

The Design of User Interface and User Experience in Rodanya Masbagia's Information System: using Design Thinking Methodology

Ibal Afib Maulana¹, Ardhin Primadewi^{2*}, Mukhtar Hanafi³, Eny Boedi Orbawati⁴

^{1,2} Informatics Engineering, Universitas Muhammadiyah Magelang, Magelang, Indonesia, 56172

³ Information Technology, Universitas Muhammadiyah Magelang, Magelang, Indonesia, 56172

⁴ Public Administration Department, Faculty of Social and Political Sciences, Universitas Tidar, Magelang, Indonesia, 56116

Email: ibalafib57@gmail.com¹; ardhin@ummgl.ac.id^{2*}; hanafi@ummgl.ac.id³; enyorbawati@untidar.ac.id⁴

ABSTRACT

Magelang City has become an administrative city and MSMEs (Micro, Small, and Medium Enterprises) as the backbone of the economy in the city. In several regions MSMEs are utilizing digital technology, which has great potential for large-scale sales. The Government of Magelang City has implemented a community empowerment system called the Program for Empowering Community that Advanced, Healthy, and Happy Society (Rodanya Masbagia). This program aims to enhance the empowerment of the community through the local government's budget (APBD) provided by the Magelang City Development Planning Agency (Bappeda). The main challenge faced by MSMEs entrepreneurs is the limitation in selling their products widely, resulting in low demand for their merchandise. There is a sales platform for MSMEs in Rodanya Masbagia's system especially terms of product marketing. It has a feature implemented where we are not able to reach a wide market. Therefore, there is a need to develop additional features to facilitate widespread product sales. This system is created and designed using the Design Thinking Methodology, which consists of several stages: empathize, define, ideate, prototype, and test. The results of this study underwent testing using the Maze platform to facilitate the system's trial. There were 25 respondents involved in testing the prototype in Figma. The average success rate of the testing was 80% based on predefined metrics. Task 1 achieved a success rate of 90%, task 2 had a success rate of 75%, task 3 had a success rate of 80%, task 4 achieved a success rate of 100%, and task 5 had a success rate of 80%. During the testing phase, users were able to complete the tasks, but some tasks posed difficulties. The results of this study with an average of satisfied user feedback (85%) related to the recommended UI/UX design. It can be concluded that there is a need to improve the performance of the design to prevent users from feeling confused or encountering difficulties when using the product.

Keywords: Design Thinking, Magelang City, MSMEs, User Interface, User Experience

INTRODUCTION

In the world of technology, internet users in Indonesia have experienced a significant surge from year to year. Based on data from a survey conducted by the Association of Indonesian Internet Service Providers (APJII) in 2017, internet users reached 54.68%, equivalent to 143.26 million people (Ferry Anggiawan, 2021). Developments in today's smartphone hardware continue to feast the eyes and hands to add social and work use. Along with the development of social networking, social media, and with the development of mobile device technology, applications are also growing rapidly (Setiawan et al., 2019). This surge has been utilized in the field of information and communication technology, allowing Micro, Small, and Medium Enterprises (MSMEs) to enter the global market for trade (Basry & Sari, 2018). The presence of technology has had a significant influence, extending to other sectors of life, such as the economy, politics, socio-cultural aspects, security, and others (Permana, 2019).

According to (Primadewi et al., 2021) the increasing need for data and information in the functioning of a business in MSMEs is the foundation for assisting MSMEs actors, especially for ease of expansion. With accurate data and information, MSMEs can find out a market trend in certain areas. The government becomes the holder of control which is very important in providing a forum and budget to meet the needs of the community. In the government of Magelang City has implemented a community empowerment system called the Program for Empowering Community that Advanced, Healthy, and Happy Society (Rodanya Masbagia) which is aimed at increasing community empowerment through the local government's budget (APBD) funds from the Magelang City Development Planning Agency (Bappeda). Rodanya Masbagia encourages community participation in development at the sub-district level based on neighborhood Association (RT). One of the efforts to increase the role of the community is by developing potential in the field of MSMEs (Magelang, 2021).

MSMEs are a driving factor in the creation of national economic development. So that it attracts the attention of various groups, both from the government and the general public (Azis Fathoni, 2019). MSMEs with this sharp increase demand that they be able to innovate their products and carry out broader and easier sales strategies. With this strategy they can survive and be able to compete with similar products in an era of rapid technological development (Soedewi, 2022).

