Innovative UI/UX Analysis of Cooperative Apps through Design Thinking

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ABSTRACT

Radha Krisna Savings and Loan Cooperative operates as an entity affiliated with Krisna Holding Company, more commonly referred to as Krisna Oleh-oleh. Although Radha Krisna Savings and Loan Cooperative has been in operation since 2010, it did not begin utilising a desktop application as its information system until 2014. This application has since been employed to facilitate a variety of transaction processes. The issue at the Radha Krisna Savings and Loan Cooperative is that the utilised application has begun to fail to support user requirements for transactions, as certain menus, features, user interface, and user experience continue to fall short of user expectations. In light of this issue, it is imperative to conduct an analysis of the collaborative application and construct a prototype that satisfies the diverse requirements of users, serving as a benchmark for the improvement of forthcoming applications. Utilising the Design Thinking method, prototype development consists of the following phases: Emphasise, Define, Ideate, Prototype, and Test. Figma is the instrument utilised for prototyping. A User Experience Questionnaire (UEQ) is administered to a sample of eight managers from the Radha Krisna Savings and Loan Cooperative as part of the testing phase. Based on the Benchmark Data, the average value for the attractiveness scale is 2.01 (Excellent), the average value for clarity is 2.31 (Excellent), the average value for efficiency is 1.91 (Excellent), the average value for accuracy is 1.81 (Excellent), the average value for stimulation is 2.06 (Excellent), and the average value for novelty is 1.94 (Excellent).

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1. Introduction

Cooperatives are business entities comprised of individuals or cooperative legal entities that conduct their operations in accordance with cooperative principles and as a family-oriented economic movement of the people. Since their establishment, cooperative institutions in Indonesia have been oriented towards serving the economic interests of the vulnerable economic class (Hatta, 2019). Cooperatives, which sustain the Indonesian economy on a fundamental level, operate under the kinship principle. Cooperatives have thus contributed to the economic growth of Indonesia.
Cooperatives contribute significantly to the economic development of Indonesia. In conjunction with technological advancements, a performance-enhancing system is required, particularly for collaborative operational tasks; this is accomplished through the use of internet technology (Harianto et al., 2022; Rony et al., 2023). Internet technology may serve as a strategy for the cooperative to enhance its own operations.

KSP Radha Krisna is a cooperative founded in 2010 under the auspices of the Krisna Holding Company. This cooperative provides various savings products such as principal savings, mandatory savings, term savings, deposits and various other savings services. Apart from savings products, KSP Radha Krisna also provides loan products with fixed interest and decreasing interest for its members. KSP Radha Krisna is managed by 8 people including 1 Chairman, 1 Manager, 1 Head of Savings Section, 2 Savings Staff, 1 KABAG (Head of Credit) and 2 Credit staff. In the process of managing this cooperative, the managers have utilized digital technology in the form of desktop applications for various deposit transaction processes, loans and other administrative needs since 2014. Desktop applications are applications that run locally in a desktop environment and can only be accessed by desktop users. Because the desktop application from KSP Radha Krisna has been used since 2014, the managers of KSP Radha Krisna complained User experience and interface design of the KSP Radha Krisna desktop application.

From the problems above, the author wants to analyze the User Interface (UI) and User Experience (UX) for optimization in the process of redesigning the User Interface (UI) of the KSP Radha Krisna Application. The author hopes that the new design will help managers use the new information system, both in terms of user experience and interface design that is easier to understand. The advantage of the Design Thinking method is that this method provides a solution-based approach to solving a problem, so it is very useful in solving very complex problems by rearranging the problem from a human perspective (Aiyegbusi, 2020; Nakata & Hwang, 2020), create lots of ideas in brainstorming sessions, and adopt a hands-on approach in creating initial designs and conducting trials. The Design Thinking method can make it easier to understand user needs and help in creating new, sustainable innovations (Kwon et al., 2021; Marzavan, 2021). With this Design Thinking method, 71% of companies agree that the Design Thinking method improves their work culture, and 69% say this can make the company's innovation process more effective so that it can make it easier for companies during the product development process (Pan & Wang, 2019).

