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Redesign Of BUMDes And MSMEs Marketplace Platform Using User Centered Design Method

Muhammad Widya Tirta Cahyatama[1], Ariq Cahya Wardhana[*]

Fakultas Informatika,Rekayasa Perangkat Lunak, Universitas Telkom, Banyumas, Indonesia
Email: tamamwtc@student.telkomuniversity.ac.id, [2]ariqcahya@telkomuniversity.ac.id
Email Penulis Korespondensi: ariqcahya@telkomuniversity.ac.id
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Abstract

This research centers on the redesign of Waroeng Kita, a digital marketplace platform developed to facilitate transactions for Village-Owned Enterprises (BUMDes) and Micro, Small, and Medium Enterprises (MSMEs) in rural Indonesia. An initial usability assessment conducted for this study revealed a low System Usability Scale (SUS) score of 49.16, classifying the platform as "Not Acceptable" and highlighting significant usability challenges. To address these issues, the study systematically applied the User-Centered Design (UCD) methodology, following an iterative process aligned with the ISO 9241-210:2019 standard. Across two design iterations , critical usability flaws, including a static cart, unclear input forms, and unfamiliar terminology —were systematically resolved based on direct user feedback. The final evaluation after the second iteration demonstrated a substantial improvement, with the average SUS score increasing to 70. This score elevates the system to a "Marginally Acceptable" status (Grade C), confirming that the UCD approach is highly effective for enhancing system usability, particularly for users in rural settings with limited digital literacy. The study provides practical insights for creating more inclusive digital solutions in similar socio-economic contexts.

Keywords: User-Centered Design; BUMDes; MSMEs; SUS; UI/UX; Marketplace; Usability

1. INTRODUCTION

The trend of digitalization serves as a significant driver for propelling economic expansion across multiple sectors, with a particular impact observed at the village level through the functions of Village-Owned Enterprises (BUMDes) and Micro, Small, and Medium Enterprises (MSMEs). Fueling this phenomenon are advancements in information and communication technology, which provide local businesses with expanded market access, enhanced operational efficiency, and a stronger competitive edge [1]. Nevertheless, significant impediments remain in the adoption of digital tools by MSMEs. A substantial number of these enterprises fail to fully leverage existing marketplace platforms, attributing this underuse to factors such as perceived complexity, interfaces that are not intuitive, and user experiences that are suboptimal [2]. This disparity is underscored by usability benchmarks from popular Indonesian marketplace platforms; for instance, Tokopedia holds a System Usability Scale (SUS) score of 80 and Shopee a score of 76. These figures are considerably higher than those of local platforms like Waroeng Kita, which registered a SUS score of only 69.63 [3], [4], [5], [6].

Waroeng Kita is a local marketplace platform developed to support the marketing of MSME products in partnership with BUMDes RCM in Giyanti Village, Rowokele District, Kebumen Regency. This platform is the main link between MSMEs and partner stalls that become product distribution points. Despite its commendable objective, evaluations indicate that the platform's usability metric remains poor. With a System Usability Scale (SUS) score of 69.63, the system is classified within the "marginal" range of acceptability, signifying that it has not achieved full user adoption [6].

Enhancing the quality and competitive standing of Waroeng Kita necessitates improvements guided by the User-Centered Design (UCD) framework. UCD is defined as an iterative design methodology that positions the user as the focal point throughout the entire product development lifecycle [7]. In practice, UCD consists of four main stages, namely: 1) understanding the context of use, 2) defining user needs, 3) generating design solutions, and 4) conducting design evaluation [8]. Evaluation is done by direct observation of user interaction through usability testing and SUS measurement [7], [9].

Previous research shows that the application of UCD has been proven to improve the quality of UI/UX on various digital platforms. For example, in the redesign of an e-learning platform, the use of UCD managed to increase the SUS score from 42.9 to 80.82 [10]. Another previous research, the OVO application shows that the efficiency aspect is very good, but the novelty aspect is rated low so it needs improvement in terms of design [11]. Therefore, the application of UCD to Waroeng Kita is expected to improve the value of SUS and the overall quality of user experience.

Although the effectiveness of the User-Centered Design (UCD) methodology is well-established and the digital divide impacting MSMEs is widely documented, a significant gap exists where these two fields intersect. There is a notable lack of empirical studies that meticulously detail the iterative implementation of the UCD process, as outlined by the ISO 9241-210 standard, to specifically resolve the usability issues of marketplace platforms built for rural Indonesian MSMEs. This demographic contends with a distinct set of obstacles, including low digital proficiency and infrastructural limitations, which are typically not addressed by generic platform designs. Current literature often examines the problem and the solution separately; very few studies present a thorough, replicable case study of a UCD-driven redesign that is customized for this vital yet technologically neglected population.

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Consequently, this research is centered on the redevelopment of the Waroeng Kita marketplace platform, applying the User-Centered Design method to achieve the primary goal of elevating its usability and overall user satisfaction. Through an iterative process of design and testing, it is expected that this platform can make a real contribution in facilitating the digitalization of BUMDes and MSMEs, especially in the aspects of product marketing and distribution.

2. RESEARCH METHODOLOGY

This study employs the User-Centered Design (UCD) methodology, a framework that aligns with the ISO 9241-210:2019 standard [7]. The selection of UCD was based on its systematic, iterative, and user-focused approach. The research workflow is structured around four primary phases: 1) Specifying the Context of Use, 2) Defining Requirements, 3) Producing a Design Solution, and 4) Evaluating the Design [7], [12]. User-Centered Design (UCD) is a methodology used by developers and designers that delivers products that meet user needs. UCD is a method that runs on data to support a design and UCD can reduce time and reduce losses by meeting user needs with the right solution.

2.1 Research Stages

The overall methodology of this study followed a structured process, which is visualized in the research flow diagram in Figure 1. The initial step of the research process involved problem identification. The principal issue was identified as the low System Usability Scale (SUS) score of 69.63 for Waroeng Kita, a conclusion drawn entirely from literature reviews [6]. Upon identifying the problem, the research objective was established: to enhance usability and user satisfaction by means of the User-Centered Design (UCD) approach. To strengthen the theoretical basis, a study of relevant literature and previous research was conducted, including the theory of MSMEs, E-Commerce, UI/UX, UCD, and usability evaluation methods such as SUS [1], [2], [6], [7].

