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UX Design Of E-Mogmo Web Based Application Using Design Thinking Approach

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Abstract

E-HogMo is an E-commerce web based application that will facilitate the buying and selling process of the sellers (small scale farmers) and buyers (meat vendors, hog raisers and meat processors). The app aims to improve the process of taking longer time to search for qualified sellers and prevent high cost of product due to the big commissions taken by the middlemen or agents. And given the threat of the African Swine Fever (ASF) this app is required to market livestock that are ASF free. This study focuses on determining the user experience design of a livestock E-commerce application using the Design Thinking (DT) methodology. The Empathy, Define, Ideate, Prototype, and Test phases of the Design Thinking approach were used to identify the present scenario or experiences, problems and issues, and potential solutions to their concerns. A Focus Group Discussion (FGD) was conducted to fifteen (15) participants consisting of hog raisers and buyers to determine the features and functionalities that the users required based on their needs. A prototype design which includes Registration, Search by products, Managing products, Virtual Farm Tour, Ordering, Payment and Dashboards modules was created and presented to the users for validation. The results show the significance of the features in addressing the current problems in the buying and selling process such as it will lessen the time to search for quality products, it will help to regulate the costs of the livestock and meat products and prevent selling of swine that are infected with ASF.

Index Terms— hogs, e-commerce, design thinking.

Introduction

In the Philippines, swine industry contributes the most to the livestock industry, making up around 55% of the entire sector. As of September 30, 2022, there were 10.07 million estimated heads of swine wherein smallscale farms are accounted for about 77.7% of the nation's swine population, followed by commercial farms (21.2%) and semi-commercial farms (1.1%) [1]. The study presents the traditional buying and selling process of livestock specifically swine or hogs in Calabarzon which is one of the top 5 hog producing region in the country.

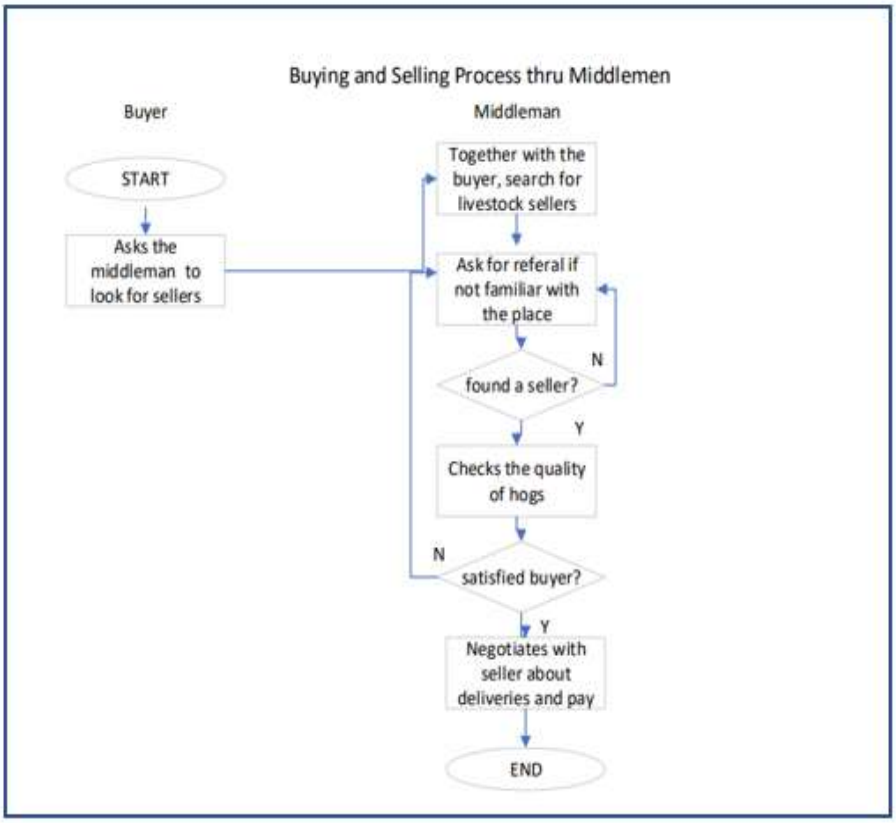
A. Current buying and selling of livestock.

