



Research Article

The Experimental Garden in the E-Commerce System of the Faculty of Agriculture (KFPF) at Udayana University

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ABSTRACT

The marketing of agricultural products has long been a challenge for the Experimental Garden of the Faculty of Agriculture (KFPF), particularly in the business-to-customer (B2C) arena. To address this issue, KFPF, as one of the business units at Udayana University, has recently embarked on the development of an e-commerce system, recognizing its potential as an alternative medium for promotion, communication, and information dissemination. The objective of this study is to identify the characteristics of each KFPF field and to design an e-commerce system that caters to their respective needs. The analytical approach employed in this study was descriptive qualitative method, supported by simple tabulations and the Lean User Experience (Lean UX) approach. Our findings reveal that each KFPF field has performed its assigned tasks and responsibilities satisfactorily. The e-commerce system we have developed offers customers a choice of payment methods, including cash on delivery (COD), and ensures timely delivery, thus enabling customers to enjoy the products in a fresh condition without any loss of quality. Further research is needed to assess the system's effectiveness using the Success Rate as a usability parameter and to evaluate the efficiency of usage time, measured in seconds or minutes, required by customers to complete each task.

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INTRODUCTION

The absence of experimental gardens in most of the agricultural faculties in Indonesia is a significant gap in the education and research opportunities available to students and faculty. Gunadi (2018) highlights the crucial role of the Experimental Garden at the Faculty of Agriculture (KFPF) of Udayana University in facilitating education, research, and practical training for students and instructors. This garden offers a platform for hands-on learning experiences that enhance the competence of graduates, aligning with the objectives of the Faculty of Agriculture. Dharmadiatmika et al. (2019) view KFPF as a green open space that supports production activities within the framework of education and research. Semarajaya et al. (2017) underscore that KFPF

serves as a valuable resource for learning various aspects of agriculture. Rahmayanti and Diana (2021) also emphasize the significance of experimental gardens for educational and research purposes, as well as for reforestation initiatives. Therefore, the need for establishing experimental gardens in agricultural faculties is imperative to enhance the quality of education and research in Indonesia.

Experimental gardens in other countries are typically managed by specialized entities called agricultural experiment stations, which play a critical role in advancing agricultural research and technology. Pearson and Atucha (2015) highlight the significant contributions of agricultural experiment stations in supporting research progress and enhancing agricultural technology. Wright (2019) further expounds on the multifaceted purpose of agricultural experiment stations, including addressing contemporary agricultural problems, developing new technologies, generating discoveries, and promoting agricultural research. Lund (1972) underscores that the agricultural experiment station is closely integrated with the Faculty of Agriculture, benefiting from the expertise of agriculture specialists within the faculty. The integration of agricultural experiment stations with agricultural faculties enhances the quality of education and research by promoting synergies between practical research and classroom learning.

Apart from its main function, the Experimental Garden at the Faculty of Agriculture of Udayana University currently operates as a business unit with an economic function. However, its economic interests do not solely target maximum profit but are also expected to align with innovation and technology development produced by KPFP. Nonetheless, the Experimental Garden faces several challenges in product marketing, particularly in business-to-customer (B2C) activities, struggling to reach consumers effectively. Kizito et al. (2018) classify e-commerce activities into two categories, business-to-business (B2B) or B2C. Kumar and Raheja (2012) define the B2C model as any transaction or business that directly delivers products to consumers without intermediaries. Additionally, Matthyssens et al. (2008) posit that managers in B2B marketing face various challenges, necessitating companies to adopt different market strategies from past approaches. These challenges underscore the need for innovative marketing strategies to improve the marketing of products from the Experimental Garden, particularly in B2C activities, while considering the role of e-commerce in facilitating such efforts.

An e-commerce-based marketing system can be a valuable alternative for KPFP in terms of promotion, communication, and information dissemination, as well as reducing the marketing chain distribution of agricultural products. Drigas and Leliopoulos (2014) cite Barkley, Markley, and Lamie to demonstrate the rapid increase of e-commerce business-to-customer (B2C) sales, which reached \$189 billion, accounting for around 2.0% of total business-to-business sales to customers in 2005. Furthermore, Akhter et al. (2004) emphasize the benefits of e-commerce to customers, such as convenience, comparison, product research, more choices, and lower prices. Ozlen et al. (2014) also provide evidence of the benefits of e-commerce for companies and customers. Hildebrandt's (2015) research highlights the need for small-store strategies that enhance customer awareness and local competitiveness, accomplished through local e-commerce solutions. These findings underscore the need to adopt e-commerce strategies in marketing agricultural products to facilitate efficient communication and distribution while enhancing local competitiveness.

