

DESIGNING THE UI/UX OF A MOBILE-BASED ULOS E-COMMERCE APPLICATION TO IMPROVE ACCESSIBILITY AND SALES USING THE UCD METHOD

Holfes Rivaldi Sitanggang¹, Heni Wulandari², Hermansyah³

^{1,2,3}Universitas Pembangunan Panca Budi

Email :¹holfesbinjai@gmail.com ²heniwulandari04@gmail.com ³hermansyah@pancabudi.ac.id

ARTICLE INFO

Keywords:

(UI/UX, mobile application,
ulos sales, User-Centered
Design, accessibility)

ABSTRACT

Ulos has high cultural and economic value, but its market accessibility in the digital era is still limited due to the dominance of conventional sales. The Yusnita Tenun Uwis Nipes SME in Binjai City faces obstacles in online marketing and a lack of specialized platforms that provide accurate product information. This study aims to design the user interface (UI) and user experience (UX) of a mobile-based ulos e-commerce application to expand market reach and increase sales conversion. Using a User-Centered Design (UCD) approach, this study ensures that the application is designed according to user needs and preferences to be more intuitive and user-friendly. The results of this design are expected to increase product visibility, facilitate digital transactions, and support the preservation of Ulos culture through adaptive technology.



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

Corresponding Author:

Holfes Rivaldi Sitanggang
Universitas Pembangunan Panca Budi
Email: holfesbinjai@gmail.com

INTRODUCTION

Ulos is a traditional woven fabric that has high cultural, historical, and economic value in Indonesia, especially in North Sumatra. This fabric is often used in traditional ceremonies, such as weddings, funerals, and other important events, and is a handicraft product that is sought after by domestic and international tourists[1]. However, ulos is still mostly sold conventionally through traditional markets and offline stores, which limits accessibility for consumers outside the production area. The main challenges include limited geographical reach, lack of accurate product information (such as materials, motifs, and prices), and difficulties in marketing ulos to the global market. This has led to a decline in ulos sales, especially amid competition from modern textile products that are more easily accessible through digital platforms.

A case study of Yusnita Tenun Uwis Nipes, a small and medium-sized enterprise (SME) in Binjai City that focuses on producing ulos with unique patterns and high-quality materials, shows great potential for e-commerce development. Yusnita Tenun Uwis Nipes Facing

obstacles such as limited online marketing, the lack of a dedicated digital platform for ulos, and challenges in reaching young consumers who are more familiar with mobile technology. A well-designed mobile-based e-commerce application can increase the visibility of ulos products, expand the market, and support cultural preservation[2]. Therefore, the design of the UI/UX of the ulos e-commerce application using the UCD method is necessary to ensure that the application is not only functional but also user-friendly, thereby significantly increasing accessibility and sales[3][4]. This study aims to address this gap through a user-centered design approach, with the hope of having a positive impact on ulos SMEs such as Yusnita Tenun Uwis Nipes[5].

In today's digital age, mobile-based e-commerce has proven effective in increasing the accessibility of local products and boosting sales[6]. Mobile applications allow consumers to shop anytime and anywhere, with features such as interactive product catalogs, customer reviews, and digital payment integration[7]. However, many existing e-commerce applications are not yet optimal in terms of user interface (UI) and user experience (UX) design, often failing to attract users or facilitate navigation[8][9]. This problem is exacerbated by the lack of a user-focused design approach, such as the User-Centered Design (UCD) method, which emphasizes understanding user needs, behaviors, and preferences from the outset of the design process[10][11]. Without UCD, applications can become less intuitive, resulting in low sales conversion rates and poor user experiences. The User-Centered Design (UCD) approach is highly relevant and crucial in mobile application interface development because it places the user as the main focus in every stage of design[12][13][14]. This method helps create interfaces that are responsive and adaptive to user needs and preferences, thereby increasing user engagement and convenience when shopping for ulos products through digital platforms[15][16]. An aesthetic and intuitive UI (User Interface) and a smooth UX (User Experience) that facilitates the transaction process can improve first impressions, trust, and customer loyalty, all of which have a positive impact on sales growth[17][18].