The number of MSMEs in Magelang City is 86.4% in 2021 or reaching 727 MSMEs (Magelang, 2021). With a large percentage of MSMEs, it is necessary to do mapping in each region. Currently, the community can monitor the Rodanya Masbagia on the <http://simasbagia.dp4kb.magelangkota.go.id/> website. This web-based system serves as: (1) a data repository for RT profiles, (2) plans for community needs, (3) results of plans for community needs, (4) monitors the implementation of Rodanya Masbagia self-management, (5) the number of Rodanya Masbagia self-supporting communities, (6) galleries and news, regulations, (7) frequently questions and answers, overall budget Rodanya Masbagia.

After analyzing Rodanya Masbagia's information system, it can be seen that there is no system to manage or record data related to MSMEs. So that the impact on the marketing and data collection process up to the dissemination of information is delayed. In addition, the system seems not to be categorized as an effective information system to use. There needs to be an innovation or new feature to introduce, record, and disseminate information in the City of Magelang. Especially in every RT so that the data can be stored and used as promotional media for MSMEs to improve the economy in each RT in Magelang City. With the addition of new features to Rodanya Masbagia, an understanding of the User Interface (UI) and User Experience (UX) is needed to support a more user-friendly system. This feature is to design a product that can be seen and used properly, thereby increasing user comfort and convenience in using the product (Nasution & Nusa, 2021).

In a web-based system as a population data repository, users or customers can use marketing and data collection to disseminate information. In designing the User Interface (UI) and User Experience (UX) in this public service system, design thinking is applied in its design. This will be based on new patterns of creation because in the process it focuses more on perception, possibility, and practice (Surachman et al., 2022). Design Thinking Methodology has several stages, namely empathize, define, ideate, prototype, test to support Rodanya Masbagia's information system in marketing.

The results of this study will focus on designing a prototype using Figma as a design tool used to create user interface designs as a tool, especially on adding marketing and data

collection features on Rodanya Masbagia using the design thinking methodology. consumer. This research can produce strategic planning that is more user-friendly in mapping MSMEs in Magelang City.

LITERATURE REVIEW

a creative approach used in product and service development to solve user problems by focusing on their needs. In the context of user interface (UI) and user experience (UX) design, design thinking can help designers understand users, identify existing problems, and design effective solutions. In this study, the design thinking methodology is used as an approach used for innovation from designers to solve problems with a human-oriented approach (Nadhif et al., 2021). To provide answers to user problems, if the design process uses a methodological structure and follows the rules, then it is capable of producing quality research that can be accounted for from all aspects (Subarjah & Ari Purno Wahyu, 2022). One of the advantages of using design thinking from start to finish is to produce a good level of user experience in the future (Nadhif et al., 2021). According to (Almaghaslah & Alsayari, 2022) Design thinking is a problem-solving approach that is gaining popularity in various fields, a systematic approach prioritizing deep empathy for the desires, needs, challenges of users to fully understand the problem, with the aim of developing comprehensive and effective solutions.

Design thinking has several stages, namely: Empathize, Ideate, Prototype, and Test (Larysa & Marta, 2019). Empathize to be able to understand user needs, the way to know empathy is to observe, engage with users, and participate in understanding what users feel. Ideate to rearrange based on solutions and innovations that can be used to solve the problems previously described. Define aims to see the problem to be solved and find out what the user needs. The next step is a prototype to realize the idea in the form of a model with a reduced version to get a response. This stage can be called the primary process of the design thinking methodology because the analysis of the results and ideas has been compiled, outlined, and combined into a design product. The final step with testing aims to rigorously test the complete product using the best solutions identified during the prototyping phase. According to (Syahrul & Palcomtech, 2019) design thinking is a tool used in a problem-solving, problem-design, to problem-forming. Not only can solve a problem but can also form and design an existing problem. In the process, design thinking can be human-centered or human-centered. Every design thinking process originates and is directed at humans.