2. Literature Review

In the first research, the design thinking method was used, where this research was carried out by (Sudjatmoko et al., 2022) which explains that there are several application problems that do not suit user needs. This problem was obtained from the results of observations made by distributing questionnaires to users consisting of sellers and buyers. By using the SUS (System Usability Scale) test, the Digidesa application received an average score of 55, meaning it is still below average. For this reason, researchers redesigned the Digidesa application so that it can be understood by village communities easily by conducting research and designing the application's User Interface (UI) and User Experience (UX) using the Design Thinking method. Other research (Pande & Bharathi, 2020) explains the stages of the design thinking method which is easy to understand user needs, namely Empathize (collecting data), Define (defining the core of the problem), Ideate (gathering ideas and designing solutions), Prototype (designing a prototype), Test (testing, collecting feedback, and concluding) (Kwon et al., 2021). Other research (Yusaliano et al., 2020) modifying UI/UX on marketplace applications by combining design thinking methods with System Usability Scale (SUS) testing (Agung et al., 2022; Desnanjaya et al., 2023). Next, there is research that the author wants to carry out with the title "UI/UX analysis of cooperative applications at KSP Radha Krisna using the Design Thinking Method." This research was carried out by the author because of application-related problems experienced by cooperative managers at KSP Radha Krisna. One of them is the menu and features that are no longer in accordance with the cooperative program in 2023 because the application has been used since 2014. Apart from that, the chairman of KSP Radha Krisna also wants...
to switch from a desktop application to a Web-based application to make it easier in terms of accessibility. The method used by the author is Design Thinking, because the design thinking method is a human-centered innovation approach which was initiated because designers must integrate human needs, technology and business needs. This method has a solution-based approach that will be used to solve problems. The final result in the form of a prototype will be tested with a user experience questionnaire to find out how optimal of the new design (Sohaib et al., 2019).

3. Research Methods

Design thinking method. The Design Thinking method is a method used to solve a problem from a different point of view. Design thinking is a design process & problem solving method that focuses on the user (Aiyegbusi, 2020; Micheli et al., 2019). The following are the stages of the Design Thinking method in designing research applications (Cross, 2023; Mabogunje et al., 2019; Pan & Wang, 2019).

1) Emphasize

At this empathize stage the researcher will discuss data collection which will later be used for research purposes. At this stage, data collection was carried out by empathizing with managers or staff, conducting observations and interviews with managers who were responsible for managing KSP Radha Krisna. At this empathize stage, researchers want to know how the interactions, desires and needs of users use this cooperative application. To obtain this data, the author did several things in the empathize stage, such as observation and interviews.

2) Define

Next, at the stage of defining the problem or define, the researcher will define the problems, shortcomings of the application, and difficulties in using the application obtained from the results at the empathize stage, namely observation, interviews, and questionnaires. The data obtained will later be used to find out what the users’ needs are. So at this stage the researcher focuses on defining problems that focus on the user or user (Nakata & Hwang, 2020). The results of the previous empathy stage in the form of problems from KSP Radha Krisna's cooperative application will be used by researchers to describe an idea based on the user's views which will later be implemented into recommendations for the User Interface (UI) and User Experience (UX) of the Cooperative application. The following are several processes that researchers will carry out at the Define stage as a user approach.

• Personal user

User persona here is done by collecting data from KSP manager Radha Krisna. This user persona was created according to research conducted in order to gain a deeper understanding of the user. Researchers use user personas as a tool to make it easier to understand the desires of KSP Radha Krisna managers. Using user personas makes it easier to find design solutions that can make products according to user behavior, needs and goals (Malik & Frimadani, 2022; Wiguna et al., 2022). The user persona will later be equipped with relevant data about the user's personal data starting from name, age, occupation and domicile address. Frustrations, Goals and Expectations will represent problems and solutions related to the KSP Radha Krisna application.

• User Scenarios

In the stage after the user persona, there will then be a user scenario stage which contains three user activities. User scenarios consist of several columns, namely "as a?", "I want to", "so that", and "scenario 1". The aim of creating user scenarios is to understand the motivations, obstacles, desires and expectations of cooperative managers regarding how to use designs, generate ideas, and optimally test the usability of solutions. Later it will contain several concise user scenarios (Mabogunje et al., 2019).

• Customer Journey Map

Next, the customer journey map stage has the following sections: user actions, user goals, Process and channels, problems, Experience and ideas/Opportunities. The stages section is the
stages that the user or users go through in the customer journey map which consists of awareness, considerations, decision, and interest (Marzavan, 2021). Aware means the user's concern, considerations means the user's consideration of the solution, decision means making a decision regarding the solution obtained, and interest means the user's interest in the solution being used. With the customer journey map, you can find out the user's experience before and while using the Cooperative application.

3) Ideate
In the ideate stage, the writer will collect ideas and solutions that can be used to overcome various problems that have been defined in the previous stage. At this stage the author will concentrate on generating ideas or ideas as a basis for creating a prototype of the design that will be created (Cho & Kim, 2020). Brainstorming at this stage was carried out with KSP Radha Krisna managers. At the ideate stage there are 2 processes, namely User Flow and Sitemap. And later at this ideate stage, the ideas and solutions obtained will be collected and created in the form of a User Flow and Sitemap which will later be used to improve and solve a problem in the Cooperative application at KSP Radha Krisna. The following is the application framework mapping process which is carried out in the following process:

Analysis of the functional requirements of the system to be built can be written in several points, as follows:

• User Flow
At this user flow stage, the researcher created the process or steps carried out by cooperative managers in the application to complete the tasks or obligations of managers in each division at KSP Radha Krisna. In conducting User Interface (UI) and User Experience (UX) analysis it is necessary to consider the path in which users will navigate through cooperative applications that encourage the creation of user flow. This path is divided into a series of steps that the user takes from the entry point (start) to the final action (end).