Recognizing the significant role of e-commerce in contemporary business, there is a promising opportunity for KPFP, a business unit at Udayana University, to develop an e-commerce system. Recent research has focused on developing a prototype of an e-commerce system tailored to the specific needs of KPFP, with attention to user experience (UX) aspects for each sector within KPFP's scope. The objective of this research is to identify the unique characteristics of each sector within KPFP and to design a KPFP e-commerce system that aligns with those characteristics.

METHOD

This study focuses on the Experimental Garden of the Faculty of Agriculture (KPFP) and each sector under its scope. The study was conducted between March and October 2020. Primary data was collected through direct interviews with KPFP management and each sector under its scope using a questionnaire. The primary data includes the ease of use of the e-commerce system, system display, completeness of menus and supporting features, ease of transaction processing, and usefulness of e-commerce in online shopping. Secondary data was gathered from previous research related to system design using the five planes method, as well as from supporting books such as marketing management, e-commerce, and e-marketing-related research.

The present study aimed to investigate the types and methods of data collection for designing an online marketing system for agricultural products using the e-commerce model. The data were collected from both

primary and secondary sources. Primary data sources included interviews, observations, and questionnaires. Interviews involved direct questioning of informants who were knowledgeable about the study's subject matter. Questionnaires were distributed to a sample of respondents to collect data. Secondary data sources consisted of documentation related to the study's subject matter that was collected by reviewing relevant literature.

This study will conduct a detailed data analysis based on its research objectives. The first objective is to analyze the characteristics of each sector under the scope of KPFP. A descriptive qualitative analysis will be utilized, using a simple tabulation to determine the function of each sector, including (1) equipment, practicum, and research, (2) information and demonstration plots, (3) specific skills, and (4) business and marketing.

RESULTS AND DISCUSSION

Gunadi (2018) noted that the Experimental Garden of the Faculty of Agriculture (KPFP) has significant potential for development. This potential is attributed to the availability of fertile land resources with a relatively broad economic scale, which can be easily treated to enable planting of lowland plant species. In addition, the human resources at the Faculty of Agriculture of Udayana University (FP UNUD) are highly competent, as evidenced by the development of several technologies and innovations by the faculty that can support the progress of KPFP. The rapid development of the City of Denpasar has had a positive impact on KPFP as the garden is strategically located close to residential areas, shops, and traditional markets, thus presenting significant market potential for garden products. As a result, the utilization of agricultural and garden areas in urban settings can be optimized for production.

KPFP e-commerce system planning method

The second objective of this study is to plan the e-commerce system for KPFP, for which the Lean User Experience (Lean UX) method is utilized. To achieve these objectives, several stages of analysis are carried out:

1. Observation

To identify the necessary features for the prototype design of the website, existing websites such as <http://www.kusuma-agrowisata.com/>, <https://mekarsari.com/>, and <https://www.jtp.id/> were observed. This observation helped in identifying the required features that would be incorporated into the prototype design.

2. Labelling

The website name, "KPFP," is derived from the Experimental Garden of the Faculty of Agriculture's abbreviation. This name was chosen to represent the website's purpose, which is to serve as a platform for purchasing various products offered by the Experimental Garden of the Faculty of Agriculture and to provide information about the garden's profile.

3. Color selection

The visual elements of the KPFP website will adopt color schemes from a selected website. The color scheme comprises primary and secondary colors. The primary colors include green and orange, representing freshness, youthfulness, organic, creativity, happiness, freedom, and confidence. The secondary colors are intended to complement the primary colors, particularly in symbols, illustrations, and navigation.

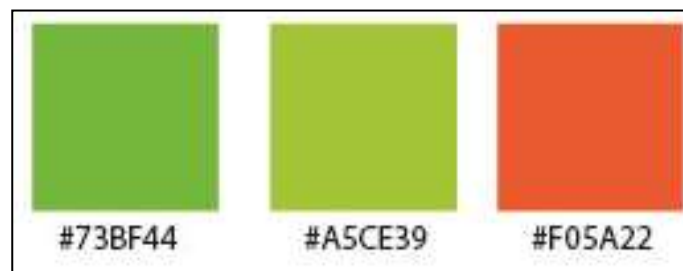


Figure 1: Primary Colors
(Source: own research and processing)

4. Font selection

The font type used in the prototype design is San Serif, specifically Montserrat and Lato. These fonts are selected based on their high legibility, and they offer a range of thicknesses from thin to black italic. This allows for easy adjustment of the content hierarchy based on its importance, making them suitable for both headings and body text.



Figure 2: Font Montserat and Font Lato
 (Source: own research and processing)

5. Logo creation

The KPFP logo serves as the primary logo used for various design media, including promotions on other platforms. The logo features green as the main color, with an icon consisting of multiple leaves. The choice of using a Serif logotype aims to convey a modern and simplistic impression that is easy to read. The logotype uses the Mogen font.