RESEARCH METHOD

This study uses the User-Centered Design (UCD) method as the main framework for designing the UI/UX of a mobile-based ulos sales application. UCD is an iterative approach that places users at the center of the design process, with four main stages: Specify the Context of Use, Specify User Requirements, Design Solution, and Testing[19][20]. This method was chosen because it allows for the collection of data directly from potential users, such as ulos buyers (consumers) and local sellers (artisans), to ensure an intuitive, accessible, and effective design that will increase sales. Data was collected through online surveys, in-depth interviews, field observations, and prototype testing, with a sample of 20 respondents from various user groups. This process was carried out iteratively, where the results of one stage influenced the next stage, to produce an optimal solution[21][22].

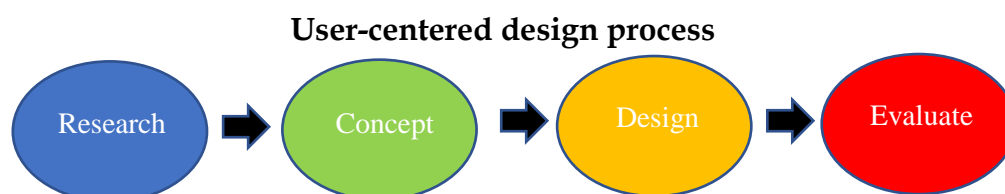


Figure 1. UCD Stages

Specify the Context of Use

The first stage in the User-Centered Design (UCD) method is to gain a deep understanding of the environment and conditions in which the product or system will be used. This stage aims

to identify the main users (user personas), their characteristics (such as age, technical abilities, and goals), the tasks they need to complete, and the devices, technologies, and physical or social environments where interactions take place. By defining this context, designers can create solutions that truly match the users' reality, rather than relying solely on assumptions.

Specify User Requirements

The next stage is to formulate the functional and non-functional requirements of users. These requirements are obtained from an in-depth analysis of user goals, the obstacles they face, and the results they expect from the product. Requirements can be desires that can increase user satisfaction. These specifications become the main reference and benchmark for design success, ensuring that every feature developed has a strong foundation in real user needs.

Design Solution

At this stage, the design team begins to create solutions based on the defined context and requirements. This process is iterative and gradual, starting from rough concepts (such as sketches or wireframes) which are then developed into more detailed prototypes, both static and interactive. The design focuses on meeting user needs with an intuitive interface, logical task flow, and a pleasant user experience.

Evaluate

The evaluation stage is conducted to test whether the design meets user needs and is suitable for its intended context. Evaluation can take the form of testing with real users (usability testing), review by experts (heuristic evaluation), or other methods. The feedback collected is analyzed to identify problems, gaps, or opportunities for improvement. The results of this evaluation are then used to refine the design repeatedly before the product is finally launched. This process ensures that the final product is truly effective, efficient, and satisfying for users

RESULTS AND DISCUSSION

Planning Stage

Table 1. Interview and Observation Results

Informants	Conditions Experienced	Expectation
Craftsmen/Sellers	<ol style="list-style-type: none"> 1. Ulos sales are conducted conventionally (sold in traditional markets). 2. Ulos display using statues/hangers 3. Ulos promotion is carried out by shouting (using voice). 4. Decline in sales due to limited access 	<ol style="list-style-type: none"> 1. An online ulos sales app has been created 2. Ulos catalog feature to showcase products easily. 3. Advertising and content creation for promotion 4. An easy-to-use application
Buyers	<ol style="list-style-type: none"> 1. Limited access to reach ulos shop. 2. Difficulty to find information about ulos prices 3. The transaction that is still manual (pay directly at the store) 4. Difficult to find different types of ulos 	<ol style="list-style-type: none"> 1. Requires ulos sales application. 2. Ulos catalog feature 3. Transfer or COD (cash on delivery) feature 4. Search/category feature to find types of ulos

Table 1 shows the results of interviews with sellers and buyers, indicating that ulos sales have traditionally been conducted in a traditional manner (sold at traditional markets). The difficulty and limited access to ulos have led to a decline in ulos sales. As a solution and hope for sellers and buyers, an online ulos sales application is needed to facilitate the sale and purchase of ulos.