User Interface (UI) is a technological development that is able to utilize digital or internet facilities, in order to design a product that can be seen and used properly in order to

increase comfort and convenience for users in using products or services (Haryuda et al., 2021). User Interface (UI) design is made with convenience in mind for the user to have an important role because he is the direct link between the system and the user (E. Susilo et al., 2017). The user interface is the most important element of a computer-based system or product, the user interface is very important because in application systems almost all applications have a user interface, a bad interface creates confusion and frustration for ordinary users, so it will affect productivity (A. T. Susilo et al., 2021). According to (A et al., 2019) The user interface is the way a program and users interact with each other. The user interface is a part of the computer and software that can be felt by the user, touched, and understood by the user, in the form of making a design display in a computer or software device, several user interface indicators include (1) connectivity, (2) simplicity, (3) directional, (4) informative, (5) user friendliness, (6) personalization, and (7) continuity. The function of the UI in making websites for Facilitate user interaction: The main function of the UI is to facilitate interaction between the user and the website. A good UI is designed to provide an intuitive, efficient and comfortable user experience. Through elements such as buttons, navigation menus, forms and icons, UI helps users interact with content and features on the website. Improve readability and navigation: A good UI helps improve content readability and makes it easier for users to navigate within the website. Improves visual alignment: UI helps create visual alignment within the website. Increases responsiveness: UI also plays a role in increasing website responsiveness to user actions. Increase conversions and business goals: A good UI can help increase conversions and achieve desired business goals. Increase user satisfaction: A good UI can increase overall user satisfaction.

User Experience (UX) or UX designers are able to visualize user flow that has been tested (Haryuda et al., 2021), according to (Subarjah & Ari Purno Wahyu, 2022) User Experience (UX) is a term for user experience (emotions, attitudes, behavior, etc.) while interacting with each other. Based on (Shirvanadi & Idris, 2021) UX design will provide comfort and convenience with the user's approach while interacting with the system. To run the product, the level of product quality must be balanced with the capabilities of a product, not all users who use an application feel comfortable, the thing that affects the website is the user-friendly aspect. UX will be a liaison between a business goal and user goals, with the intervention of UX design that involves users will have a high level of success in conveying business goals and goals by users. According to (A. T. Susilo et al., 2021) user experience is the attitude, behavior and emotions of the user when using a product, system or service, can involve individual perceptions related to benefits that can be felt easily after being obtained. The user interface is very important in the process of creating

websites and applications, because in the end, after the website or application is finished, what will interact continuously in everyday life is the user himself, to improve usability and UX. There is also the use of UX in making websites for, understanding user needs: UX helps in understanding user needs and preferences. Through user research, interviews, observation, and data analysis, UX helps identify who the target users are, what they are looking for, and how they interact with the website. With a deep understanding of users, it is possible to design experiences that meet their needs. Designing intuitive layouts: UX helps to design website layouts that are intuitive and easy for users to understand. Improve usability and accessibility: UX focuses on improving the usability and accessibility of websites. Creating a smooth user flow: UX helps in creating a smooth and intuitive user flow in the website. Maintain consistency and alignment: UX contributes to maintaining consistency and alignment of the design across the website. Increase user engagement: UX helps increase user engagement with the website. Through the use of interactive elements, eye-catching animations and engaging user experiences, UX creates an engaging environment for users. By increasing user engagement, UX can increase user retention rates, reduce bounce rates, and drive higher conversions.

Usability is part of the Human Interaction science, this usability can study interface design and interactions between humans and hardware, namely computers (Sukmasetya et al., 2020). Usability data has various solutions to solve problems, namely testing efficiency, ease of learning, and the ability to remember how to do interactive tasks without difficulty or making mistakes. (Jumiati et al., 2021). According to (Sauer et al., 2019) studies in usability will discuss the experience by a user in learning and using a technology, application or website. According to (Fahmi et al., 2018) usability is part of the user experience, usability is taken from the word usable in the sense that it means the level of quality of a product that can be used easily, can be learned easily and can be encouraged to use it as a tool in completing tasks. Usability can also be used to measure the quality of experience by users when interacting with a product such as a website or application. function of usability in testing to Gather user feedback: Usability testing allows designers to gather direct feedback from users testing prototypes. Users can provide their perspective on the user experience, the difficulties encountered, and the things that worked or didn't work in using the product. This feedback is invaluable in identifying deficiencies and potential improvements to prototype designs. Identify user problems and challenges, validate design assumptions, Determine design strengths and weaknesses, Gain insight into user preferences.