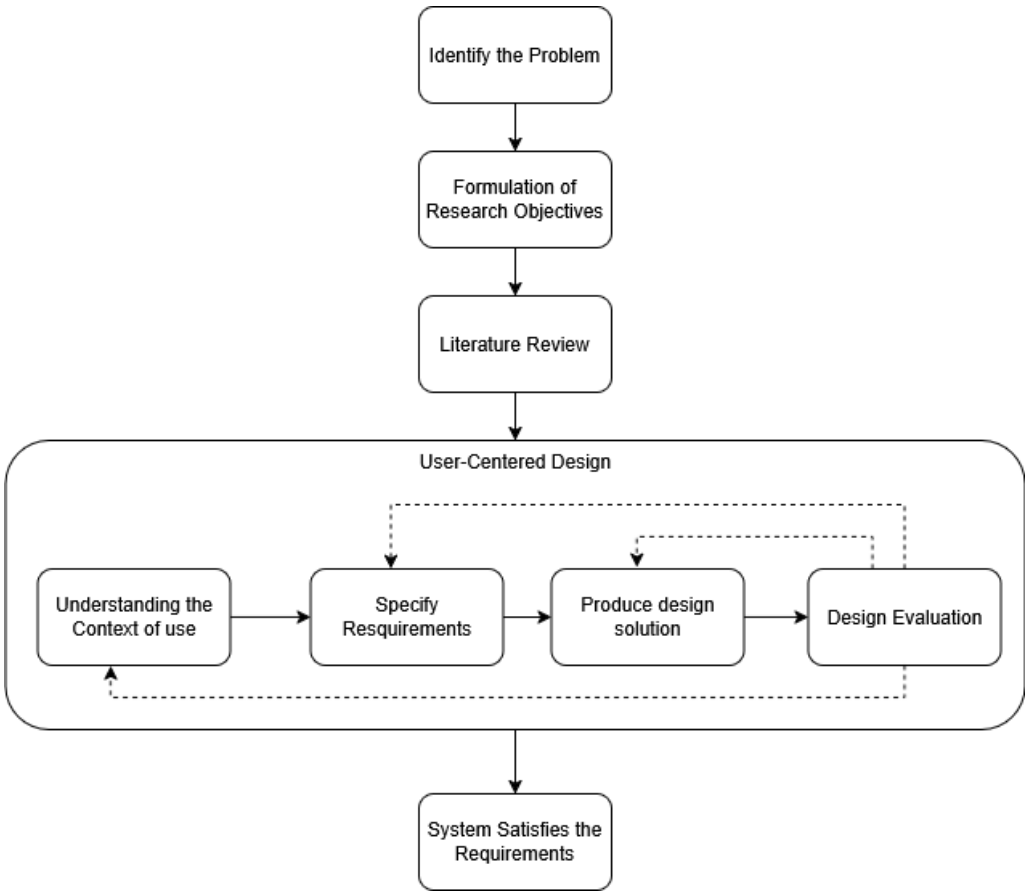

Figure 1. Research Flow Diagram

After that, the research entered the Specifying Context of Use stage, where researchers identified the context of use of the platform by conducting interviews and observations to potential users, namely BUMDes partners. At this stage, an initial SUS measurement was also conducted to determine the baseline level of platform usability [10]. The data obtained is then processed in the Specification of Requirements stage through analyzing user needs [8]. The results of the analysis are outlined in the form of Requirement Table and Sequence Model which describes the needs and flow of user tasks in using the application [13].

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Based on these needs, the researcher proceeded to the Produce Design Solution stage, which developed wireframes, high-fidelity and prototypes using Figma [14]. The prototype was designed following the UI development principles based on the previously identified user task hierarchy [10]. The subsequent phase, Design Evaluation, involves subjecting the prototype to usability testing. Testing is done with task scenarios that are organized based on the sequence model, where user performance is observed and assessed using the SUS questionnaire [15]. The design is deemed valid only if the resulting SUS score achieves a minimum of Grade C, an "OK" adjective rating, and a "Marginal" acceptability level. If not, then iterate the design based on the evaluation results, by repeating the process from producing the design solution until the criteria are met [16].

2.2 User-Centered Design (UCD)

User-Centered Design (UCD) is a well-established approach to interactive systems development that aims to make systems usable and useful by focusing on the users, their needs, and their requirements. The name User-Centered Design was first used by Rob Kling in 1977 which was later adopted by Donald A. Norman who is the author of The Design of Everyday Things, where the book explains that design can affect the daily lives of users [17].

ISO 9241-210:2019 defines it as a process that applies human factors, ergonomics, and usability knowledge and techniques to enhance effectiveness, efficiency, and user satisfaction while counteracting possible adverse effects on human health and performance [7]. The methodology is guided by several core principles, including:

a. The design is based upon an explicit understanding of users, tasks, and environments.
b. Users are involved throughout the design and development process.
c. The design is driven and refined by user-centered evaluation.
d. The process is iterative.

These principles are operationalized through the four key activities mentioned previously, ensuring that the final product is not only functional but also deeply aligned with the user's context.

The selection of the UCD framework for this study is deliberate and justified. The primary challenge of the Waroeng Kita platform stems from a significant misalignment with the needs of its target users: rural MSMEs characterized by varying levels of digital literacy and unique operational constraints. Research indicates that technology for rural users must be intuitive and mitigate barriers related to geographic and digital isolation [18]. UCD, with its foundational emphasis on deep contextual understanding and continuous user involvement, is uniquely suited to address these specific usability issues and fulfill the research objective of creating a more inclusive and effective digital tool.

2.3 System Usability Scale (SUS)

System Usability Scale (SUS) is one of the testing methods that uses reliable measuring instruments [15]. To measure usability, the standardized ten-item SUS questionnaire, shown in Table 1, was administered to participants.

Table 1. SUS Questionnaire

No	Questions	Scale
1	I think that I would like to use Waroeng Kita frequently	1-5
2	I found Waroeng Kita unnecessarily complex	1-5
3	I thought Waroeng Kita was easy to use	1-5
4	I think that I would need the support of a technical person to be able to use Waroeng Kita	1-5
5	I found the various functions in Waroeng Kita were well integrated	1-5
6	I thought there was too much inconsistency in Waroeng Kita	1-5
7	I would imagine that most people would learn to use Waroeng Kita very quickly	1-5
8	I found Waroeng Kita very cumbersome to use	1-5
9	I felt very confident using Waroeng Kita	1-5
10	I needed to learn a lot of things before I could get going with Waroeng Kita	1-5

The System Usability Scale (SUS) score is derived from the answers provided by respondents and is subsequently computed using formula (1) as detailed below:

$$\text{SUS} = 2{,}5 \times \left[\sum_{n=1}^{5} (u_{2n-1} - 1) + (5 - u_{2n})\right] \quad (1)$$

An explanation of the System Usability Scale to determine the score obtained as follows:

a. Un indicates the nth question
b. Questions with odd numbers in the SUS sequence each result that has been filled in by the participant is reduced by one
c. Questions with even numbers in the SUS sequence each result that has been filled in by the participant, Value five minus the score that has been filled in by the participant.
d. Each SUS score obtained is then summed up from all questions and multiplied by 2.5

After the respondent's answer is calculated by formula (1), the resulting SUS scores were interpreted using a standardized grading system that correlates scores with adjective ratings and acceptability levels, as illustrated in Figure 2. [19]. This grading system is the basis for determining whether the research has been completed or needs to do another iteration.

