CENTIVE
VOL. 4, NO. 1, PP.1012-1023, DEC 2023
ISBN : 978-602-53004-0-0

Conference on Electrical Engineering, Informatics, Industrial Technology, and Creative Media 2023

Designing User Interface and User Experience on Ecoprint E-Commerce Mobile Application using Design Thinking Method (Case Study: Cimemo.id)

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Received on 09-11-2024, Revised on 18-11-2024, Accepted on 24-11-2024

Abstract

This research aims to design the user interface (UI) and user experience (UX) of a mobile-based e-commerce application for Cimemo.id, by applying the Design Thinking method. This approach is suitable for addressing challenges faced by Cimemo.id in introducing its ecoprint fashion products and improving user interactions through a structured, user-centered process. The test results show that the effectiveness of the application reaches 81.81%, which is categorized as very good. Additionally, the efficiency value of 0.039 indicates a very fast turnaround time. The implementation of the Design Thinking method helped design a more attractive and user-friendly interface, improving shopping convenience and user understanding of the ecoprint products offered. With this efficient and effective UI/UX design, the application is expected to strengthen Cimemo.id's competitiveness in the increasingly competitive e-commerce market.

Keywords: Design Thingking, E-Commerce, Ecoprint

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I. INTRODUCTION

Evironmental pollution due to industrial waste is a global problem that has yet to be resolved. In Indonesia, the industrial sector, including textiles, is one of the significant contributors to waste, according to data collected by the Ministry of Environment and Forestry (KLHK) there are 2,897 industries with hazardous waste that has the potential to endanger ecosystems and human health [1]. This encourages the emergence of awareness of the importance of environmental preservation and the growing trend of environmentally friendly products [2]. One innovation that supports this effort is the ecoprint technique, which is a technique of printing motifs on fabrics using natural materials such as leaves, flowers, stems, and twigs. The uniqueness of ecoprint lies in the use of natural materials and does not involve synthetic chemicals, making it an environmentally safe solution that does not pollute water, soil, or air [3]. Each motif produced by ecoprint has its own uniqueness, depending on the type and geographical location of the plants used.

In today's digital era, the development of information technology opens up great opportunities for the fashion industry to expand their market through e-commerce platforms. E-commerce platforms offer a number of advantages, such as ease of access, variety of products, and more competitive prices. This

development has helped drive the growth of the e-commerce industry in Indonesia [4], [5]. Previously, clothing purchases were generally made in person at physical stores, but the internet has changed this habit by facilitating online transactions [6].

Cimemo.id, a boutique located in Purwokerto, Central Java, was established in 2018 and focuses on ecoprinted fashion products. Although it has been operating for several years and has unique products, Cimemo.id faces challenges in introducing its products widely and attracting buyers. Based on an interview with the owner, Sugiarti, the main obstacles faced are the lack of attractiveness of the site interface and the difficulty in conveying information about the uniqueness of ecoprint, making it difficult for potential customers to understand the products offered [2]. In addition, many people still consider ecoprint as part of batik, although technically ecoprint is not batik [3].

Along with the need to introduce products more widely and increase transactions, Cimemo.id requires a website-based e-commerce system with effective and efficient user interface (UI) and user experience (UX) design. A good UI/UX design is expected to increase user comfort while shopping and provide a positive experience that can encourage customer loyalty [7]. In this research, the Design Thinking method was chosen because it is one of the methods with an approach used to design UI/UX with a focus on user needs. This process involves five stages, namely empathize, define, ideate, prototype, and test. Through this method, the author can more quickly understand user needs through experimentation, visualization, and prototype development. Design Thinking is often used because it helps generate effective solutions, especially for mobile-based applications such as Cimemo.id[8], which aims to increase customer satisfaction and encourage them to shop at Cimemo.id again.

II. RESEARCH METHOD

The Design Thinking method was used when creating the "Cimemo.id" application to answer user problems. The purpose of this method is to gather information about the problems faced by users to then create solutions. After finding ideas, the next step is to implement the design results[9]. Design Thinking has an iterative nature that allows improvements during the design stage if errors or problems are found in the results already achieved [10]. There are five steps in the design thinking method to generate more detailed data.