Figure 3: KPFP logo
 (Source: own research and processing)

6. Selection of symbols (icon and pictogram)

Symbols aim to reduce user errors and confusion when accessing the website, therefore the pictograms and icons are made as attractive and simple as possible by adopting standard icons made for navigation from Adobe XD.



Figure 4: Example of Icon
 (Source: own research and processing)



Figure 5: Example of Pictogram
 (Source: own research and processing)

7. Wireframe design

During the wireframe development stage, Adobe XD software is utilized to create a prototype design for the interface layout concept that will be implemented in the prototype process. The wireframe creation process involves the following steps:

- a. Identifying the design elements to be included in the wireframe, including the layout of the header, body content, footer, icon placement, and logo, and adjusting them to suit the built features.
- b. Applying these design elements to a digital artboard using Adobe XD software.

8. Prototype design

At this stage, the prototype design is created with more attention to detail in terms of visuals and content, as compared to the wireframes. The prototype is colorful and closely resembles the final look of the website. It includes transitions and animations on each page, as well as interactive and clickable features, allowing users to experience the design. Adobe XD software is used to create the prototype. The following are the steps involved in making the prototype design:

- a. Reviewing the wireframes to ensure completeness of the layout and placement of each element.
- b. Importing the wireframes into the Adobe XD artboard.
- c. Clarifying the wireframe appearance by adding necessary design elements such as colors, typography, textures, images, and icons that suit their function.
- d. Including transitions or animations between pages and menus if necessary, making the prototype more interactive and clickable.

9. Prototype examination

At this stage, the prototype is subjected to testing by systematically evaluating its features to determine if they align with the intended objectives. The purpose of this testing is to ensure that the prototype meets the desired goals and produces satisfactory results. The evaluation process is conducted independently and involves task-based assessments of the prototype's performance.

The Characteristics of Each Sector Under the Cope of KPFP

The KPFP encompasses four key areas of operation, namely: (1) equipment, practicum, and research; (2) information and demonstration plots; (3) specific skills; and (4) business and marketing.

The equipment, practicum, and research sector at KPFP is a priority for the implementation of *Tridharma*, including practicum courses and agricultural research for students at Udayana University, including those pursuing undergraduate (S-1), postgraduate (S-2), and doctoral (S-3) degrees. The facilities are also open to students from other faculties and institutions as long as the land is available. Agricultural staff utilize available land that has not been planted by cultivating various types of crops throughout the year, taking advantage of the long grace period at the end of the even semester due to student holidays. This efficient use of land allows for maximum management by staff. The following three lecturers are responsible for the equipment, practicum, and research sectors: (1) Ir. I Wayan Dana Atmaja, M.P., (2) Ir. I Nyoman Dibia, M.Si., and (3) Ir. I Wayan Wiraatmaja, M.P.

The information center and demonstration plots sector plays a vital role in planning, coordinating, implementing, and controlling activities related to the sector. The demonstration plots are used as a part of the agricultural extension counseling method to deliver agricultural materials to meet the needs of farmers and workers. This method aims to make the audience understand, accept, and be willing to apply the knowledge. KPFP utilizes appropriate methods to deliver counseling materials effectively to the target audience. The lecturers responsible for this sector are Ir. I Ketut Sumiartha, M.Agr, Ir. I Putu Dharma, M.Si, and I Made Agus Dharmadiatmika, SP., M.T. As reported by Vandercasteelen et al. (2020), the agricultural experiment station serves as a place for researchers to experiment with tiff plants in Ethiopia. The station created a new technology for the row cropping system by establishing demonstration plots at the village level, guided by counseling workers.

The sector of Specific Skill Areas is responsible for providing training programs and guidance to develop individuals' skills. With the combination of basic skills and intensive guidance, individuals can produce valuable outcomes for themselves and others. The lecturers in charge of the Specific Skills field are I Putu Sudiarta, S.P., M.Si., Ph.D. and Ir. I Gusti Alit Gunadi, M.S. Maynard (1994) noted that the Connecticut Agricultural Experiment Station in New Haven, established in 1875, has made significant contributions, including the development of hybrid corn, by its scientists.

The business and marketing sector plays a vital role in analyzing the market and its environment. Its functions encompass predicting and identifying opportunities as well as challenges that need to be addressed. This sector is responsible for devising marketing strategies to attract potential customers, increase market share, and boost revenue. The following are the names of the lecturers who are responsible for the business

and marketing sector: (1) Dr. Gede Mekse Korri Arisena, S.P., M.Agb, (2) Naniek Kohdrata, S.P., MLA, and (3) A.A.A. Wulandira Sawitri Djelantik, S.P., M.M.A.

KPFP E-Commerce System Planning

Based on the design that has been made, here are the results of the implementation that consist of several citations of the following pages.



Figure 6: The main page view
(Source: own research and processing)

In the initial webpage that the customers access by clicking on the link, Figure 6 provides a primary overview of KPFP along with some essential selections in the header. In case the customer is interested in online shopping, they can scroll down to the subsequent webpage.