Specify the Context of Use

Table 2. Identification Results

User	Description
Seller	As the manager of the smooth operation of the entire sales system, responsible for product management and updates to product details, managing product orders.
Customers	Users of the Ulos E-commerce Application can access all features available on the website, add, remove, and update products in the Shopping Cart, and make fast and secure payments

Table 2 above outlines the steps for identifying users of the Ulosku Application as an effort to understand their characteristics. This stage consists of two processes: user identification and user characteristics.

Table 3. User Characteristics

User Characteristics
Frequent Online Shoppers (app)
Interested in and knowledgeable about Ulos
Minimum age of 17
Knowledgeable about the Internet
Physically and mentally healthy

In Table 3, after identifying users, the next step is to understand the characteristics of users, namely people who frequently shop online. Interested in and knowledgeable about ulos, minimum age of 17 years old, knowledgeable about the internet, and physically and mentally healthy.

Specify User Requirements

Table 4. User Requirements

User	Requirements
Seller	<ol style="list-style-type: none"> 1. Mobile-Based Application 2. Responsive display 3. Features Manage customer data 4. Features for uploading photos of ulos to be sold 5. Features for order validation 6. Order details feature 7. Messaging feature
Customers /Buyers	<ol style="list-style-type: none"> 1. Mobile-based application 2. Responsive display 3. New account/customer registration feature. 4. Ulos catalog feature (types of ulos) 5. Search feature 6. Messaging feature 7. Ulos description feature 8. Shopping cart feature 9. Payment transaction feature 10. Order details feature

This stage focuses on gathering and analyzing specific user needs to ensure that the application meets their expectations.

- Using interview and survey techniques: Collecting data from 20 respondents about their preferences, current problems (e.g., difficulty finding authentic ulos or complicated purchasing processes), and expectations for the application, such as ease of navigation and payment features.
- Identifying functional requirements: Features such as a product catalog with filters (based on price, pattern, or location), ulos search, chat integration with sellers, and promotional notifications.
- Identifying non-functional requirements: The design must be responsive (suitable for various screen sizes) and secure (personal data protection). Persona analysis and user scenarios were created to prioritize needs, such as ease of use for elderly or less tech-savvy users.

Design Solution

This phase involves developing a prototype based on the defined needs, with iterations to refine the design.

- Creating UserFlow, wireframes, and mockups: Using tools such as Figma to design the initial UI, including the main screen (homepage with ulos product highlights), catalog page, shopping cart, and checkout. The UX design emphasizes a simple flow, such as 3-5 steps to complete a purchase.
- Integrating cultural elements: Incorporating authentic ulos visuals (motifs, traditional colors) to increase engagement, while ensuring intuitive navigation with clear icons and text.

- Iterating based on initial feedback: Brainstorming with the design team and revising low- fidelity prototypes to address issues such as information overload or accessibility difficulties.

UserFlow

User flow is a process of organizing the steps that users will take when interacting with a website. The initial stages involve logging in or registering as a user to be able to shop using the Ulosku app.