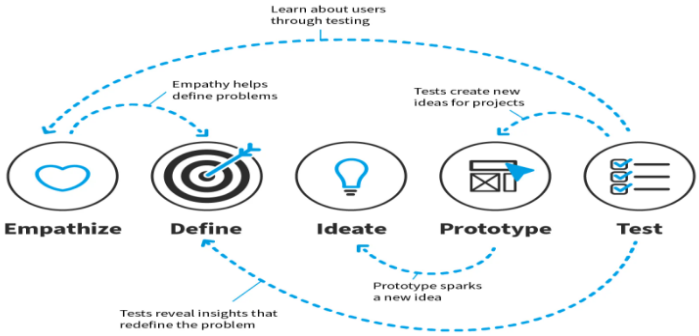


Fig. 1. Steps of the Design Thinking Method

A. *Empathize*

The purpose of empathy is to find out the needs of users so that researchers can empathize with users if they are in the same place and perspective. At this stage, potential users and owners (Stakeholders) are surveyed and interviewed [11].

B. *Define*

Define is the process of gathering all the information that has been collected during the empathize phase. Next, this information is evaluated to find the research topic. At this stage, the user's desire for the problem raised is identified by making How Might We Questions [12].

C. *Ideate*

The Design Thinking approach concentrates on the Ideate stage, which is the move from understanding the problem to solving it. At this stage, creative ideas are gathered and developed to solve the previously

defined problem. At this stage, concepts and solutions are designed to meet user needs. This process produces wireframes and User Flow, which is the process that users perform while using an application, starting from the beginning to completing the task [8].

D. Prototype

The next stage, after idete, is the protoype or initial design of a product. At this point, the author designs the next high-quality prototype, using various interactions on each page and using figma to implement the system design that has been used. The finished prototype will be observed and analyzed again before being disseminated to the public to find out how good and bad a medium is [11].

E. Testing

In the evaluation stage, the Usability Testing method is used to ensure the design is in accordance with user needs. Testing is carried out by involving users who have different characteristics and personas, and continues until the prototype meets the user's wishes. According to Justin Mifsud, there are usability metrics included in each category of usability aspects, namely:

1. Usability Metrics for Effectiveness

Completion rate is a way to determine effectiveness. Known as a fundamental usability metric, a value of '1' indicates the user's success in completing the task (direct success), '0.5' indicates the user completed the task but experienced problems, and '0' indicates failure. Effectiveness can be represented as a percentage using the following simple equation [13]:

$$Efectiveness = \frac{Number\ of\ tasks\ completed\ successfully}{Total\ number\ of\ tasks\ undertaken} \times 100\% \quad (1)$$

As shown in Table 1, the 1991 Ministry of Home Affairs R&D Reference Standard was used to interpret the results of the average percentage of respondents' success in completing the scenario tasks [14]

Table I. STANDAR UKURAN EFEKTIVITAS

No	Effectiveness Ratio	Achievement Rate
1	< 40%	very ineffective
2	40% - 59,99%	not effective
3	60% - 79,99%	moderately effective
4	≥ 80%	very effective

2. Usability Metrics for Efficiency

Efficiency refers to the period of time required by the user to complete the task, measured in seconds or minutes. The calculation of the time to complete a task can be done by subtracting the time when the task starts from the time when it finishes, following a simple equation to determine efficiency [13]:

$$Time\ Based\ Efficiency = \frac{\sum_{j=1}^{R}\sum_{i=1}^{N}\frac{n_{ij}}{t_{ij}}}{NR} \quad (2)$$

This formula shows the elements in the evaluation of tasks by users. N is the total number of tasks, R is the number of users, nij is the result of the i-th task by the j-th user, and tij is the time spent by the j-th user to complete the i-th task. This description helps analyze user performance based on results and completion time.

Furthermore, the time range in the time behavior indicator shown in Table 2 is used to interpret the average amount of time needed to complete the scenario task. This is done to determine the results of measuring the efficiency level of the application [14].

Table II. INTERVAL WAKTU PADA INDIKATOR TIME BEHAVIOR

No	Length of time	Qualification
1	60 – 300 *Second*	very fast
2	360 – 600 *Second*	fast
3	660 – 900 *Second*	slow

III. RESULTS AND DISCUSSION

This research will explore the results of applying the Design Thinking approach in designing the interface and user experience (UI/UX) of Cimemo.id application. The purpose of this research is to find creative ideas and problem solutions for the UI/UX design of Cimemo.id application. The Design Thinking implementation process consists of five stages.