METHOD

In this study, the Design Thinking Methodology has 5 stages (Figure 1) which will be explained in the following paragraphs.

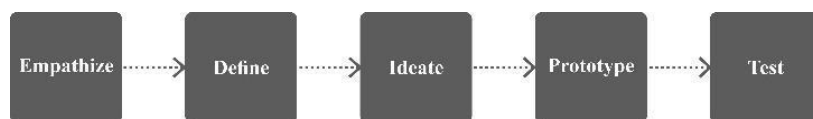


Figure 1. Stages of the Design Thinking Methodology

The first stage is Empathize. This stage uses interviews and observations at the Magelang City Bappeda office to obtain data. In the empathize process, a list of questions is also prepared so that results are obtained which will then be processed to the next stage. What criteria will be determined as respondents in the study.

Proceed to the next stage define, after obtaining data on needs and problems in the empathize process, at this stage a list of needs is made from the Magelang City Bappeda office and grouping all the material that has been obtained, then monitoring to get problems as a point of view from the list of questions.

After understanding from the empathize and define stages the author understands the problems experienced at the Magelang City Bappeda office with the help of a list of questions and a list of needs that have been made before. The next stage is ideated, after studying the problems experienced by users and reviewing the information and all ideas collected, the next step is for the author to hold a meeting with the Magelang City Bappeda team to rearrange the ideas that have been created and filtered based on solutions and innovations that can be used to solve the problems that have been previously presented.

In the prototyping and testing stages, ideas and solutions that have been made in the previous stage are prototyped and will be tested on users. Some of the steps include making prototypes with userflow, wireframes, mockup. In this last stage the results of the prototype are tested using the maze platform. Solution design testing is carried out by giving several tasks related to the features of using the prototype, at this stage the writer can find out how the experience is by the user. Whether the user has difficulties or not, at this stage can determine whether the design needs to be improved or not, according to the user's ease in completing the tasks given.

RESULT AND DISCUSSION

Based on the method described earlier, the research stages implemented are as follows.

Empathize

At the empathize stage, knowing various information about Rodanya Masbagia is done by interviewing Bappeda. The list of interview questions related to the public service system is as follows:

Table 1. List of Questions

No	A list of questions
1	How do you sell products on Rodanya Masbagia?
2	How long will it take to trade?
3	Has the marketing of MSMEs products on Masbagia Wheels been maximized?
4	Is the marketing of MSMEs products on Rodanya Masbagia maximized?
5	Is there data collection for MSMEs products on Rodanya Masbagia?
6	How to collect data on MSMEs products on Rodanya Masbagia?
7	How is the distribution of promotional media on Rodanya Masbagia?
8	What is the strategy for disseminating MSMEs product information so that it can be recognized by consumers?

From these questions the aim is to collect information that will be processed to carry out the observation step to the next stage.

Define

At the define stage to get error information from previous data. Data obtained from interviews with Bappeda members to obtain user opinion and to understand user needs. The results of this study there are problems with the sales method that has not been maximized and the dissemination of information that is less relevant. The solutions are

designed according to the target user. The following Table 2. are a list of user needs from the empathize process.

From the data in Table 2. It can be concluded that the needs of the users are arranged based on the problems to provide the solutions and solutions needed. Next, hold deliberations to discuss the features that will be developed in the Rodanya Masbagia Wheel system.

Ideate

From the core of the problem that has been found, the next step is to provide the right solution. The proposed solution to facilitate the sale of goods and data collection of each citizen for sales. At this stage it needs to be done to get new perspectives and innovative ideas in marketing their wares safely and making it easier for users to trade. The following is an ideate process to evaluate data from the define process to provide the right solution. The following is the solution to be designed in Figure 2.

Table 2. List of Needs

No	List of Needs
1	A website system that is easy to use on smartphones, laptops, and other devices.
2	Merchandise products that can be purchased from various marketplaces.
3	Easy to understand menu.
4	There is a location feature to make it easier for merchants to expand buyers.
5	Discussion feature for users and buyers.
6	Buyer review feature that can communicate with merchants.
7	There is a menu of the latest information.
8	Create an account with an email and strengthen it with a password.