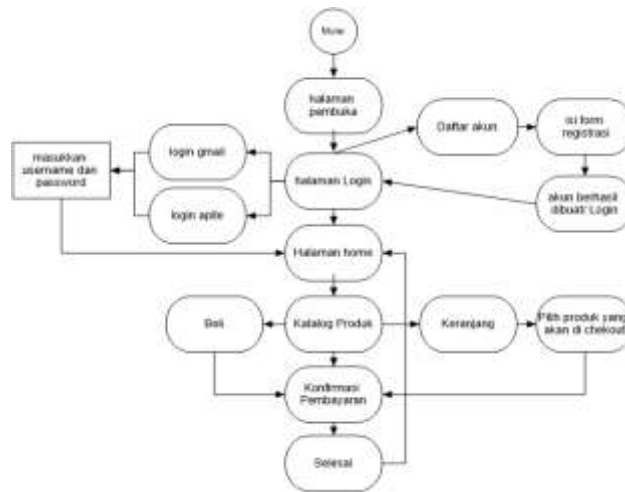


Figure 2. UserFlow

WireFrame

Creating a sketch of the application structure that includes the main page, login page, product catalog, product detail page, and checkout. Wireframe is a basic display on UI/UX. It is an illustration or framework that can provide a rough picture of each page.



Figure 3. Wireframe Design

Prototype

The next step is the prototype. A prototype is a design model created, so that users can see and try out the applications features before the application is actually completed. Below is the designed user interface of the Ulosku application.



Figure 4. Home Page

Figure 4 above shows the home page of the Ulosku application. Users can press start and next to proceed to the login page.

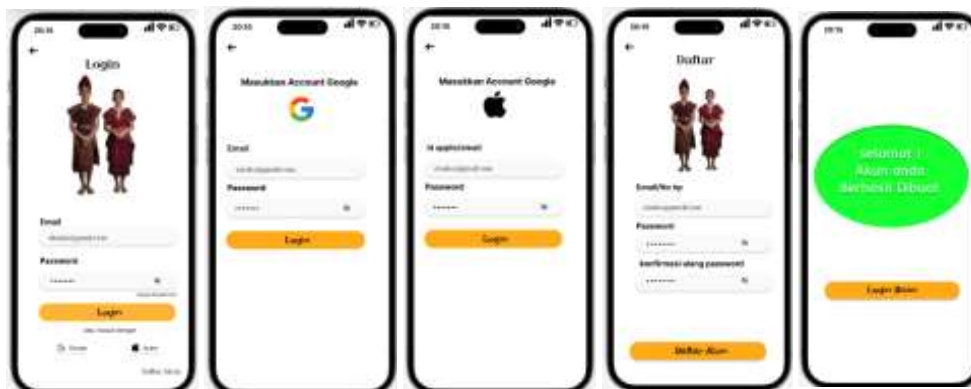


Figure 5. Login and Registration Page

Figure 5 above shows the login and registration page. Users can log in using their Gmail or Apple account. If users do not have an account, they can create one in the "Register Account" menu.





Figure 6. Home page and Product Catalog

Figure 6 above shows the home page and product catalog. On the home page, users can see the types of ulos and the latest notifications. On the catalog page, users can see the variety of ulos, descriptions of each type of ulos, and the prices of ulos.