A. Empathize

Empathy is the first step in using the Design Thinking method. At this stage, the author must understand the feelings, circumstances, and experiences of the user. This is done to identify the needs and problems that may be faced by users of mobile-based ecoprint e-commerce applications. The research method focused on the problems felt by the owners and users of cimemo.id. Users were interviewed to find out their problems and how to use the ecoprint e-commerce application. Next, the observation interview questions were entered into a table, as shown in table 3.

Table III. PERTANYAAN WAWANCA

Area	interview questions
user criteria	1. Participants who are interested in fashion products
	2. Participants who are interested in batik products / batik activities
	3. Participants who use online applications (e-commerce) in purchasing fashion products
	4. Participants who have an awareness of environmental issues
demography	1. How old are you?
	2. Where do you live?
	3. What are you currently doing?
psychography	1. Have you heard about Ecoprint before?
	2. If you have heard, do you know what ecoprint batik is?
	3. Where did you get the information about ecoprint batik?
	4. How much do you know about ecoprint batik?
	5. Are you interested in using ecoprinted batik products?
	6. If interested, what makes you interested in this ecoprint batik?
users' behavior and feelings	1. Have you ever done online shopping before, especially for fashion products?
	2. For purchase transactions, do you prefer to come directly to the place or through a mobile application?
	3. If there is a special application (e-commerce) for ecoprinted batik, would you use it?
	4. What is the reason you want to use the application of this ecoprint batik?
users need and challenges	1. If you prefer to use an app, what are your expectations from the app?
	2. What are your concerns or anxieties when using online apps for fashion products?

The research will then produce emphaty maps. Empathy maps, a summary of user information researched through interviews, are a way to show user needs. This empathy map illustrates users' preferences in buying batik. They consider ecoprint environmentally friendly and mobile apps practical, although they feel that the size and color of online products often do not match. Users tend to buy fashion once a month, prefer offline shopping, and switch to online if they have to. They want unique and eco-friendly products, and while they like online shopping, they still prefer to buy in-store. This map shows that users prioritize convenience, quality and trust in the shopping experience.

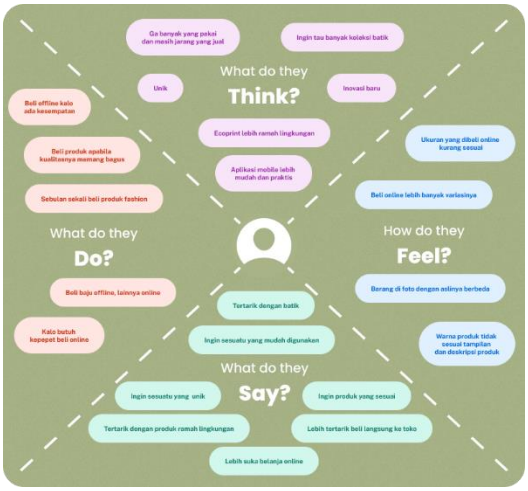


Fig. 2. Empathy Maps

Next, the author determines the Area Of Exploration to direct the focus on relevant topics, identify and understand the scope of the application to be created.

Table IV. AREA OF EXPLORATION

Area	Description
demography	1. Age 18 - 50 2. Male and Female
geography	Indonesia
psychography	1. Concerned about efficient environmental preservation. 2. Apply environmental awareness in daily life
users need and challenges	1. Interested in fashion products especially patterned ones such as batik 2. Using online applications to buy fashion products

B. Define

The define process is the process of identifying problems and user needs by collecting a list of user requirements from the previous stage. The definition stage is also used to find the core of the problem that can be formulated from the previous data. The author determines the description of users who will use the Cimemo.id application as an effort to remain user-centered before entering the ideation stage.