Figure 2. Solution Results

Prototype

In the prototyping stage, ideas and solutions that have been made will be made into a prototype that can be sensed or a concrete representation. With this stage where the design for the appearance of a Rodanya Masbagia website is carried out. With this prototype design the author can visualize the target user needs of the Magelang City Bappeda office. The prototype stage has several steps, namely, userflow, wireframe, and mockup. The following is the prototype stage:

a) Userflow

In the userflow stage the steps taken by users to achieve references in designing features on a website, it will be easier to design products and optimize products to improve user experience and increase conversions, target users on Rodanya Masbagia are MSMEs customers, userflow

designs are made from the following existing solutions are the designs in Figure 3.

b) Wireframe

The stages of designing the Rodanya Masbagia website UI design start with making a wireframe design. This design is the first step that describes the shape of the website UI before heading to the mockup design stage. Following are some of the wireframes that have been made which can be seen in Figure 4 (Left).

c) Mockup

The next stage of designing the Rodanya Masbagia website UI is creating a mockup. The prototype design stage was made using the Figma supporting application. Some of the prototypes that have been made are as follows. There is a display of the Rodanya Masbagia main logo in the middle of the on boarding page and is equipped with a login and

register menu below it as shown in Figure 4 (Right). The Roda Masbagia logo is on the left of the register menu. Users can login to the website using a username and password if they already have an account. This is the first time the user has entered, so they must register for an account first and can complete their personal data by filling

in their name, email, username, and password then clicking the submit menu.

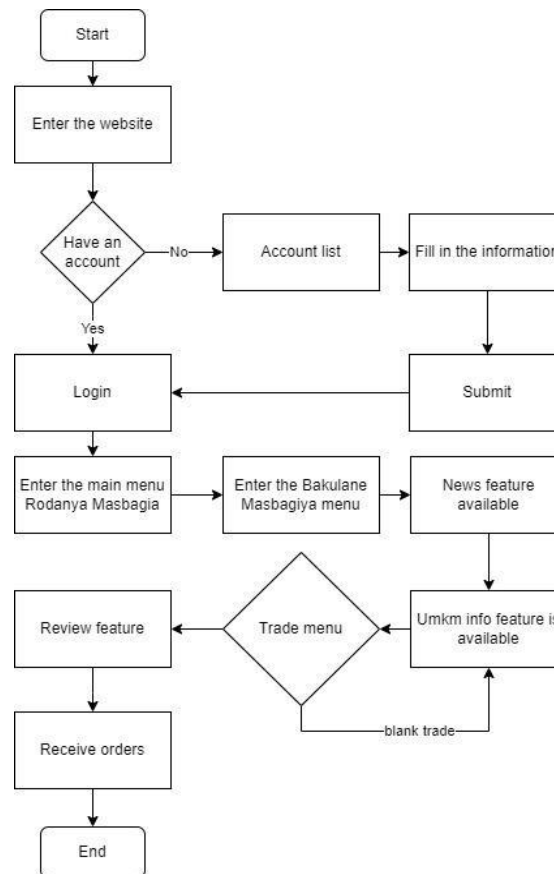
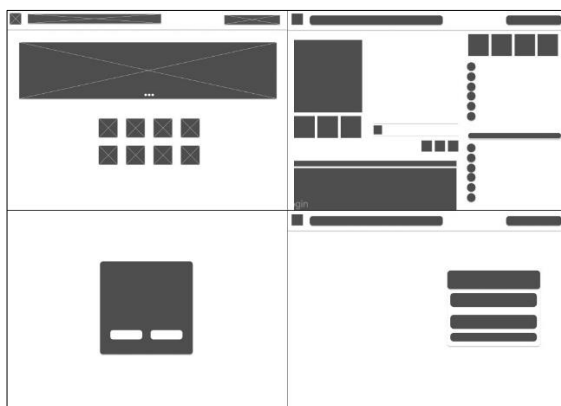
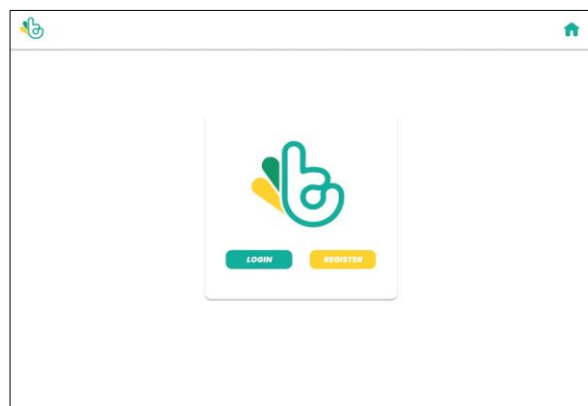