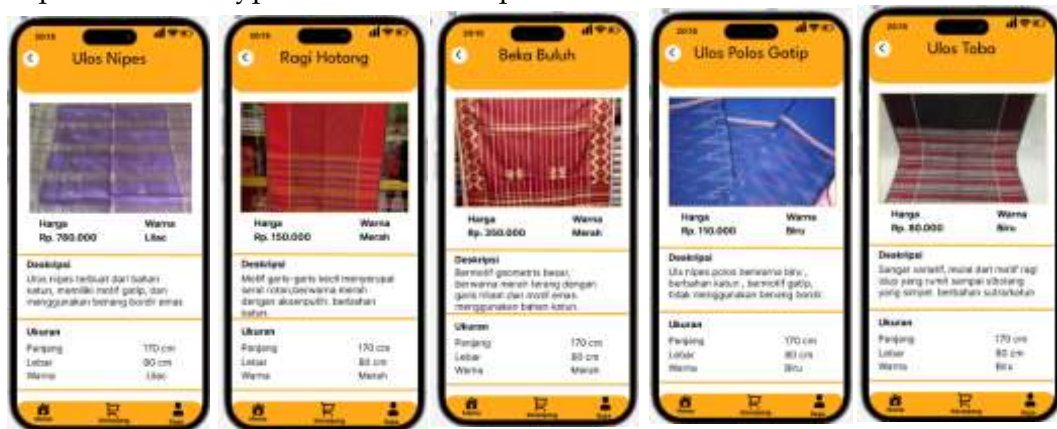


Figure 7. Product detail page

Figure 7 above shows the product detail page. Users can view the specifications of the ulos they are looking for and order or add the product to their shopping cart.



Figure 8. Payment and shopping cart page

Figure 8 above shows the payment and cart page. If users have selected ulos and want to make a payment, the payment confirmation page will appear, where they can select the payment method to be used. If users add products to the cart, the "My Cart" page will appear.



Figure 9. Profile, Settings, Chat, Notifications

Figure 9 above shows the profile and settings page. If the user wants to change their personal data, the profile display will appear. If the user wants to change their password, log out, or manage their account, they can select the settings page. If the user wants to contact the seller, they can select the seller chat menu, and the notification menu.

Evaluate

SUS (System Usability Scale) is a measurement tool used to assess the extent to which a system or product can be used easily and effectively by users. After collecting data through an online questionnaire from 20 respondents, the results obtained are as follows.

Table 5. Initial Respondent Data

(R) Responden	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
R 1	5	2	4	1	4	2	4	2	4	1
R 2	4	2	4	1	4	2	4	2	4	1
R 3	5	3	4	5	4	4	4	4	4	4
R 4	5	1	5	1	5	1	5	1	5	2
R 5	4	3	4	1	5	3	4	3	4	3
R 6	5	1	5	1	5	1	5	2	5	3
R 7	4	2	4	2	4	2	4	2	4	2
R 8	4	1	5	3	5	3	4	3	3	3
R 9	5	2	4	2	4	3	4	3	4	2
R 10	4	3	4	3	4	3	4	5	4	1
R 11	4	2	5	3	4	3	4	3	1	2
R 12	4	1	4	3	4	2	4	3	3	1
R 13	5	3	5	1	5	3	4	3	4	1
R 14	4	3	5	3	5	2	4	3	4	3
R 15	4	3	4	3	5	3	4	3	1	1
R 16	4	2	5	5	4	1	4	2	5	3
R 17	5	2	4	3	4	2	4	2	4	3
R 18	4	3	5	1	5	2	4	3	4	3
R 19	4	3	4	3	5	1	4	3	4	1
R 20	5	3	4	1	4	2	4	3	5	3

The table above the initial data in the from of responses from 20 respondent to 10 statements In the SUS questionaire. This data is raw scores using a 1-5 likert scale. This raw data will then

be processed using the SUS Score conversion formula to determine the level of application usability objectively. As show in the table below.

Tabel 5. Sistem Usability Scale

(R) Responden	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Jumlah	Nilai (Jumlah X 2.5)
R 1	4	3	3	4	3	3	3	3	3	4	33	82,5
R 2	3	3	3	4	3	3	3	3	3	4	32	80
R 3	4	2	3	0	3	1	3	1	3	1	21	52,5
R 4	4	4	4	4	4	4	4	4	4	3	39	97,5
R 5	3	2	3	4	4	2	3	2	3	2	28	70
R 6	4	4	4	4	4	4	4	3	4	2	37	92,5
R 7	3	3	3	3	3	3	3	3	3	3	30	75
R 8	3	4	4	2	4	2	3	2	2	2	28	70
R 9	4	3	3	3	3	2	3	2	3	3	29	72,5
R 10	3	2	3	2	3	2	3	0	3	4	25	62,5
R 11	3	3	4	2	3	2	3	2	0	3	25	62,5
R 12	3	4	3	2	3	3	3	2	2	4	29	72,5
R 13	4	2	4	4	4	2	3	2	3	4	32	80
R 14	3	2	4	2	4	3	3	2	3	2	28	70
R 15	3	2	3	2	4	2	3	2	0	4	25	62,5
R 16	3	3	4	0	3	4	3	3	4	2	29	72,5
R 17	4	3	3	2	3	3	3	3	3	2	29	72,5
R 18	3	2	4	4	4	3	3	2	3	2	30	75
R 19	3	2	3	2	4	4	3	2	3	4	30	75
R 20	4	2	3	4	3	3	3	2	4	2	30	75
Jumlah											1472,5	
Nilai Hasil											73,625	