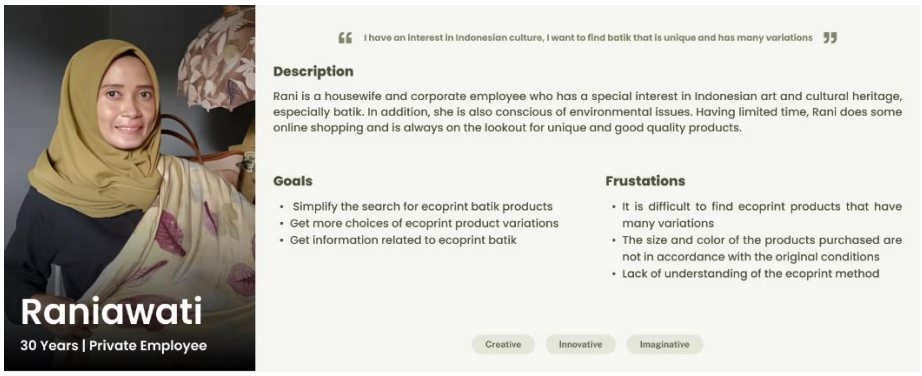


Fig. 3. User Persona

User Journey Maps are useful for describing various possible scenarios of how users interact with products that have been designed to achieve goals. They can also be used to explain the advantages and disadvantages of the product being developed.

Fig. 4. User Journey Maps

In Figure 5, the researcher applies How Might We Questions as a questioning technique to support the next process as a starting point in finding solutions.

Fig. 5. How Might We Questions

In addition, the author also conducted a Competitor Analysis using the SWOT (Strengths, Weaknesses, Opportunities, Threats) method. This method helps us to identify internal strengths and weaknesses as well as external opportunities and threats faced in relation to competitors.

Fig. 6. Competitor Analisys

C. *Ideate*

After the problem is mapped out in the define phase, the next step is to ideate, mind mapping, and brainstorming to design a product that can answer user needs. This research solution aims to increase community participation in waste management in Banyumas. This application is designed with various features that make it easier for users, so they are more interested in using it. This process uses creativity in assessing the data obtained from the definition stage to produce the right solution. above.

Userflow is a diagram that shows the flow used as a reference for designing features in the Rongsokkin application which can be seen in Figure 7.

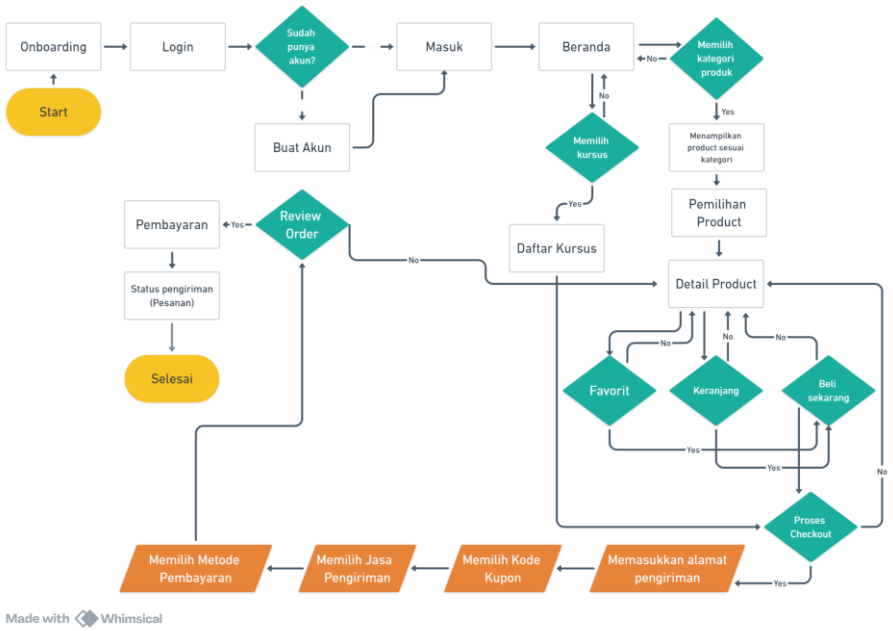


Fig. 7. User Flow

The next process in this research was to design the information architecture for the waste recycling app after the creative idea gathering stage was completed. Since it ensures that the structure of the information presented to the user is clear, organized, and easy to understand, information architecture is an important basis in the design of the app. As a result, we can ensure that users can access and use the app's features easily.