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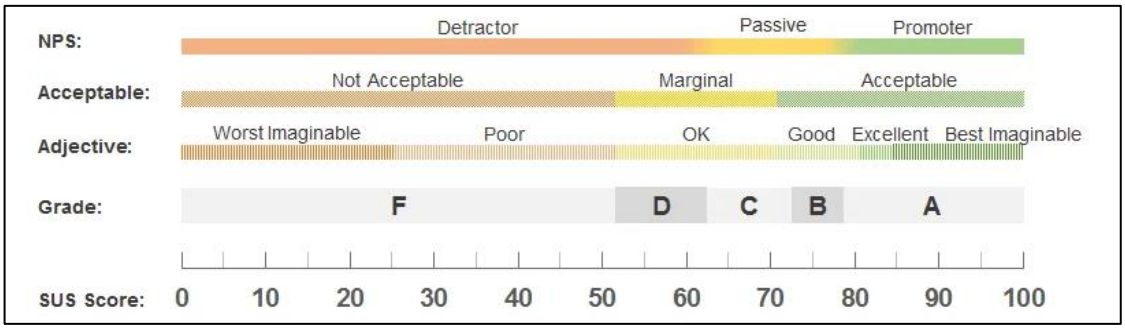

Figure 2. System Usability Score Range

If the SUS score is below the marginal, then the user is not satisfied with the application used and the design needs iterations until desired. This research is using purposive sampling where purposive sampling is a non-probability sampling technique where the researcher selects respondents based on the researcher's judgment of who will provide the most in-depth information for the study. There are steps in purposive sampling, namely determining the research questions and objectives, identifying relevant characteristics, recruiting participants, and stopping when saturation is reached where saturation is reached when no new information or insights emerge when participants are added [20].

3. RESULT AND DISCUSSION

In this stage, we will discuss the results of Specifying Context of Use, Specification of Requirements, Produce Design Solution and Design Evaluations.

3.1 Understanding the Context of Use

In this stage, testing of the application will be carried out to the respondents to get real data on the work activities, tasks, and physical environment of Waroeng Kita app users. To understand the application's context of use, a system questionnaire, detailed in Table 2, was completed at the outset of the research. This questionnaire is used to determine the use of the app, the type of respondent and the means to reach that said respondent.

Table 2. System Questionnaire

No	Questions	Answers
1	Which specific job or activity is the application intended to support?	Sale and purchase between partners and BUMDes Rowokele
2	How does this specific activity integrate into the user's broader professional responsibilities, and to what larger process is it connected?	Applications are used to facilitate distribution and can assist in sales data collection
3	Who are the key individuals responsible for carrying out this activity, with whom do they collaborate, and who is in a position to provide suggestions to complete the work?	Partner and BUMDes as Admin
4	Who is the source of the information required to perform this task, and who consumes the resulting output? This should include individuals who may not be direct users but who either manage the activity or utilize its results.	BUMDes and Partners
5	What are the primary activities performed by the identified individuals that the application aims to support?	Sale and purchase process between partners and BUMDes

So, the application is used to make it easier for Rowokele BUMDes Partners to make goods transactions to fill the inventory of goods from BUMDes Partners. After answering the questions in Table 2, the next step is to find respondents to test the application. With the help of BUMDes Rowokele, 6 respondents can be found who have been recorded in the User Tracking Sheets.

With the Respondent obtained, application testing can be carried out by visiting the respondent's place to get an overview of the place and location where the application will be used [8]. The testing carried out in the respondent place is to ensure that the apps that are being tested can truly perform in the user's daily environment. The initial usability test results, which established the baseline SUS score for the platform before any changes were made, are presented in Table 3.

Table 3. SUS Score pre-redesign

Respondent	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Score
R1	4	5	1	5	3	4	1	4	4	5	25

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R2	5	5	5	5	5	1	5	1	5	5	70
R3	3	2	2	3	2	2	2	3	4	5	45
R4	5	1	5	4	4	1	5	1	5	3	85
R5	3	5	1	5	1	5	3	5	1	5	10
R6	3	3	4	4	5	3	5	2	3	4	60
					Total						295
					Averages						49.16

As detailed in Table 3, the initial testing revealed a drop in Waroeng Kita's SUS score to 49.16 from the previously noted 69.63. According to the SUS scoring rubric in Figure 2, this score corresponds to a grade of F, a "Poor" adjective rating, and a "Not Acceptable" classification. The data obtained in user needs research is made into user personas that represent the main user segments. Persona is a representation of users equipped with demographic profiles, backgrounds, goals and pain points. Based on the initial user research, a representative user persona was created to guide the design process, as summarized in Table 4.

Table 4. User Persona

Goals	Persona
Bio	BUMDes Partners Rowokele which has difficulties in obtaining product distribution for businesses.
Motivations	BUMDes and Bumdes partners want to have a reliable and easy-to-use distribution application.
Goals	- The application has features that are easy to use. - The application has a display that is easy to understand.
Pain Points	BUMDes partners find it difficult to purchase goods, especially in checking the basket because the basket does not have dynamic updates. In addition, BUMDes partners also have problems in inputting goods into the application due to the lack of clarity of input fields in the application.
Needs	Requires a dynamic application design that is easy to use by BUMDes Partners

3.2 Specification of Requirements

This stage begins with collecting data that has been obtained at the Specifying Context of Use stage and carrying out the interpretation stage. In the interpretation stage, the purpose of this stage is to find insights that can be in the form of patterns, situations, key issues, or needs from the data obtained. The insights gathered from user research were translated into specific functional needs and design requirements, which are mapped out in Table 5.

Table 5. Requirements Table

Needs	Requirements
Get info that the cart has items	Added notification feature to cart icon
Facilitate the buying process	Added address and summarized payment methods
Facilitate the process of adding items	Reorganized the charging page

Based on the requirements outlined in the table, the Sequence Model shown in Figure 3 was developed. This model is designed with a high level of detail, specifically tracking the UI's response to every individual user action, such as a button press or data entry.

