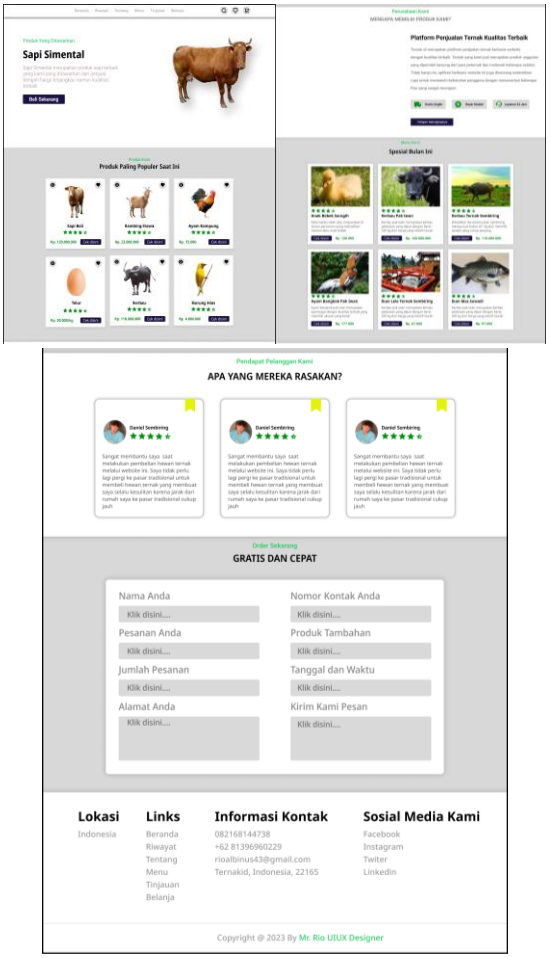

Fig 10. Home

E. Test Result

Testing is done using usability testing which includes aspects of effectiveness, efficiency and user satisfaction. In the effectiveness aspect, respondents are required to complete 15 tasks given by researchers to 100 respondents. A series of successful tasks is a task that is completed until the end. A partially successful task is one in which the user makes a mistake midway through the task or on a portion of the assigned task. A failed task is a task that fails to be performed until the final stage. The test results based on the effectiveness aspect can be seen in Table IV.

Table IV. Effectiveness Testing Results

Total Tasks Completed	
Task Outcome	1376
Partial Bewail Duty	124
Task Failed	0

$$\text{Sucess Rate} = \frac{\{B + (SB \times 0.5)\}}{Number\ of\ Task \times Number\ of\ Users} \times 100\%$$

$$Sucsess\ Rate\ = \frac{\{1376 + (124 \times 0.5)\}}{15\ \times 100} \times 100\%$$

$$Sucsess\ Rate\ = 78.9\ \%$$

The efficiency aspect is measured through the time in seconds or minutes required for participants to complete the task until the final or successful stage. The results of the time to complete the task are in Table 1 and the total time required in Table 5.

Table V. Efficiency Testing Results

Total Time Completed	
Total result time	1376
Total overall time	124

$$Overall\ relative\ efficiency = \frac{\sum_{j=1}^{R}\sum_{j=1}^{R} n_{ij}\, t_{ij}}{\sum_{j=1}^{R}\sum_{j=1}^{R} t_{ij}}$$

$$Overall\ relative\ efficiency = \frac{191799}{191799} \times 100\%$$

$$Overall\ relative\ efficiency\ = \ 100\%$$

The last aspect is the user satisfaction aspect. This aspect is measured using the USE questionnaire which consists of 30 questions and includes 4 aspects, namely usefulness, ease of use, ease of learning, and satisfaction.

Table VI. USE Questionnaire

Question Category
Usefulness
This livestock trading website helps me be more effective
This livestock trading website helps me be more productive.
This livestock trading website is very useful
The livestock trading website is very useful for the tasks I do.
The livestock trading website makes things that I want to achieve easier to do.
The livestock trading website saves me time when using it
The livestock trading website suits my needs
The livestock trading website works/operates as I expect it to.
Ease of Use
Livestock trading website is easy to use
The livestock trading website is practical to use
The livestock trading website is easy to understand by users
The steps of operating the livestock buying and selling website are very practical
The livestock buying and selling website can be customized according to user needs
No difficulties when using the livestock buying and selling website
The livestock trading website can be used without written instructions
I did not notice any inconsistencies during my use of the livestock trading website
Users who rarely or regularly use it will like the livestock trading website
I can easily recover from mistakes when using the livestock trading website
I can use the livestock trading website successfully every time I use it.
Ease of Learning
I learned to use the livestock trading website quickly
I easily remember how to use the livestock trading website

The livestock buying and selling website is easy to learn how to use.
I quickly became skillful when using the livestock buying and selling website.
Satisfaction
I am satisfied with the livestock trading website
I would recommend the livestock trading website to others
The livestock trading website is fun to use
The livestock trading website works the way I want it to
The livestock trading website is very good
I feel compelled to own and use the livestock trading website
The livestock trading website is convenient to use

Table VII. Percentage Satisfaction Score

Parameter	***Percentage Satisfaction Score***
Usefulness	82.1%
Ease Of Use	93.3%
Ease Of Learn	94.75%
Satisfaction	86.4%

$$Overall\ relative\ efficiency = \frac{effectiveness + efficiency + satisfaction}{3}$$

$$Overall\ relative\ efficiency = \frac{95.86\% + 100\% + 89.14\%}{3}$$

$$Overall\ relative\ efficiency = 81{,}78\%$$

Based on the percentage of usability values obtained by the kanecater catering application solution design, the value is 81.78%, this value is included in the very good category.

IV. CONCLUSION

At the empathize stage, the results obtained in the form of discussion results in extracting problems at this stage are the desire of sellers and buyers to create a livestock supply chain.

Then at the define stage or defining a problem there is a need to design a livestock buying and selling website. There is a mapping of problem definition in the form of user personas which includes problems experienced by personas and persona expectations. Then making pain points for buyers and sellers using sticky notes to categorize the problems experienced by users.

The next stage is ideate which is the result of brainstorming solutions from the previous problem grouping. Brainstorming solutions get results by designing features that are able to answer user problems, namely login, registration, product menu, notifications, profile, history, purchases, cart, list of livestock products that you want to sell. Then create a user flow based on the wareframe

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