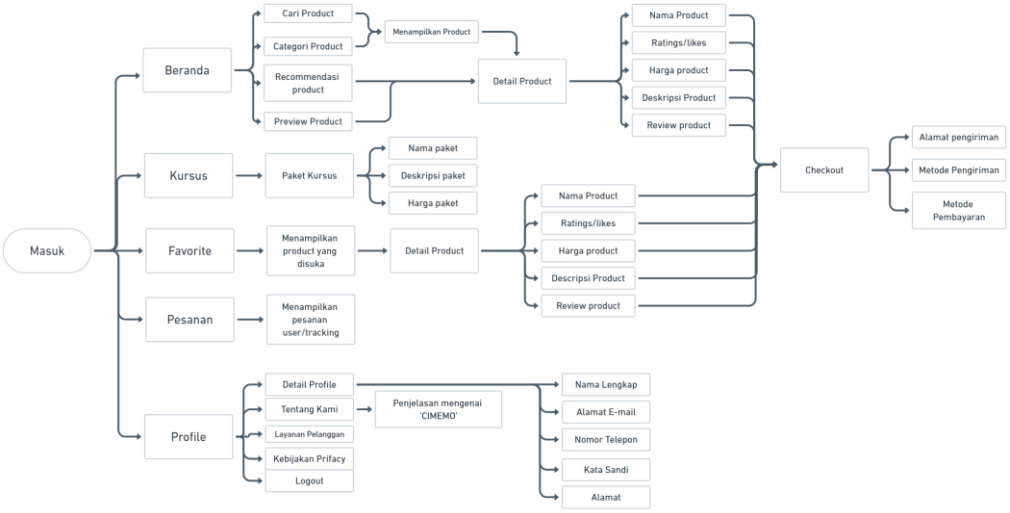


Fig. 8. Information Architecture

The data collected from the previous stage is used to create Lo-fi, which is very important to ensure the features developed are in line with the needs. Lo-fi is a rough skeleton that provides an initial overview of the appearance of the Cimemo.id application to facilitate the design process at the mockup stage.Figure 9. shows the wireframe of the Cimemo.id application.

Fig. 9. Low Fidelity Design

D. Prototype

The visual design process for the system's user interface is known as the prototype stage. A high-quality prototype that works well with the expected system is the result of this effort. For the Cimemo.id application, the system design must be created and the prototype created using the Figma tool. The visual design of the prototype must be consistent.

Design system is a set of components used to design digital products with specific rules and functions to manage the design. The design system is important to create visual consistency, provide a distinctive identity, and make the design process more efficient and replicable on a large scale. A simple and attractive logo becomes a memorable visual identity, while color selection, such as green as the main color, adds visual distinctiveness. Typographic elements, such as the use of the “Lato” font ensure that the text is easy to understand and matches the tone of voice of the app. Effective interface design connects the user with the device through elements such as layout, color, icons, and typography that are aligned with the purpose of the product.

Fig. 10. Design System

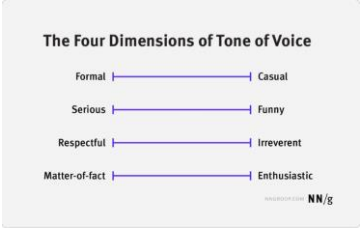


Fig. 11. Tone Of Voice

At this stage, the results of the previous wireframes are used to form the interface of the entire page. High fidelity design is a very useful method to provide a more realistic perspective of the work. There are

several features that exist in the Cimemo.id application, the following are some of the features that exist in the Cimemo.id application.

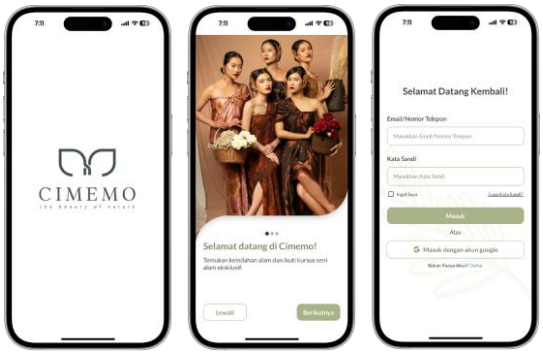


Fig. 12. Onboarding Page

Figure 12 shows the onboarding page of Cimemo.id application containing brief information about its features. In addition, there are also several options for logging into the application such as logging in using an existing account, creating a new account, or logging in using a google account.