Figure 1 shows the current buying and selling process of hogs. The process starts when the buyers, either a wet vendor, meat processor or a hog raiser ask their middleman to look for live pigs and together with the trader, search for sellers. If they are not familiar with the place, they might ask other residents to refer them to the seller. This makes the price of the commodities high because of the mark-ups that these referrals asked for (each referral asked for P100). When a seller was found, they will check on the quality of the hogs and if satisfied negotiate with the farmer for the delivery details and pay. However, if they are not satisfied with the quality of the pigs, they will look for another seller and the same process repeats. The current process took a longer time for the buyer and incurred additional costs to them thus affecting the price of the product which is the meat.

Furthermore, the farmer also sells their livestock through a middleman. Majority of the time, these middlemen also handle the logistics/deliveries and documentation. Since farmers have limited access to outside customers, they depend on intermediaries who may have direct communication with the wholesalers regarding their requirements on the quality of pigs, quantity, weight, etc. Middlemen asked for 10% to 15% commission from the farmers which made the price of the item higher when it reached the end user. As a result, middlemen appear to pose a threat to food security by taking big share of the revenues. [2]. Also, with the current issue on African Swine Fever (ASF), these middlemen were identified as one of risk factors in ASF infections and transmission because they frequently move around to purchase pigs from various sources, farms, and slaughterhouses.

Social media platforms such as Facebook are also used to market swine by either buyers or middlemen although there is a policy restriction on the buying and selling of livestock to prevent illicit trade [3]. In addition, problems arise when the livestock being advertised is ASF-infected or comes from high-risk areas [4]. The goal of this project is to utilize the Design Thinking methodology to identify the user requirements design of the web application in terms of features and functionalities that will enhance the traditional swine buying and selling process.

Figure 1. Flowchart of the buying and selling process through Middlemen



Methodology

The Design Thinking (DT) methodology was used to identify the desired features or functionalities of E-HogMo web application. It is a problem-solving strategy based on understanding users' needs and developing insights to meet those needs. Stanford Design School named the five steps in DT, such as (a) Empathy, which involves gathering information from the user through an interview with the users to determine their experiences in the buying and selling process. (b) Define- which describes the user's needs, desires, or problems, also known as Point of View. These will serve as the foundation for the ideate step, answering the question "How Might We?" (c) Ideate involves brainstorming to generate ideas and explore solutions to the defined issues (d) The prototype covers transforming the results of ideation into tangible products or interfaces, and (e) testing entails showing the prototype to intended users and soliciting feedback. The design thinking methodology assisted various users in communicating and assessing the advantages and difficulties associated to the early stages of developing a new application [5].

A. Data Collection

A Focus Group Discussion (FGD) was administered to fifteen (15) participants which consists of 7 buyers and 8 small scale farmers who are members of a cooperative in Nagcarlan Laguna. During the discussion, the participants were asked about their current experiences on trading their livestock and the problems that they encountered. Purposive sampling was used for better matching of sample obtained trustworthiness of the data and results [6].

Results and Discussion

A. Empathy

The researcher was able to empathize and understand the situations of each personas by listening to some of their fears and sentiments on their current experiences. Below are the responses in Filipino dialect:

Buyers: *Mahirap maghanap ng baboy kapag me mga okasyon Mataas din ang presyo*; *Lalong tumataas sa mga referral ng mga ng aahente. P100 pesos kada referal*; *Ako ay me agam agam pa din sa pagbili dahil sa ASF kaya hangga't maari ay gusto ko lang bumili sa kilala ko dahil tiwala na ako sa kanila Kapag akoý tumitingin ng baboy sa facebook, magaganda ang pictures at photo pero sa personal naman ay hindi kaya sayang lang ang pagpunta dun sa lugar.*

Sellers (Farmers): *Mahina ang aming benta kapag walang okasyon at mga buwang mababa ang demand kaya kami ay lumalapit sa mga ahente. . Lumiliit din ang aming kita kapag sa ganitong panahon dahil tumatawad ang mga bumibili.*

These responses were considered by the researchers to further analyze the problems and come up with the "Point of View" or POV.

B. Define

The sentiments and issues obtained from the Empathy phase were summarized, accounted and translated as the POV's below:

For the buyers:

7 out of 7 confirms difficulty in looking for hogs/swine during peak season or festive season and the price is also high.

4 out 7 experience that price becomes higher due to referral fees because other than middlemen there are agents that ask for Php100 per referral.

6 out 7 are hesitant in buying to those sellers they do not know due to ASF.