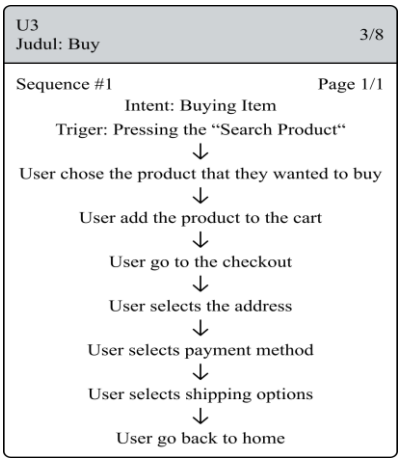

Figure 3. Buying Sequence Diagram

3.3 Produce Design Solutions

Before continuing the design process to visual stages such as wireframes and high-fidelity mockups, it is important to re-evaluate the sequence model that has been created. This evaluation aims to ensure that each component in the model has

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a relevant function, is not redundant, and supports the overall user experience. Validating the task sequence model allows potential inefficiencies or excessive complexity to be identified early on. To ensure the logical integrity of the user flow, the sequence model was validated against a set of critical questions, outlined in Table 6.

Table 6. Questions about sequence models

No	Questions
1	Does each component support each other for a coherent task or role?
2	Are there too many components, should some be combined into a more coherent UI?
3	Are the relationships between components clear?
4	Does the functionality within each component clearly support the purpose of that component?
5	Is it too complicated? Can the functionality be simplified?
6	Has it been ensured that there is no functionality that is not supported by user data?

Following the validation of the sequence model, the process moves to the brainstorming phase. A crucial step in this phase is to determine the specific platform for which the product will be developed. The main objective is to generate UI concepts that visually represent the required functionalities. The process of translating the validated user flow into a visual interface followed the structured development stages detailed in Table 7.

Table 7. Stages of UI development

No	Questions
1	Brainstorm ideas on how to represent components.
2	Develop multiple design alternatives
3	Find out the strengths and weaknesses of each idea that has been presented.
4	Address the shortcomings. Brainstorm ideas on solutions for each flaw.
5	If there is more than one alternative, choose one.
6	Sketch out the end-user interface once you have finished including all the functionalities. This will serve as a guide when prototyping
7	Run a real user work case through the prototype components to ensure the design has all the functionality needed for the case.

The result of the UI development stage is the creation of wireframes which are graphical representations of UI elements that have relatively accurate sizes, real words, boundaries between parts are displayed with simple lines, and minimal aesthetics as in Figure 4.

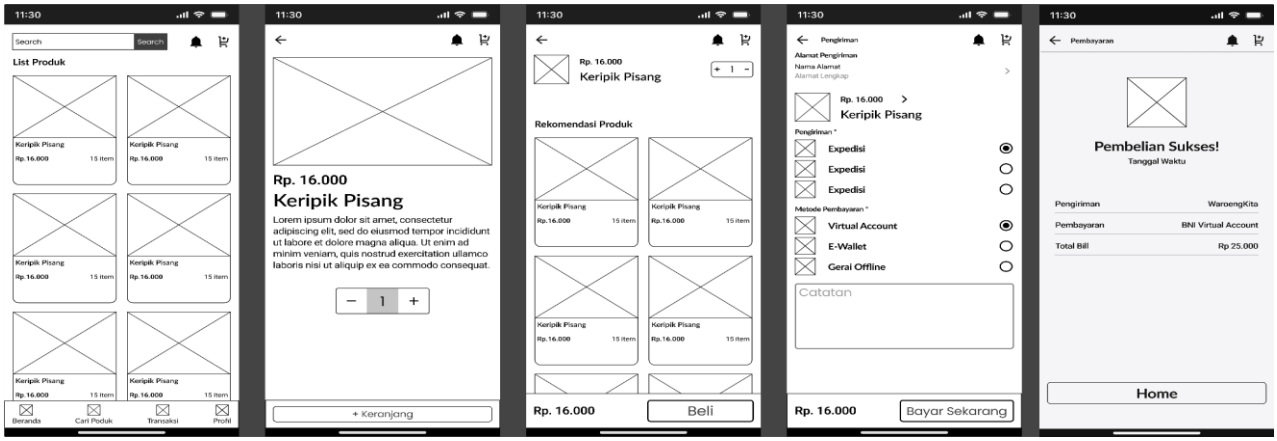

Figure 4. Buying Wireframe

The next step is visual development, which involves rearranging content and changing functionality to make it work with existing GUI standards. This stage ensures that the UI design can be implemented. This stage produces a high-fidelity mockup. These are the explanations about design that have been made (these the design is the fixed design that has been tested on design evaluations).

3.3.1 Login

Functioning as the primary entry point for users to access services, the login page represents a critical touchpoint within any application. In Figure 5, the login page before the redesign had some significant weaknesses. The redesign involved simplifying the visual layout, enlarging the font to enhance legibility, and increasing the color contrast between text and background elements to further improve readability. Thus, the redesign of the login page is not only a visual improvement, but also contributes greatly to improving the first impression, ease of access, and user trust in the system.

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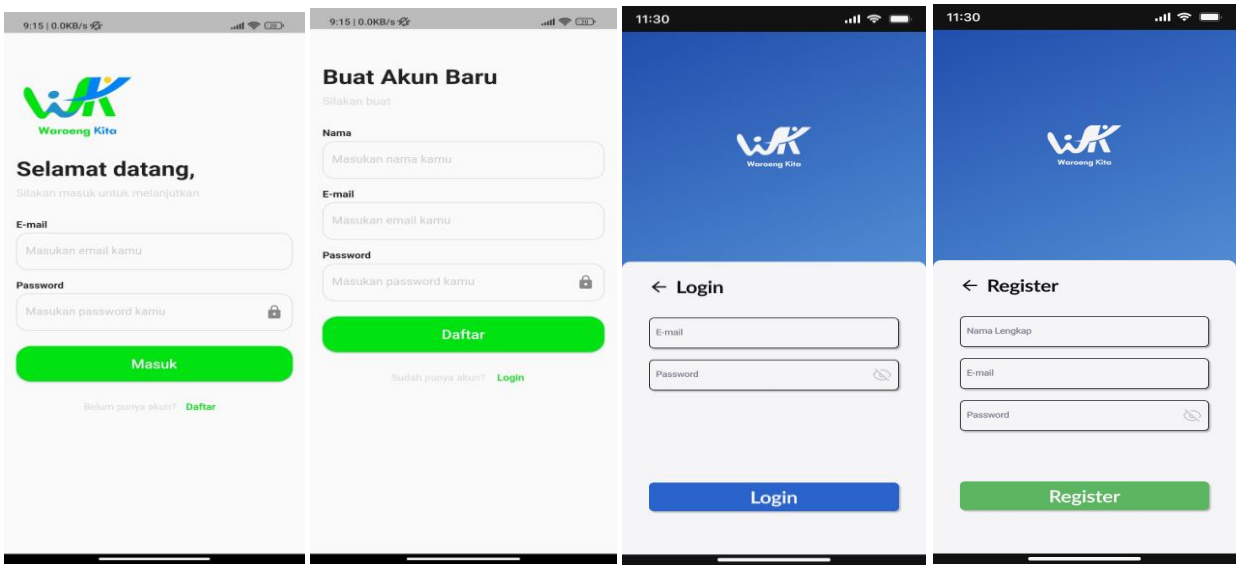