Figure 7: The second-page view
(Source: own research and processing)

Figure 7 illustrates that customers can proceed to shop for products from KPFP by accessing the "Ordering KPFP Products" menu on the page.



Figure 8: The category menu display
(Source: own research and processing)

Figure 8 presents an overview of the product categories available at KPFP. To access a more comprehensive list of products, customers can select a category from the menu and then choose a subcategory of interest. By doing so, they will be directed to Figure 9, which displays the available products.



Figure 9: The product list display of fruit
(Source: own research and processing)

Figure 9 provides an overview of the available subcategories, as exemplified by the fruit subcategory. It enables customers to browse through the available products and make selections. In case a customer wishes to obtain more detailed information about a specific product, they may click on the corresponding product image.



Figure 10: The product detail information display
(Source: own research and processing)

Figure 10 displays detailed information of a product. Customers can add the desired product to their cart by clicking on the "buy" button located in the menu.



Figure 11. The cart page view
(Source: own research and processing)

In Figure 11, the shopping cart is displayed to list the products that the customer has selected to purchase. Once the products have been added to the cart and the customer proceeds to checkout, they will be directed to the billing page, as shown in Figure 12.



Figure 12: The billing page view
(Source: own research and processing)

Figure 12 presents the billing page of the ordered product where customers can review their purchase, check the shipping address, and select the preferred payment method. Once the information is verified, customers can proceed to the payment menu and access the payment page (Figure 13).



Figure 13: The payment page view
(Source: own research and processing)

Maintaining product quality is an important aspect to consider in marketing agricultural products. A recommended method to ensure that the product stays fresh during transactions is by utilizing the Cash on Delivery (COD) transaction approach. Conducting business transactions via e-commerce can simplify the process, as supported by prior research conducted, which highlights the positive impact of e-commerce on consumer satisfaction. Implementing a COD-based payment system in e-commerce can potentially increase sales turnover. This is due to the certainty that sales transactions will occur when business actors use e-commerce and implement the COD-based payment system. Furthermore, packaging and delivery of goods can be carried out immediately, resulting in efficient and effective services for consumers.

The developed E-commerce system still offers customers the option of choosing cash on delivery (COD) as their payment method. As Wahyudiyono (2017) pointed out, COD payment is commonly used when the buyer and seller are located in the same city or have a short distance between them, allowing the seller to receive payment upon product delivery. According to Harahap and Amanah's (2018) research, individuals classified as Late Bloomers, who are older and less experienced with technology, are more likely to prefer the COD payment method. Once the customer has selected their desired product, they will be redirected to the payment page where the total amount of the purchase is displayed, and payment options are made available for selection. Finally, the customer can complete the transaction by clicking on the "pay" button (Figure 14).

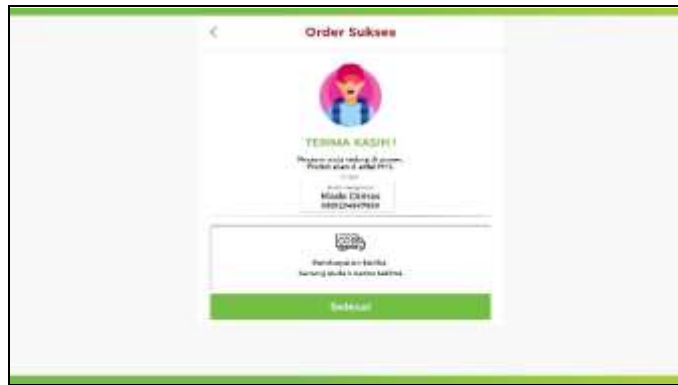


Figure 14: The final page of the shopping process
(Source: own research and processing)

The final step in the transaction process is when the user is redirected to a confirmation page indicating that the order was successful. The E-Commerce system places great emphasis on timely delivery so that the agricultural products marketed by KPPF can be enjoyed by customers in their fresh state without compromising quality. This goal aligns with the findings of Bilgies (2017) who asserted that the quality of a product can be measured by the ability to create customer satisfaction. This is also supported by Muzdalifah's (2012) research, which revealed that freshness is a crucial factor in the consumer's decision-making process when purchasing and consuming local fruits.

CONCLUSION

The present study aimed to develop an e-marketplace system for KPPF that meets the needs of users while considering aspects of user experience (UX) and the different sectors within KPPF. The system design aimed to address the challenges faced by KPPF in marketing their products, especially in business-to-customer (B2C) activities, and reaching customers. The system was found to be functional and effective in meeting the responsibilities of each sector within KPPF. Future research could focus on analyzing the effectiveness of the system using the User Success Rate and usability parameters, as well as assessing the efficiency of task completion time in seconds or minutes.

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