7 out 7 are not confident in searching for hogs thru social media platform because some hogs are only good in pictures.

7 out of 7 believes that physical inspection of livestock is needed but going from one place to another is very costly and tiring.

For the sellers:

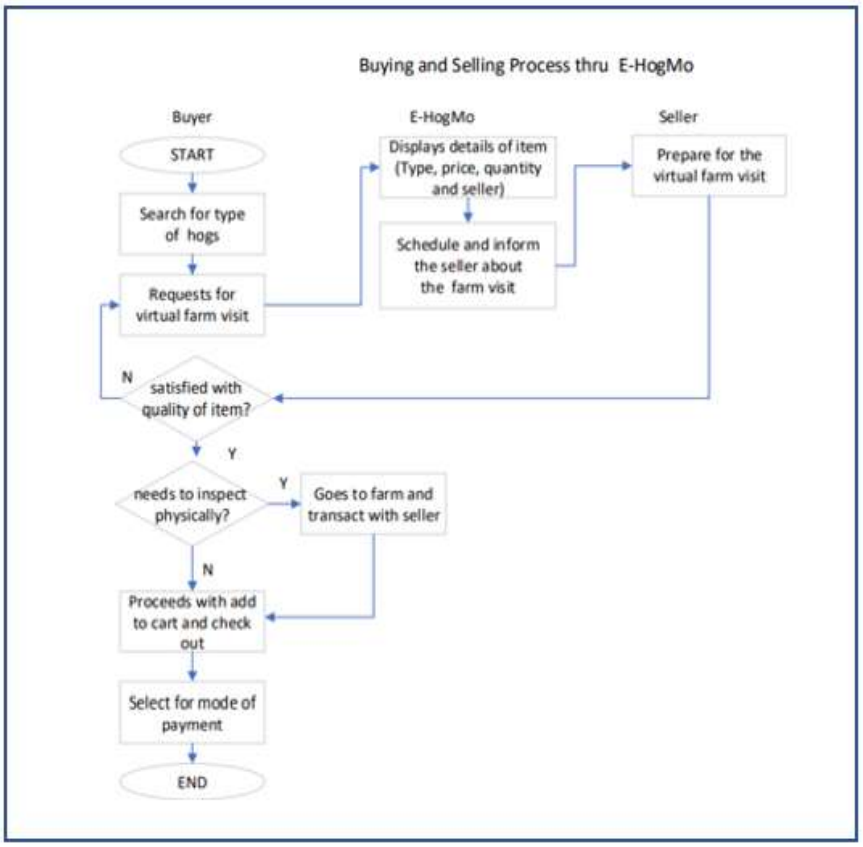
8/8 experienced that they get lower profit if they give commissions to middlemen.

C. Ideate

An E-commerce platform for livestock called E-HogMo has been conceptualized to resolve the issues by the buyers and the sellers specifically on the problems with middlemen because the use of the digital platform may eliminate intermediaries and enable farmers to sell their goods at fair prices, all of which add value to agri-food chains [7]. In the app, the cooperative will represent the farmers as the user seller who will be responsible in managing the products (add, edit and delete) and coordinating/ confirming the schedule of the virtual visit of the buyers in the farm. The buyers on the other hand, will have better access to product details, which could be accessed anywhere from the business's website to publicly available internet product reviews. Additionally, electronic commerce enabled customers to make knowledgeable decisions when shopping online, especially since they had complete access to the product details. They were able to make a more informed decision by considering different vendors and having access to more detailed product information [8].

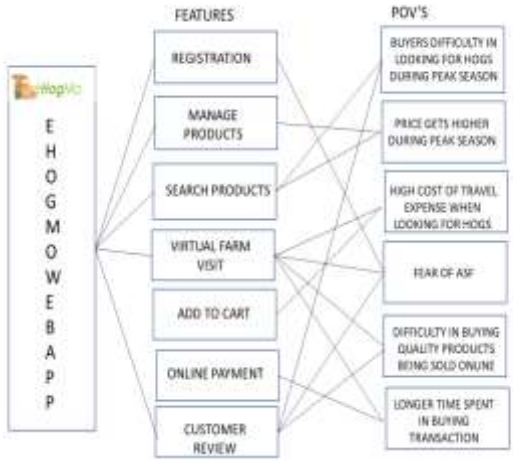
As the result of the ideation phase, the proposed business process for E-hogMo web application is presented in Figure 2. Using the platform, the buyer can search for the type of hogs that they need then, the app will show multiple sellers and the photos of their livestock so the buyer can compare. The platform can facilitate virtual farm visit, so if the buyer may request for the visit. The app will then, inform the cooperative about the request and set schedule with the farmer. If the buyer was satisfied about the quality of the hogs during the virtual visit, she/he will then proceed to the seller to inspect physically and transact with the seller. In case the buyer is not satisfied with the virtual visit, he/she can always request for another virtual visit to other farm until he/she is satisfied to proceed with the physical inspection and transaction with the seller. Upon negotiation, the buyer may continue with ordering/ add to cart process in the E-hogMo system then pay the seller upfront or through the Ehogmo application such that records of transactions for each vendor/farmer will be recorded in the app and can be shown in the dashboard.