In the SUS calculation, the average score of each respondent was obtained by adding up all the scores and dividing them by the number of respondents, resulting in a SUS score of 73,625. This falls into the *GOOD* category, which means it is acceptable or usable, as shown in the SUS graph below.

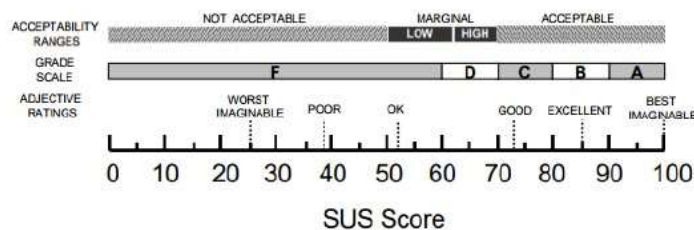


Figure 10. SUS Score Graph

CONCLUSION

Based on testing using the System Usability Scale (SUS), the UI/UX design of the Ulos e-commerce application received an average score of 76.25. This result falls into the "Good" category and is at an "Acceptable" level, which means the application is fit for use. Thus, the application of the User-Centered Design (UCD) method has proven effective in creating an

intuitive and functional interface that supports marketing and digital transactions for Ulos SMEs.

REFERENCES

- [1] J. Sadewa, P. Ilmu, I. Sosial, A. N. Febrianti, U. Muhammadiyah, and S. Utara, "Peran Kearifan Lokal dalam Melestarikan Kain Ulos Sebagai Warisan dan Budaya Batak Toba," vol. 3, no. Takari 2015, 2025.
- [2] R. S. Dewi, I. S. Wijaya, and D. Fitri, "Dampak E- Commerce Terhadap Perilaku Konsumen Dan Strategi Bisnis," vol. 1, no. 2, pp. 56–66, 2022.
- [3] P. Z. Dinata, M. A. Urwah, M. R. Rahmawan, and E. Junaeti, "Perancangan UI / UX pada web e- commerce ' Hallo Coffee ' menggunakan metode user-centered design," vol. 5, no. 1, pp. 45–58, 2023, doi: 10.37905/jji.v4i2.17511.
- [4] D. Setiawan, W. Yulianti, and U. Abdurrah, "Aplikasi Joged (Jamoe Gendong) Berbasis Mobile Dengan Pendekatan UCD," vol. 2, no. 2, 2022.
- [5] R. S. Hutabarat and K. Sudaryana, "User-Centered Design pada User Interface (UI) / User Experience (UX) Prototyping Aplikasi E-Commerce," 2024.
- [6] D. A. Fatah, R. M. Yusron, I. D. Febrianti, O. Maria, and A. Husnah, "PENERAPAN METODE USER-CENTER DESIGN (UCD) UNTUK E-COMMERCE INDUSTRI KREATIF," vol. 10, no. 1, pp. 31–40, 2021.
- [7] A. Informatics, A. Info, and U. C. Design, "Penerapan Ui / Ux Dengan User Centered Design Pada Aplikasi Android Penjualan Pada Toko Nataz Collection," vol. 06, no. 03, pp. 372–380, 2023.
- [8] M. H. Hamdanuddinsyah, M. Hanafi, and P. Sukmasetya, "Perancangan UI / UX Aplikasi Buku Online Mizanstore Berbasis Mobile Menggunakan User Centered Design," vol. 4, no. 4, pp. 1464–1475, 2023, doi: 10.47065/josh.v4i4.3850.
- [9] J. M. Polgan *et al.*, "Perancangan UI / UX Pada Website Percetakan di PT . Ikhtiar Berkah Menggunakan Metode User Centered Design (UCD)," vol. 14, pp. 1199–1208, 2025.