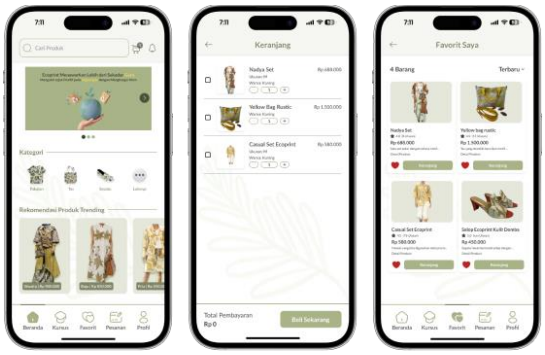


Fig. 13. Home Page

Figure 13 shows the home page that can direct users to view notifications, category options, and several recondite product options. In addition, there is a favorites page that users can see after selecting several products that they find interesting.

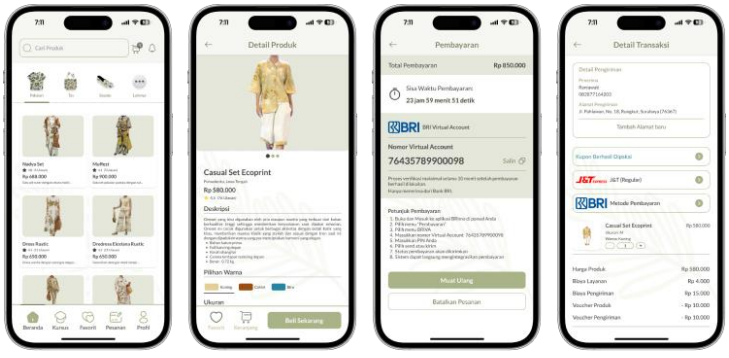


Fig. 14. Transaction Page

Figure 14 shows a page that shows various products according to the existing categories. When a user is interested in a product, they can make a transaction by purchasing the product. They can fill in some information needed to make the transaction.

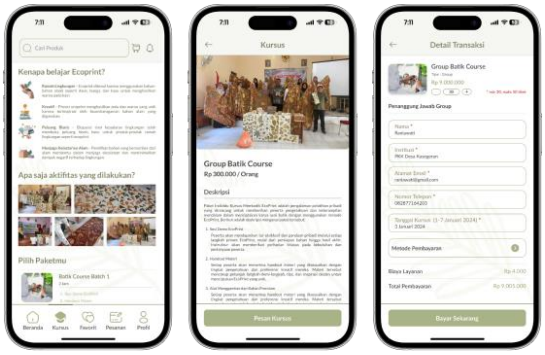


Fig. 15. Course Page

Figure 15 is a picture of the course page where users can join courses offered by Cimemo.id. They can see information about ecoprint and several course packages available. In addition, this application can book ecoprint courses online by filling in some information that must be filled in.

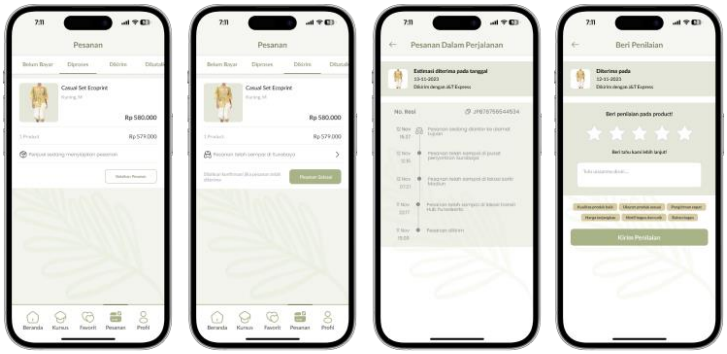


Fig. 16. Order Page

Figure 16 order page, when the user has done the checkout, he can monitor the order through the order page. There are several existing statuses such as unpaid, processed, shipped, and canceled. Users can also see where the order is and rate the products purchased.