Figure 3. Website Userflow



(a)



(b)

Figure 4 Public Service System Wireframe Design (a) and Community Service System Website Interface on the Onboarding Page (b)

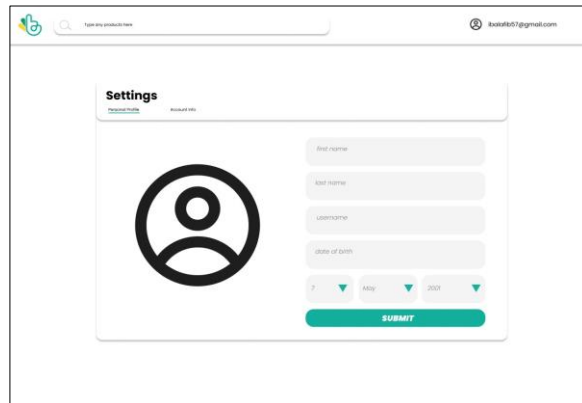
After the user has successfully logged in by registering a new account. Then the Rodanya Masbagia website homepage is displayed. There is a product search menu, user profile email name information, the latest news on the Rodanya Masbagia and Konco Masbagia menus, Bakulane Masbagia, Masbagia Satset, SIMEs Masbagia, Regulations. Can be seen in Figure 5 (Left). On the settings page the user can change personal data, on the personal profile the user

can change the full name, username, date of birth with day, month, year. In account info user can change email and password.

After the user enters the home page and selects the Bakulane Masbagia feature, on the Bakulane Masbagia menu there are two features, namely news and umkm info, the news feature displays the latest news about SMEs as shown in Figure 5 (Right)



(a)



(b)

Figure 5 Home Page (a) and Settings Page (b)

After the user enters the home page and selects the Bakulane Masbagia menu, the Bakulane Masbagia menu

contains news and info features for MSMEs, as shown in Figure 6.

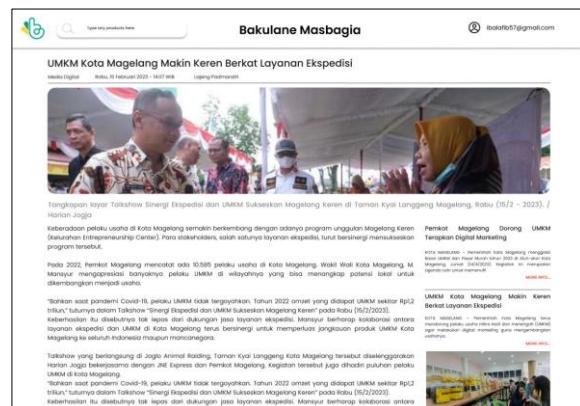
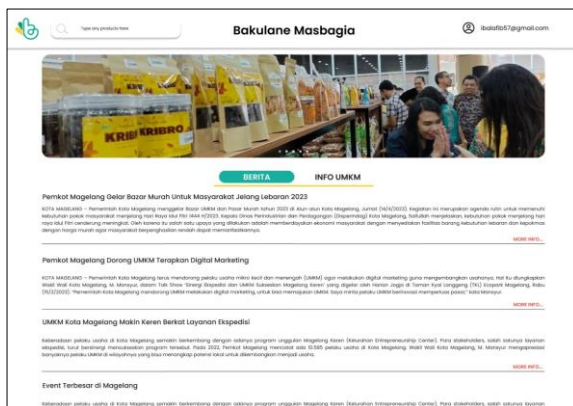


Figure 6 Bakulane Masbagia News Menu Page

In the MSMEs info feature there are several categories, in the menu there are merchant location features, discussions, reviews, links to other marketplaces, item price information, item description information, photos of

reviews from buyers, locations, and discussions between traders and buyers. The MSMEs info feature can be seen in Figure 7.