Figure 2 Flowchart of the buying and selling process thru E-hogMo app



Further, EhogMo app's functionalities/ features were considered based on POV's and review of related studies as well. Mapping of the identified features to address the issues or POV's is shown in Figure 3.

Figure 3: Mapping of EhogMo features to POV's



Registration Module : This module will require the buyer to register before a transaction can be made but he/ she can use the system as guest while searching for the supplier of the livestock. Since the cooperative will represent the farmers as the seller, it will be required to submit their Business Registration. Since the business is registered, there is less likelihood that fraud will be committed, which will help to strengthen the reputation of the farmers in the market and in building confidence [9]. This will ensure that the hogs/swine being uploaded are safe with ASF. User interface design is shown in Figure 4.

Managing the Products - the cooperative will upload the member's/farmer's livestock videos or photos of their livestock and other details to be seen by other municipalities as well. This feature may help regulate the prices of the livestock. User interface design is shown in Figure 5.

Searching of products- the buyer can easily search for the type of hogs needed based on the quantity and quality he/she requires. This will reduce the long time in searching for products as well as the cost that the buyer incurred This feature will resolve the problem of low sales during off-peak season since these products can be easily viewed by the buyers from other location or municipalities [10] and may also increase the revenue by 30 to 60% as it provides better customer experience [11]. User interface design is shown in Figure 6.

Virtual Farm Tour- the buyer may request for a virtual visit to the farm though coordination with cooperative and E-hogMo admin. This functionality will also reduce the expenses of the buyer in visiting the farm physically and in shortlisting the farms that they want to visit onsite. This feature will also encourage the sellers to post/ upload legitimate photos and videos to establish trust among the buyers such that they may no longer require physical inspection that would reduce their expenses. This feature may influence customer satisfaction and willingness to purchase [12]. User interface design is shown in Figure 7.

Ordering Module (Add to Cart)- upon searching for the quality livestock and if the buyer thinks that physical inspection is no longer needed, he/she may proceed with the ordering process. The application will automatically calculate the amount to be paid. The add to cart feature provides customers more time to compare with different alternative seller to ensure safety and prevent losses during shopping online [13]. User interface design is shown in Figure 8.

Payment Module- purchases made through ''add to cart' or through physical negotiation will be posted in the payment system. The buyer may use this facility for convenience [14] since he or she will no longer bring big amount of money in the marketplace.

Dashboards – contains relevant reports thus this feature is an opportunity to aid the farmers in planning their livestock production since it will

provide feedback regarding their sales such as the most saleable livestock, months which has the highest or lowest sale etc. User interface design is shown in Figure 9.

Customer Review- the section where the buyers can post comments about the quality of livestock and their experiences in transacting with the vendor. This feature is important as it has an influence in customer's purchasing decision [16]. User interface design is shown in Figure 10.

D. Prototype

The EhogMo features identified in the previous discussion were used to develop the prototype user interfaces (UI) are shown below:

Figure 4: User Interface of Registration module

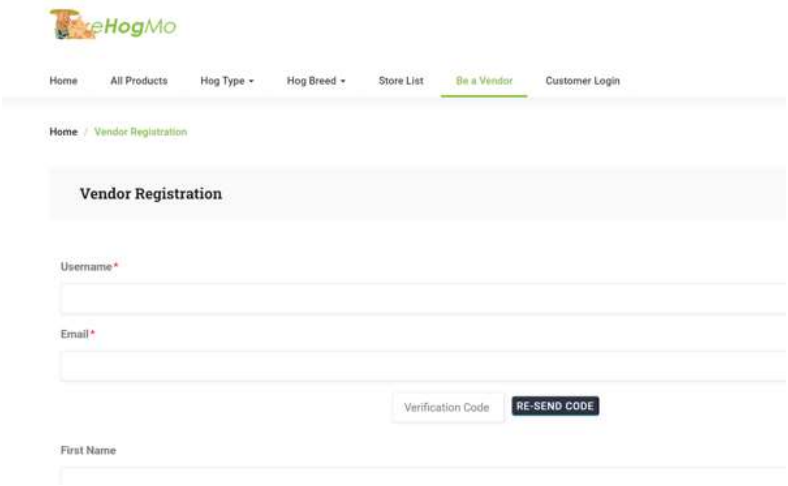


Figure 5: User Interface of Managing Products Module

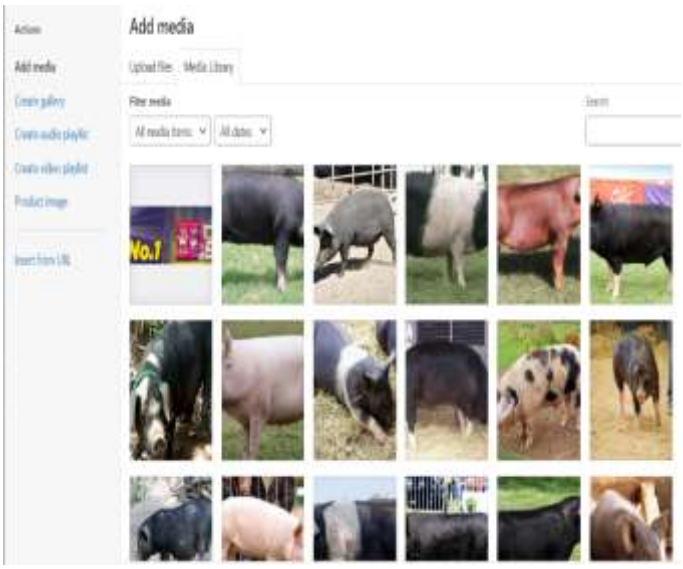


Figure 6: User Interface for Product Search

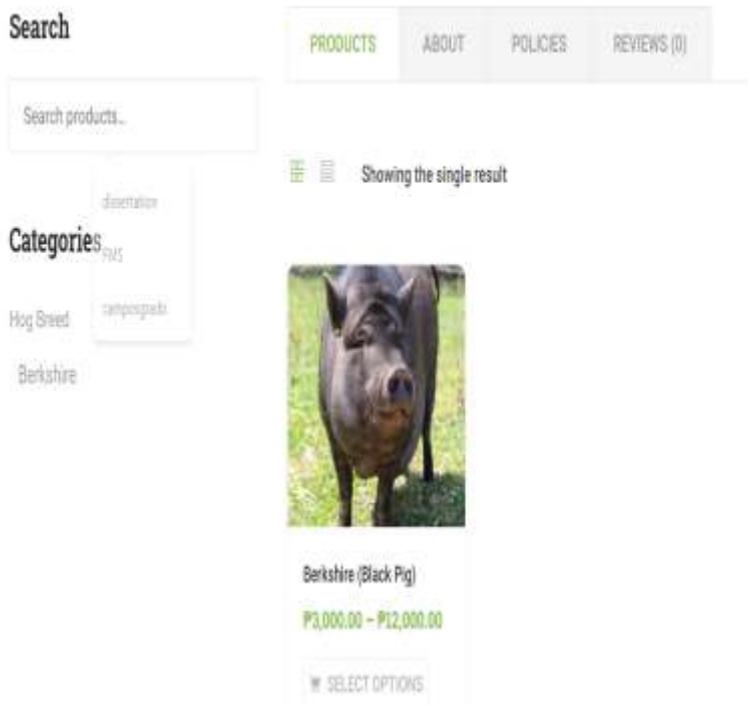


Figure 7: UI for Request for Virtual Tour

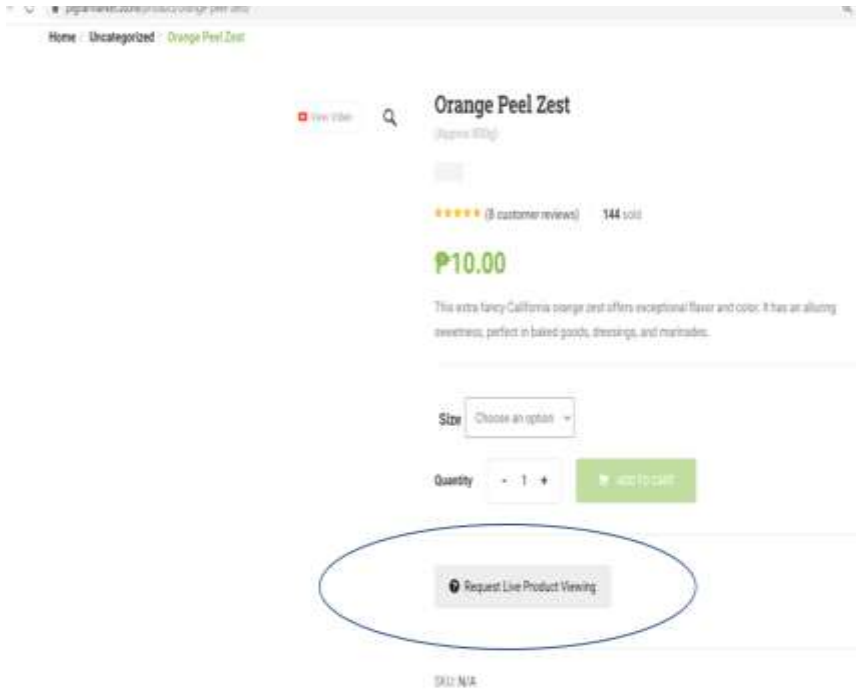


Figure 8: UI for Ordering/ Add to Cart

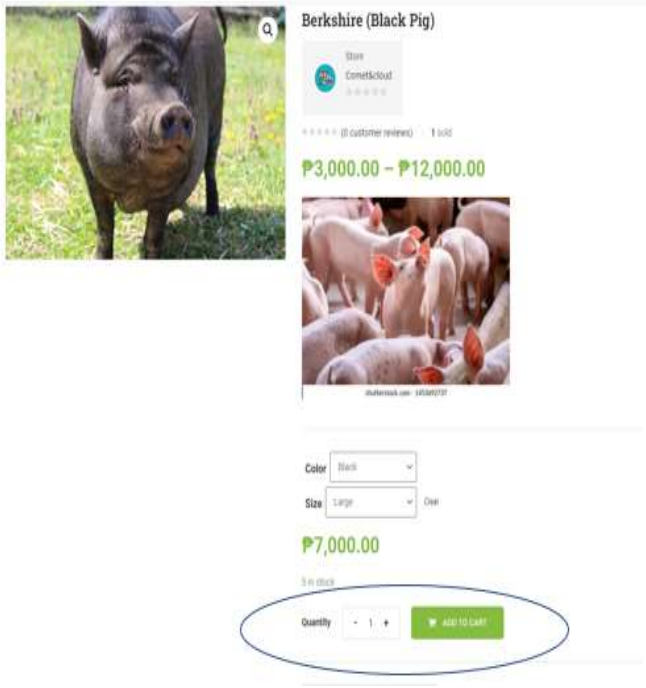


Figure 9: UI for Dashboard

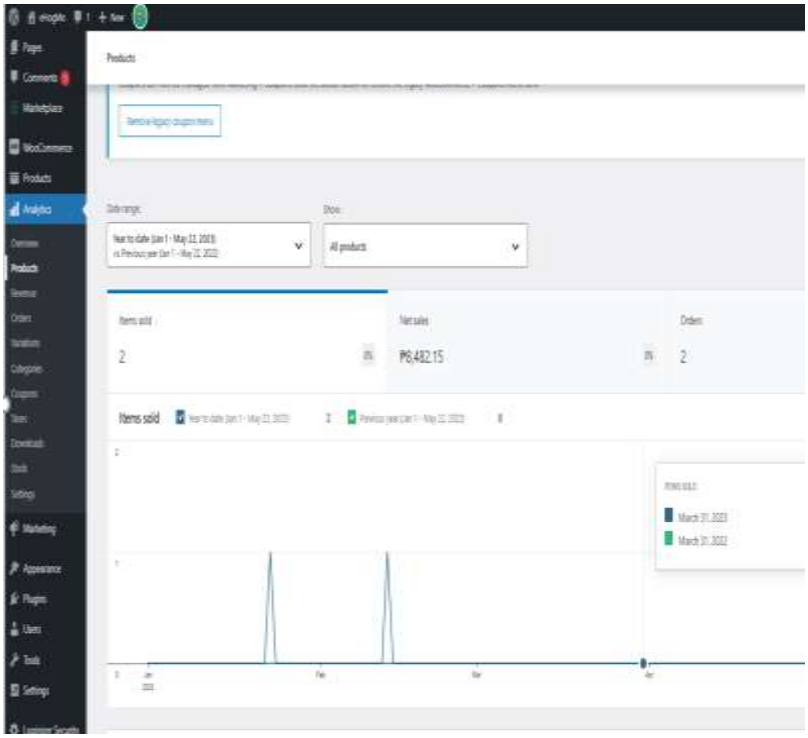
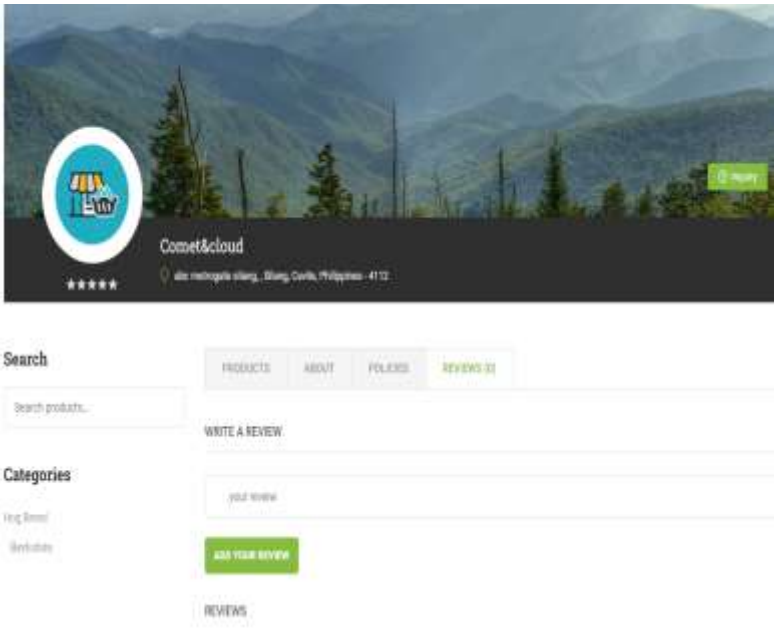


Figure 10: UI for Customer Review



E. Testing

The proposed prototype had been evaluated by the 15 respondents through a questionnaire based on the following criteria: (1) design of user interface, (2) perceived usefulness and ability to address current issues and (3) satisfaction. Using Likert scale from 1 to 5, being 1 is the lowest and 5 the highest, each question per criteria had been rated. The first criterion includes the following questions and results: Q1 I like using the interface