- [10] S. Wahyuni and V. Tasril, "Designing an Interactive Website Prototype Using HCD Method to Enhance Accessibility and Digital Experience on the ' SadeStudio ' Platform," pp. 1268–1278.
- [11] R. F. Wijaya and R. R. Putra, "Desain UI / UX Mobile App mengenai Pengelolaan Konten dengan Search Engine Optimization menggunakan Pendekatan User Centered Design," vol. 4, no. 2, pp. 1497–1502, 2025.
- [12] A. Informatics, R. Tarisa, S. Sauda, and A. Info, "User Interface and User Experience E-commerce Berbasis Mobile," vol. 06, no. 03, pp. 412–422, 2023.
- [13] M. Z. Syafiq, R. D. Arista, T. Informasi, U. Pembangunan, and P. Budi, "Desain UI / UX Aplikasi Rekam Medis untuk Meningkatkan Efisiensi dan Akurasi Data Pasien Medan Dental Center Cabang Johor dengan Metode User-Centered Design (UCD)," vol. 13, pp. 2534–2541, 2025.
- [14] A. Akbar, H. Kurniawan, F. Wadly, M. R. Alfarizi, U. Pembangunan, and P. Budi, "Design of a Motor Vehicle Tax Payment Management Information System with the Integration of a Lucky Draw Feature Based on UI / UX Figma," vol. 2, no. 3, pp. 111–115, 2026, doi: 0.61306/jitcse.
- [15] R. N. Ahmadi and I. A. Saputro, "PERANCANGAN UI / UX TOKO BAJU MANUVESHKO BERBASIS MOBILE," vol. 2, no. 3, pp. 952–960, 2025.
- [16] A. Karimullah, A. Rizal, A. Susilo, and Y. Irawan, "PUBLIK BERBASIS MOBILE DENGAN METODE USER," vol. 12, no. 3, 2024.
- [17] I. Yudistira and H. Wulandari, "Perancangan UI / UX Sistem Pemesanan Produk di PT . Total Karya Berkah Menggunakan Metode User-Centered Design," vol. 13, pp. 2592–2603, 2025.

- [18] M. S. Maulana, A. Sasongko, R. Dwi, and W. Romadhon, "HERBAL JAMUPURI MENGGUNAKAN METODE USER CENTERED DESIGN (UCD)," vol. 4, no. 2, pp. 128–131, 2023.
- [19] P. Studi, S. Informasi, and U. Bakrie, "PENGEMBANGAN TAMPILAN ANTARMUKA APLIKASI SURVEI BERBASIS WEB DENGAN METODE USER CENTERED DESIGN," pp. 106–114.
- [20] M. Metode and D. Thingking, "Ui/ux design of e-commerce applications at the bolu miranti store using the thinking design method desain ui/ux aplikasi e-commerce pada toko bolu miranti menggunakan metode desain thingking," vol. 8, pp. 464–471, 2025.
- [21] D. A. Titania, L. Kurniawati, and T. Haryanti, "Perancangan Desain UI / UX Sistem Informasi Pengarsipan Surat Menggunakan Metode User Centered Design," 2024, doi: 10.47002/metik.v8i1.686.
- [22] F. M. Alja, E. Daniati, A. Ristyawan, and K. Kunci, "PERANCANGAN UI / UX E-COMMERCE MENGGUNAKAN METODE USER CENTERED DESIGN (UCD) Abstraksi Keywords : Pendahuluan Tinjauan Pustaka Metode Penelitian," vol. 6, no. 1, 2024.