Figure 5. Login page display before and after redesign

3.3.2 Home Page

The home page or home screen is the starting point of user exploration in using the application. Therefore, this page should be able to present core information in a concise, easy-to-understand manner, and make it easy for users to take key actions. In Figure 6, Prior to the redesign, the initial home page was considered suboptimal due to several shortcomings, including a dense and disorganized information layout, the use of unfamiliar terminology like 'POS', and a lack of clear emphasis on primary features. As a result, users had difficulty recognizing the app's core functions from the first time they logged in. In the post-redesign, focus on the context of use of BUMDes partners who mostly use mobile devices and have limited digital literacy. Design changes include rearrangement of the visual hierarchy to highlight key features such as product categories, search features are made more prominent and accessible directly from the home page, while navigation icons are simplified. To increase user engagement and understanding, visual elements such as illustrations and colors were carefully selected to be attractive yet light on the eyes.

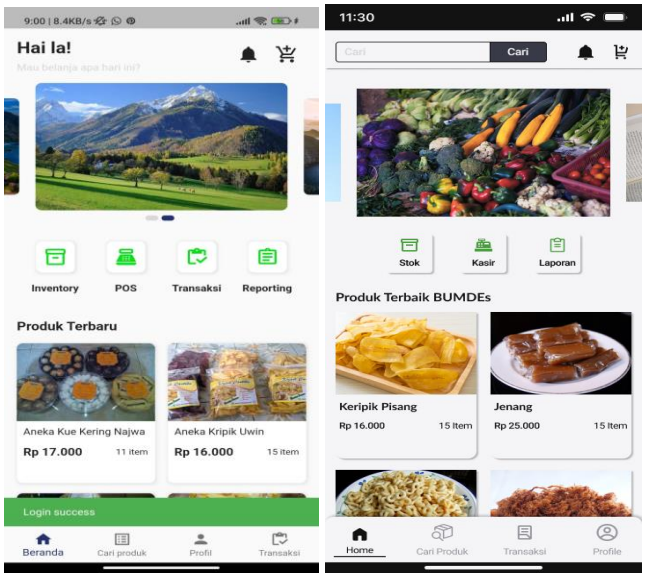

Figure 6. Home page design before and after redesign

In essence, the enhancements to the home page were not limited to visual improvements but also encompassed the simplification of interactions, the enhancement of clarity, and the provision of clear user navigation. The redesigned home screen, therefore, plays a pivotal role in shaping a positive first impression and motivating users to explore the application's functionalities more thoroughly.

3.3.3 Buy Feature

The purchase feature is a core component in marketplace applications such as Waroeng Kita, as it is the realization point of the main interaction between users (BUMDes partners) and the products offered. Prior to the redesign, the purchasing process in this application experienced several significant obstacles. A key usability issue was the user's difficulty in

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recognizing that items had been added to the cart. This problem was addressed by implementing dynamic notifications on the cart icon, providing users with immediate visual feedback upon adding a product. Action buttons such as "Buy" are also given a contrasting color and strategically placed for easy finger-reach on the phone screen as shown in Figure 7.

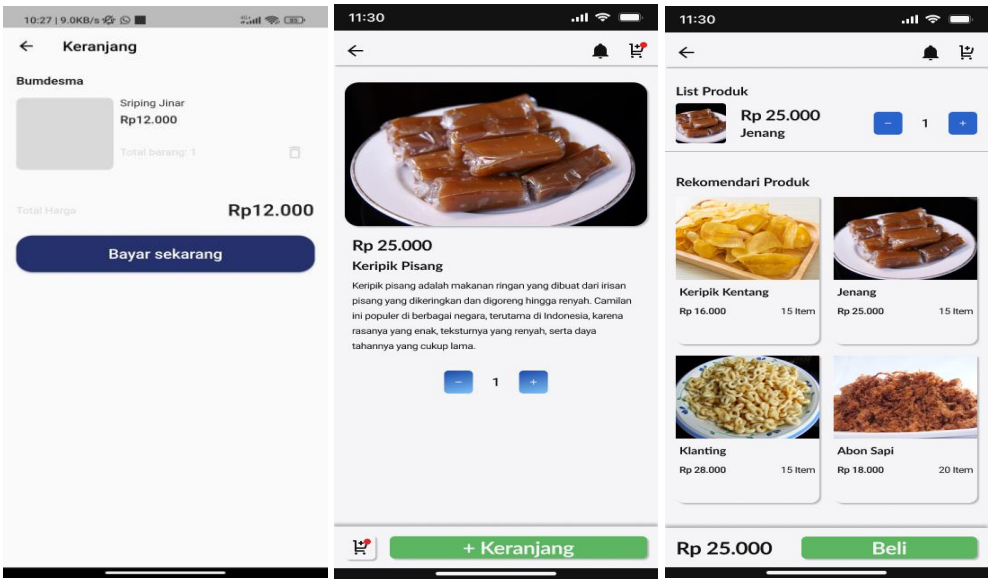

Figure 7. Buy Feature design before and after redesign

3.3.4 Purchase and Selling History

The transaction history feature is an important element in marketplace apps as it provides a chronological record of users' economic activities. The original version of the Waroeng Kita application featured separate menus for purchase and sales history, as depicted in Figure 8. In contrast, the redesigned interface consolidates all transaction records—both purchases and sales—into a single, unified view. The aim is to simplify the access flow and make it easier for users to monitor all their economic activities in one place. To avoid confusion between transaction types, visual distinction is applied through the use of a consistent color scheme:

a. Purchase transactions (incoming goods from BUMDes) are marked in red or orange, which visually reflect the expenditure.
b. Sales transactions (goods going out to other parties) are given a green color, which is commonly associated with income.