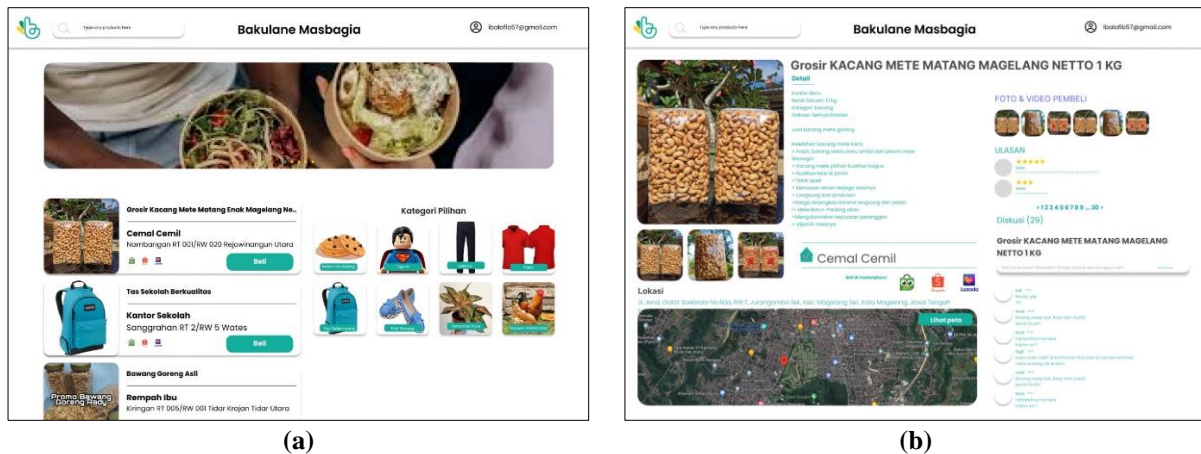


Figure 7 MSMEs Info Menu Page (a) and MSMEs Product Detail Page (b)

Test

The fifth or final stage of design thinking is testing potential users. In testing using Maze. Maze can test quickly which allows to collect qualitative and quantitative data in one platform. The Usability Testing technique is used at this testing stage, during Usability testing there are 5 respondents who are similar or close to the target user criteria. At this stage the prototype that has been made is

tested. The test includes variable task 1 login account, variable 2 create account, task 3 edit account, task 4 view news, task 5 buy goods. The success of the prototype is measured using the time parameter. The measurements in Table 3 are based on time indicators.

Tasks are carried out by users and get feedback. If the features have deficiencies, then the prototype needs to be made. The results of participant data can be seen in Table 4.

Table 3 Time Indicators

Task	Succed	Confused	Difficulty
Task 1 (Login Account)	<30 second	30 second – 50 second	>50 second
Task 2 (Create Account)	<20 second	20 second – 40 second	>40 second
Task 3 (Edit Account)	<15 second	20 second – 40 second	>40 second
Task 4 (View News)	<15 second	15 second – 30 second	>30 second
Task 5 (Buy Goods)	<20 second	20 second – 40 second	>40 second

After the user can complete the task that has been given, the next step is that the user can provide feedback on the application scenario that has been created previously. If features experience deficiencies in design or flow, they need

to be changed and republished so they can be developed and published again. The data results of participants who have completed the assignment can be seen in Table 4.

Table 4 Test Results on The User

User	Task 1	Task 2	Task 3	Task 4	Task 5
User 1	10 second	13 second	20 second	5 second	10 second
User 2	17 second	8 second	19 second	6 second	5 second
User 3	19 second	12 second	33 second	11 second	6 second
User 4	35 second	64 second	82 second	22 second	27 second
User 5	7 second	13 second	20 second	13 second	13 second

After testing the user prototype, the following data is based on predetermined metrics in the form of task 1 90% success rate, task 2 75% success rate, task 3 80% success rate, task 4 100% success rate, task 5 80% success rate. In the ongoing testing phase, users can complete the task successfully, but there are several factors in the task that are difficult to complete. It can be concluded that there is a need to improve the performance of the designs that have been created so that users do not feel confused or difficult when using the product.

CONCLUSION AND RECOMMENDATION

Product design can solve trading problems for the people of Magelang City. The final design of the product is in the form of a prototype, which is tested using usability testing techniques to produce a good prototype according to the test of getting a score with an average score of 85%. Which can be interpreted that the product results are developed with a user-friendly design method approach.

Based on the conclusions that have been made, the authors provide several suggestions, namely, by expanding research so that it continues to develop additional features in the public service system prototype design and can also be integrated with other systems by making it multiplatform.

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