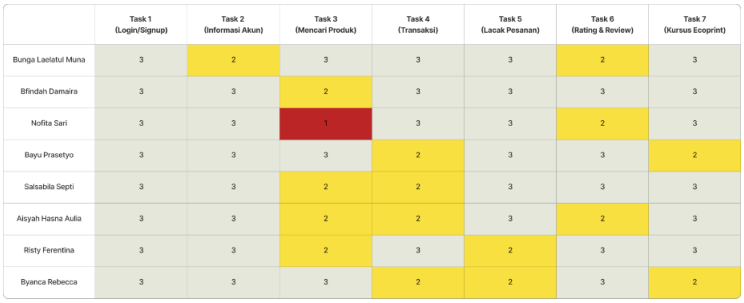
Fig. 17. Profile Page

Figure 17 shows the profile page which discusses account information. In addition, there is information about the application and policies of the Cimemo.id application. If users experience difficulties on this page, it also has some answers to questions that users often ask.

E. Testing

In the testing phase, the developed prototype is tested directly by users to determine the extent to which the design meets the requirements and how effective it is in use. The results are analyzed, and conclusions are drawn to evaluate the feasibility of the design.

The author uses the Maze platform to get the results of the tests we do here. We conducted both online and offline tests, and the author saw how participants performed the tasks. This test aims to evaluate the effectiveness and efficiency of the Cimemo.id application interface in helping users complete their main tasks. Some of the tasks include login/signup, account information, searching products, transactions, tracking orders, ratting, and courses.



	Task 1 (Login/Signup)	Task 2 (Informasi Akun)	Task 3 (Mencari Produk)	Task 4 (Transaksi)	Task 5 (Lacak Pesanan)	Task 6 (Rating & Review)	Task 7 (Kursus Ecoprint)
Bunga Laelatul Muna	3	2	3	3	3	2	3
Bfindah Damaira	3	3	2	3	3	3	3
Nofita Sari	3	3	1	3	3	2	3
Bayu Prasetyo	3	3	3	2	3	3	2
Salsabila Septi	3	3	2	2	3	3	3
Alsyah Hasna Aulia	3	3	2	2	3	2	3
Risty Ferentina	3	3	2	3	2	3	3
Byanca Rebecca	3	3	3	2	2	3	2

Fig. 18. Testing Result

Testing is done with the Guerilla Usability Test where the test participant is assessed while performing the given task. When the participant smoothly performs the task, it will be given a score of 3, when experiencing difficulties but can complete the task, it will be given a score of 2 and when he cannot do the task at all, it will be given a score of 1. Figure 17 shows the results of testing from the participant.

Table V. TESTING CALCULATION

Task	Time Based Efficiency	Overall Relative Efficiency	Effectiveness
task 1 (login/signup)	0,0413665626	100	100
task 2 (account information)	0,04508647677	92,01634877	93,75
task 3 (search for products)	0,01794107524	51,79431599	62,5
task 4 (transaction)	0,02224365277	75,3503961	75
task 5 (track orders)	0,05078700628	83,78378378	87,5
task 6 (rating & review)	0,06370748617	79,59934587	81,25
task 7 (ecoprint course)	0,035939305	90,16985138	87,5
Result	0,03958165212	81,8162917	83,92857143

The test calculation results in Figure 19 show that the application effectiveness of 81.81% is considered very good based on the Ministry of Home Affairs R&D Reference Standards in 1991. While the efficiency value of 0.039 shows a very fast completion time according to the Time Behavior indicator [14].

From the results of this test, the author also received input from several respondents who experienced difficulties in several tasks. We identified three big problems, among others, first on the task of finding products, respondents were quite confused about the scenario, choosing the wrong item, too many tasks were done. Second, in the batik course task, the placement of the payment option section is not appropriate if it is above the course details section. Third, in the transaction task, the selection of coupons, payments, delivery is less flexible.

IV. CONCLUSION

This research concludes that the application of Design Thinking method in UI/UX design for Cimemo.id e-commerce application succeeded in creating a better and more attractive user experience. The prototype, which is the final product design, was tested using the Guerilla Usability Test method. The effectiveness of the prototype scored 81.81%, indicating that a user-friendly design method was used to create the product. The resulting interface was able to effectively convey the uniqueness of the ecoprint product, helping users understand and appreciate the product. These results show that the Design Thinking method is a great choice for improving user interaction and convenience in e-commerce applications. However, it is important to continuously collect user feedback and conduct regular evaluations to find areas of improvement to ensure long-term success. This method allows the app to constantly evolve and suit the needs of users while helping to raise public awareness about sustainable environmental practices.