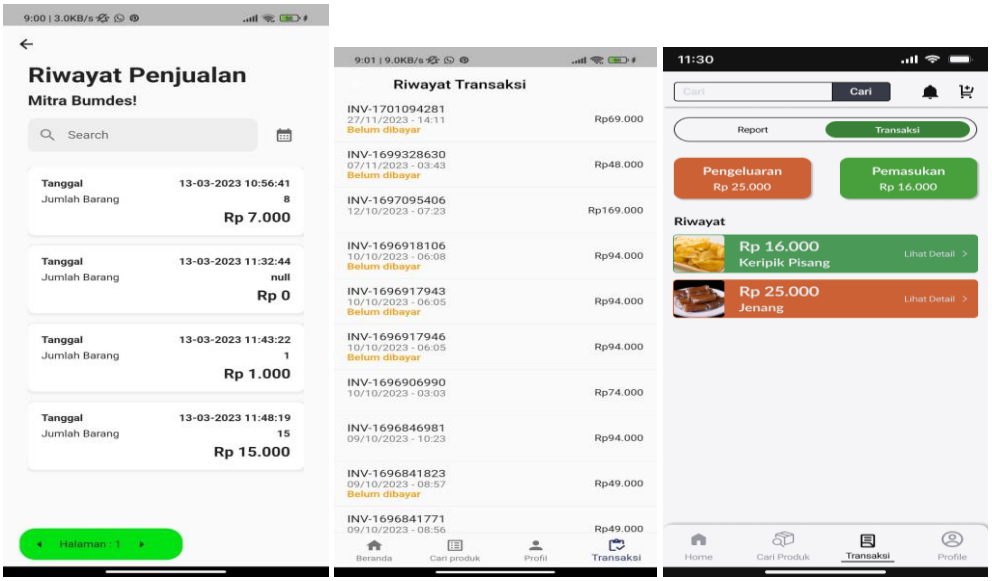

Figure 8. Purchase and Selling History design before and after redesign

The addition of color is not just an aesthetic element but serves as a visual cue system that accelerates user perception and understanding without having to read the details of each entry. In addition, a simple icon such as an arrow to the side with the phrase "View Details" to view the details of the transaction.

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3.3.5 Inventory

The Inventory feature is a crucial part of the Waroeng Kita application as it serves as a product management center for BUMDes partners. In the initial version of the application, the process of inputting items into the inventory was inefficient and unintuitive. The fields were not clearly labeled, the order of input was not logical, and the visual design for the list of items already in inventory was too unstructured.

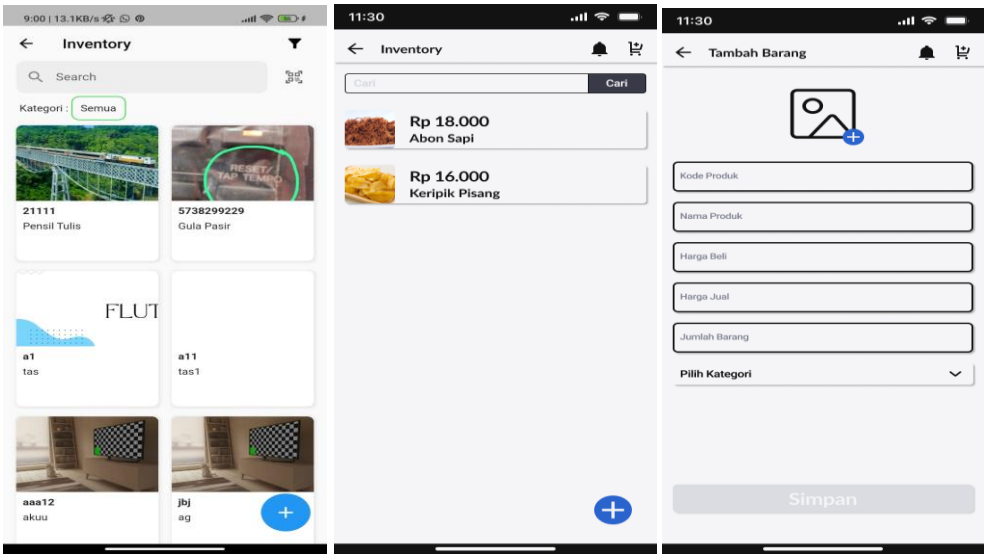

Figure 9. Inventory design before and after redesign

The redesign began with redesigning the item input form to make it more compact and easier for users to understand. Each input field is clearly labeled, such as: Item Name, Item Code, Category, Purchase Price, Sell Price, and Stock Quantity. Fields that were previously hidden or ambiguous are now explicitly displayed as shown in Figure 9. After the items have been inputted, the items that have entered the inventory are now displayed in the form of redesigned cards with a new information hierarchy structure. In the previous design, images were displayed predominantly, In the new design, price information is now the main focus: The selling price is displayed in a larger, contrasting font at the top of the card, followed by the name of the item below it and the image of the item is shown sparingly. By placing the price in the most prominent position, users can quickly compare values between products without having to open the details one by one.

3.3.6 POS

The POS (Point of Sale) feature in the Waroeng Kita application serves as a tool for direct sales transactions conducted by BUMDes partners at the store. As a feature that supports the cashiering process, POS should be designed to be efficient, fast, and easy to understand, especially by users with varying levels of technological literacy. However, in the initial version of the application, the use of the term “POS” on the main page caused confusion, as not all users were familiar with the term. In addition, the existing transaction flow was too complicated, thus slowing down the service process in the store.

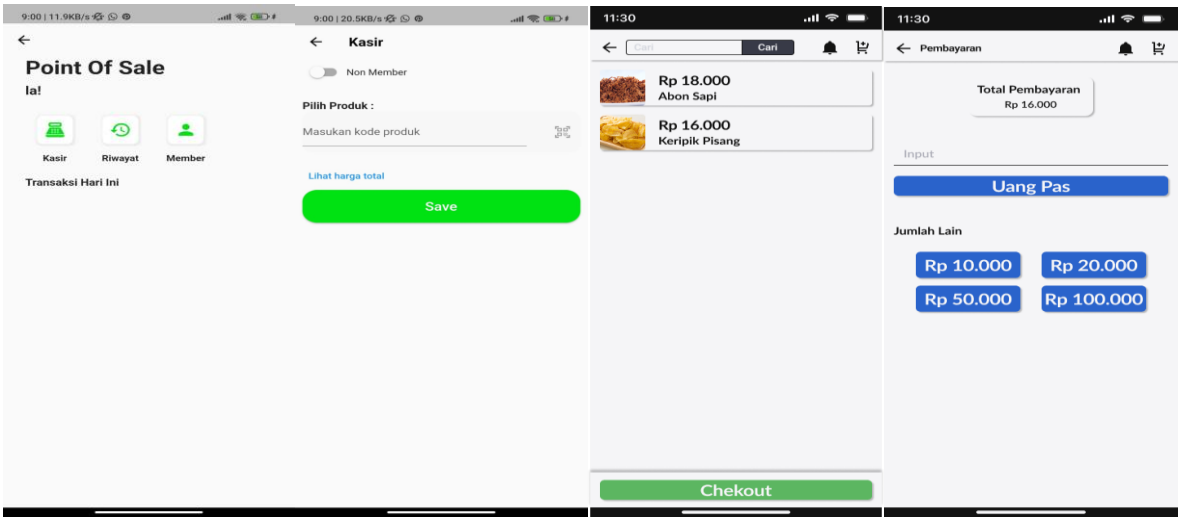

Figure 10. POS Design before and after redesign

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The transaction flow in the redesign, POS feature was redesigned to follow the cashier's work steps that are commonly done in the field. products have their own list and can be searched using the item name not just the product code. The design is also equipped with an automatic calculation system, so that the total price is immediately visible after the product is added. If the customer pays in cash, the app displays the payment suggestion or the user can enter the amount manually and the app displays the change amount instantly as shown in Figure 10. This helps cashiers reduce errors and speed up customer service.