of Ehogmo app, with an average score of 4.5; Q2 The content of the app is well presented, with an average score of 4.4; Q3 The images on the application are well designed, with an average score of 4.6; Q4 The layout is pleasant to use with an average score of 4.2. For the second criterion which is perceived usefulness and ability to solve current issues, the results are as follows: Q1 Registration is useful in the prevention of fraudulent sellers got an average score of 4.7. Q2 Managing the products may prevent overpricing got at average score of 4.5. Q3 Searching of products minimize the time and money spent through agent and middlemen had an average score of 4.8. Q4 Virtual farm tour minimized the time and cost spent in physical inspection got an average score of 4.1. Q5 Dashboards provides sales performance that can aid farmers in their future plans had an average score of 4.6. Q6 Customer review can help the buyer decide on where to buy had an average score of 4.5 For the satisfaction criterion, Q1 I am satisfied with the content with an average score of 4.4; Q2 I feel I need to use this app in the future with an average score of 4.5. The average score for all the questions in the three criteria is 4.5 which means that the design of the web application is acceptable to the intended users.

Conclusion

The paper provides innovation to improve the buying and selling processes of livestock through EhogMo web application. Using the Design Thinking approach, the authors were able to determine the needs and opportunities through focus group discussion with the intended users (buyers and sellers). Those experiences, issues and opportunities were used to come up with the design of the web application containing features that will resolve the current issues. Lastly, the design of the EhogMo prototype was evaluated based on the design of user interface, usefulness and customer satisfaction. The assessment shows satisfactory results which means that the proposed web application will be beneficial to both buyers and sellers.

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