ACKNOWLEDGMENT

The authors would like to thank all parties who have supported this research, especially the Cimemo.id team for their information and cooperation, as well as the respondents who have participated in the test. Thanks also go to the University and supervisors for the guidance and facilities provided during this research process.

REFERENCES

[1] V. A. Dihni, "Indonesia Hasilkan 60 Juta Ton Limbah B3 pada 2021," databoks.katadata.co.id/. Accessed: May 29, 2024.

[2] D. A. Asmara, "Penerapan Teknik Ecoprint pada Dedaunan Menjadi Produk Bernilai Jual," *J. Pengabdi. Seni*, vol. 1, no. 2, pp. 16–26, 2020.

[3] Y. Fatmala and S. Hartati, "Pengaruh Membatik Ecoprint terhadap Perkembangan Kreativitas Seni Anak di Taman Kanak-Kanak," *J. Pendidik. Tambusari*, vol. 4, no. 2, pp. 1143–1155, 2020.

[4] M. Danuri, "Development and transformation of digital technology," *Infokam*, vol. XV, no. II, pp. 116–123, 2019.

[5] T. D. Mustikarani and I. Irwansyah, "Pemanfaatan Teknologi Informasi dan Komunikasi dalam Industri Fashion Indonesia," *War. ISKI*, vol. 2, no. 01, pp. 8–18, 2019.

[6] D. Haryuda, M. Asfi, and R. Fahrudin, "Perancangan UI/UX Menggunakan Metode Design Thinking Berbasis Web Pada Laportea Company," *J. Ilm. Teknol. Infomasi Terap.*, vol. 8, no. 1, pp. 111–117, 2021.

[7] C. Ravelino and Y. A. Susetyo, "Perancangan UI/UX untuk Aplikasi Bank Jago menggunakan Metode User Centered Design," *J. JTIK (Jurnal Teknol. Inf. dan Komunikasi)*, vol. 7, no. 1, pp. 121–129, 2023.

[8] S. I. Febrianti, "Perancangan Ui/Ux Aplikasi Pengelolaan Sampah (Bangsa) Berbasis Mobile Menggunakan Metode Design Thinking," *PROSISKO J. Pengemb. Ris. dan Obs. Sist. Komput.*, vol. 11, no. 2, pp. 183–189, 2024.

[9] I. S. Widiati, "Pengembangan E-Commerce Produk Fashion Menggunakan Metode User Centered Design," *J. Ilm. IT CIDA*, vol. 5, no. 2, pp. 31–43, 2020.

[10] A. A. Swardana and A. Candra Ayuswantana, "Perancangan Ui/Ux Website E-Commerce Mercandise Kota Sidoarjo Menggunakan Design Thinking," *SENIMAN J. Publ. Desain Komun. Vis.*, vol. 2, no. 1, pp. 81–92, 2024.

[11] R. F. Sunartama, P. Sukmasetya, and M. Maimunah, "Implementasi Design Thinking pada UI/UX Bank Sampah Digital Banjarejo Berbasis Android," *JURIKOM (Jurnal Ris. Komputer)*, vol. 10, no. 2, p. 590, 2023.

[12] M. Fajar Nadillah and A. Voutama, "Perancangan Ui/Ux Aplikasi Daur Ulang Sampah Berbasis Mobile Menggunakan Metode Design Thinking," *JATI (Jurnal Mhs. Tek. Inform.*, vol. 8, no. 3, pp. 2663–2671, 2024.

[13] J. Mifsud, "Usability Metrics – A Guide To Quantify The Usability Of Any System," https://usabilitygeek.com/. Accessed: Nov. 15, 2024.

[14] M. S. Tuloli, R. Patalangi, and R. Takdir, "Pengukuran Tingkat Usability Sistem Aplikasi e-Rapor Menggunakan Metode Usability Testing dan SUS," *Jambura J. Informatics*, vol. 4, no. 1, pp. 13–26, 2022.