On the Home page, the feature previously labeled as “POS” is now changed to “Cashier”. This change aims to improve users' understanding of the feature's function. Based on the results of testing and interviews, many users are confused by the term “POS” because it is considered a technical term. The word “Cashier” is more commonly used in daily practice and directly describes the purpose of the feature.

3.3.7 Profile

The Profile feature in an application serves as the center of user identity and personal data management. The Profile feature in an application serves as the center of user identity and personal data management. In the initial version of the Waroeng Kita app as shown in Figure 11, the profile view is very minimalistic and users only see an email address without name or location details, and features such as printer settings or data updates are not explicitly available. The Log Out button is also displayed without a clear visual hierarchy.

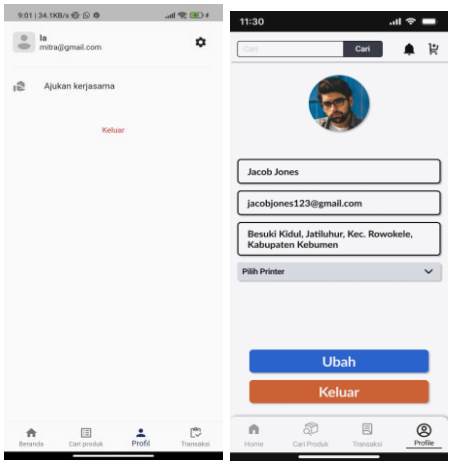

Figure 11. Profile design before and after redesign

In the redesigned version, the structure and appearance of the profile page was revamped. User information is now displayed in a complete and structured manner, including username, email, and store address. The layout of elements is made vertical with enough space between elements (white space) to improve readability and visual comfort. The Change button is added with a blue color design and a clear button shape, giving a strong affordance that the element is clickable. The Logout button is positioned at the bottom of the page with a orange color that differs from the other main action buttons. This is done to highlight the logout function as an important action, but still avoid being accidental. This visual hierarchy also follows modern interface conventions, where destructive actions or system exits are visually distinguished. After the High-Fidelity Design stage is complete, each interface component is integrated into an interactive prototype that the user can interact with as shown on Figure 12.

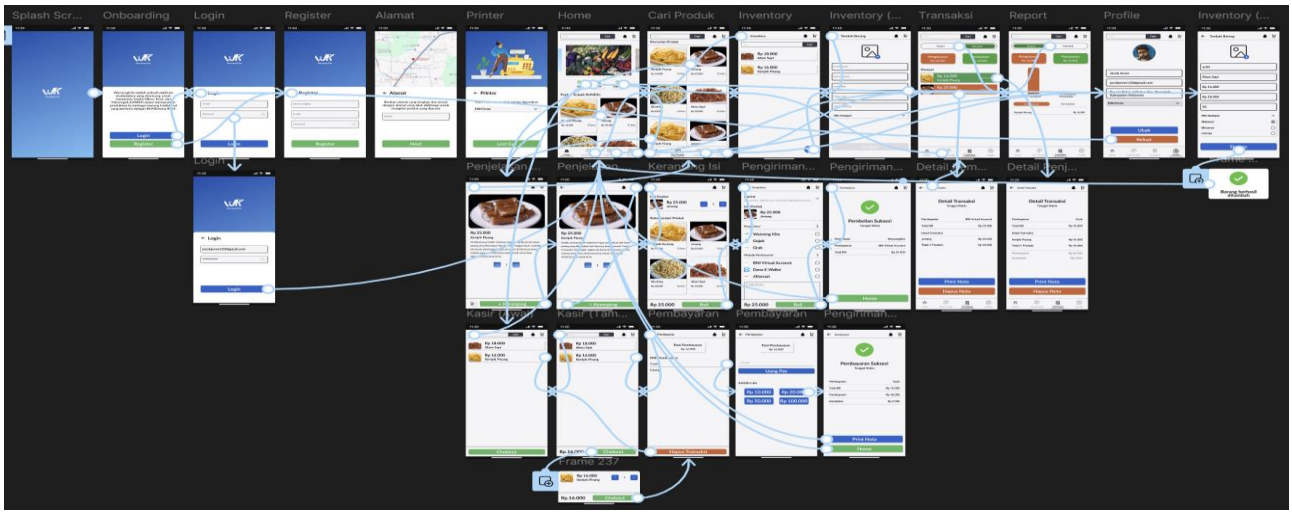

Figure 12. Prototype Design on Figma

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Once the interface prototype design has been developed and linked into the application prototype in Figure 12, the next step is to ensure that the UI development process follows basic principles and rules that support design testability and understandability. These rules serve as important guidelines in building prototypes that not only represent user interactions realistically, but also facilitate the usability evaluation process [8]. To ensure the prototype was testable and understandable, its development adhered to the fundamental rules listed in Table 8.

Table 8. Stages of UI development

No	Rules
1	Ensure that any part of the UI that may move or be moved is movable.
2	Create links for each major UI component you are testing.
3	No hidden functions in the UI prototype.

3.4 Design Evaluations

Following the development of the prototype, the research advanced to the prototype interview stage, where participants tested the new user interface changes so that their feedback could be recorded. Each participant was directed to complete a set of predetermined tasks using the redesigned prototype and then subsequently filled out the System Usability Scale (SUS) questionnaire.

3.4.1. First Iterations

The quantitative results from the first round of usability testing are presented in Table 9, showing the initial impact of the redesign.The first design iteration produced an average SUS score of 56.5. Based on SUS benchmarks, this score places the system at Grade D, corresponding to an "OK" adjective rating and falling into the "Marginal" acceptability category.

Table 9. SUS Score on the first iteration

Respondent	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Score
R1	5	3	3	5	5	1	4	4	4	5	57.5
R2	5	5	5	5	5	1	5	1	5	5	70
R3	4	3	3	3	4	3	3	4	3	5	45
R4	5	5	5	5	5	2	5	1	5	5	67.5
R5	3	3	3	5	4	3	3	3	3	5	42.5
					Total						282.5
					Averages						56.5

These results indicate that while the system still required improvement, users began to perceive significant changes in usability. In addition to quantitative evaluation, qualitative feedback was also collected. Table 10 summarizes the insights gathered from users, which highlighted two primary issues: the need for more familiar Indonesian terminology and the inclusion of a buying price field to improve inventory input logic. Both issues were rated as having a high impact and were addressed in the second design iteration.

Table 10. User Feedback

Respondent	Feedback	Actions	Impact
R2	the names of the features needed to be in common Indonesian language	Rename the features to a more common Indonesian name.	High
R2	on the input new item in Inventory, it needed a buying price so the seller new how much profit to store is making	Add a Buying price in addition to selling price for the store for an easier bookkeeping	High

3.4.2. Second Iterations

Following the improvements made based on the first iteration feedback, the second iteration of testing was carried out with six respondents. As summarized in Table 11, the second testing iteration demonstrated considerable progress, achieving an improved average SUS score of 70. This score corresponds to Grade C, maintaining the “OK” adjective label but now reaching the second quartile, signifying a more consistent and acceptable level of usability.

Table 11. SUS Score on the second iteration

Respondent	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Score
R1	5	1	5	5	5	1	5	2	2	5	70
R2	5	1	5	2	5	1	3	2	5	3	85
R3	4	4	4	3	3	3	3	3	3	4	50
R4	5	5	5	4	5	2	4	1	5	5	67.5
R5	5	1	5	2	5	1	5	1	4	4	87.5

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Respondent	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Score
R6	5	3	3	3	3	2	4	1	3	5	60
					Total						420
					Averages						70

The positive trajectory observed in both the average and minimum scores suggests that the implemented refinements—specifically, the introduction of clearer feature labels and an enhanced item input workflow—had a beneficial impact on the user experience. To offer a more comprehensive visualization of this evaluation process, Figure 13 displays the distribution of SUS scores across the three distinct testing phases (pre-redesign, first iteration, and second iteration) by means of boxplot diagrams [21]. This graphical representation highlights not only the improvement in average scores but also the reduction in variability, indicating more consistent user satisfaction.

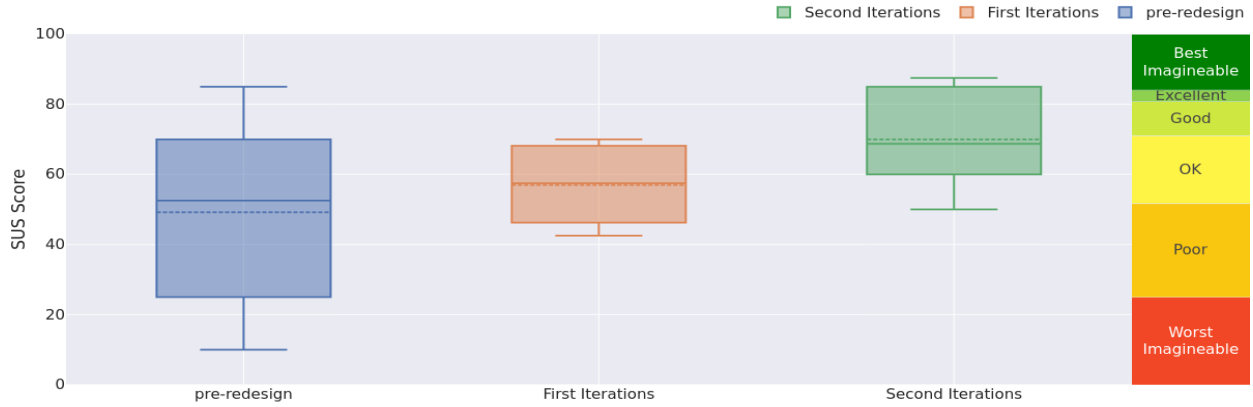

Figure 13. Boxplot SUS Evaluation

The pre-redesign (blue) has a very wide distribution of scores, with a very low minimum score (10) and a maximum score of 85. This indicates a high variability of perceptions among users. Many respondents gave ratings below 50, which according to the SUS adjective scale falls into the "Poor" and "Not Acceptable" categories. This low score reflects that the initial interface of Waroeng Kita contains various usability issues, such as:

a. Confusing navigation, unclear task flow structure.
b. Unfamiliar terminology
c. The lack of dynamic feedback.

Users feel that the system is not intuitive and does not provide an efficient experience in daily use.

After the first iteration of the interface design (based on the user pain points in the previous stage), there was an increase in the mean and median scores, and a drastic decrease in the standard deviation. This indicates that the system is starting to be easier to use and user perceptions are becoming more consistent. However, the maximum score only reached 70 and most were still in their 50s. Although the system is starting to be acceptable (Marginal), there are still many aspects that require improvement, such as needing to use more familiar terms. The design at this stage has made progress but has not fully resolved the main usability issues.

The second iteration was the result of design refinements based on direct feedback from users in the previous test. At this stage, there was a significant increase in scores, both on average and in distribution. The median was close to 70, indicating that most users rated the system in the positive category. There is an important feature of the second iteration results which is

a. Almost all scores were above 50, close to the "Good" threshold according to the SUS scale.
b. Score variation remains stable and under control.
c. Scores are now in the 2nd quartile, which is the minimum acceptable level in digital product design.

Although the system has not reached Grade A or B, design validity has been achieved, and the platform is considered feasible to use by the majority of users, especially in the context of users in rural areas and the MSME/BUMDes sector.

4. CONCLUSION

This research has effectively shown the value of applying the User-Centered Design (UCD) method to enhance the usability of Waroeng Kita, a local marketplace platform developed to facilitate digital transactions for BUMDes and MSMEs. The preliminary assessments uncovered several critical usability flaws, which included a lack of dynamic interaction feedback, a poorly organized navigation structure, and design elements that were not intuitive to users. Using UCD's iterative process, key features such as the cart, inventory, login, and profile screens were redesigned based on user feedback and contextual observations. A noteworthy improvement in the System Usability Scale (SUS) score was recorded over two testing iterations, rising from an initial 49.16 to a final 70. This increase shifted the system's classification from "Not Acceptable" to "Marginally Acceptable". Visual and structural redesigns—such as simplified

transaction flows, clearer terminology, and prioritized information hierarchy—contributed to better comprehension and task completion among users. These results confirm that UCD is a potent methodology for creating inclusive digital systems specifically designed for rural and low-tech user demographics. Recommendations for future research include the exploration of expanded features—such as inventory analytics and offline functionality—and conducting long-term assessments of the platform's impact on the digital literacy and economic success of participating MSMEs [22].

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