• Sitemap
After the user flow stage, namely the sitemap stage which contains information on the pages in the cooperative application which provides a visual representation of the application as to how various parts can be connected simultaneously. Sitemap makes it easier for researchers to analyze the pages and features of the Cooperative application. Sitemap helps researchers analyze and helps users understand the flow of this Cooperative application.

• Event List
The event list stage is the stage that provides information regarding a list of events that will occur in a system on each application menu page.

4) Prototype
At the prototype stage, the researcher will present solutions to the problems obtained in the previous stages. The design will be in the form of a High-Fidelity Prototype which will later be used to try or test the solution that the researcher has obtained. It is at this prototype stage that researchers design how to interact with the User Interface (UI) and User Experience (UX) displays to implement solutions to problems obtained in the previous stage (Hölzle & Rhinow, 2019). With the aim of understanding how the design process suits the needs of cooperative managers of the application cooperative. By being able to understand the interactions that have been carried out, researchers hope that at this stage they will find deficiencies and solutions to the problems that the application has.

5) Test
Then the final stage is the Test stage, at this stage testing is carried out on the User Interface (UI) and User Experience (UX) prototypes that have been designed and designed in the previous steps obtained from solutions to problems in the previous steps. During testing, researchers will analyze how customers interact with previously designed prototypes (Foster, 2021; Putri et al., 2024; Sarasvananda et al., 2022). The User Interface (UI) and User Experience (UX) testing phase is carried out to detect initial bugs and usability problems from the User Interface (UI) design and User
Experience (UX) prototype of the Cooperative application. Testing was carried out using the User Experience Questionnaire (UEQ) system. The User Experience Questionnaire (UEQ) Usability Scale is used to measure the interface appearance and user experience in Cooperative application design. At this stage, the researcher will ask 26 (twenty six) questions. UEQ has a scale range of 1 (one) to 7 (seven).

4. Results and Discussions

Design thinking is a design process and problem solving method that focuses on the user. The following are the stages of the Design Thinking method in designing application prototypes in research.

![Color palettes](image)

**Fig.1. Cooperative application background color palettes**

After determining the color palettes for the background of the cooperative application, below is a High-Fidelity prototype image of the application Cooperative along with the explanation.

**Login Page**

The Login page is the first display you will encounter when you first want to open the cooperative application. In the login display, the user can see the username and password input button. Users only need to input this data to log in to the homepage of the cooperative application. If the user doesn't have a username and password, he can create an account with the help of the create account button. Because the cooperative application is web based, the application can be accessed via personal computer/laptop, tablet and smartphone with any gadget with the help of the internet. The following displays the login page.
In image 2 and image 3 above are the Login pages on PC, Tablet and Smartphone displays. Because the cooperative application is web-based, users can access this application with various gadgets and have a responsive display. In the login display, users who already have an account can immediately log in using their username and password, but if the user does not yet have an account, the user can register by clicking the words "click here" to go to the account registration page.

**Home Page View**

After the login process, the user will see a home page which contains 6 main menus, including customer service, cashier, financial reports, loans, savings and settings.
In Figures 4 and 5 it can be explained that the home menu display has 6 main displays, namely customer service, cashier, financial reports, loans, savings and settings. The menu design on the display uses icons related to the type of service on the menu to help cooperative managers understand the function of these menus.

**Evaluation Results with UEQ**

Before evaluating the cooperative application design, the first thing to do was distribute questionnaires to the respondents who had been determined, namely the managers of the Radha Krisna Savings and Loans Cooperative, totaling 8 respondents. The data processing process using the User Experience Questionnaire (UEQ) evaluation method uses Data Analysis Tools which will automatically provide output results in the form of evaluation results from questionnaire data that has been input previously. The following is 1 which contains questions from the User Experience Questionnaire.

The questionnaire was distributed to all cooperative managers as many as 8 people containing 26 questions with a measurement scale ranging from 1 to 7. The results of this questionnaire were used by researchers to find out how users experience related to the application, both from menus, features, User Interface (UI), and User Experience (UX).

a) Assessment Results of All Respondents
Overall, the total number of respondents used in this research was 8 respondents who were all managers of KSP Radha Krisna.

Table 1. Data after conversion

| Items | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 0     | 1 | 2 | 3 | 1 | 3 | 2 | 3 | 1 | 2 | 3 | 1 | 3 | 3 | 1 | 3 | 3 | 1 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 |
| 3     | 2 | 0 | 2 | 2 | 2 | 2 | -1 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | -3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 |
| 3     | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 0     | 2 | 0 | 1 | 0 | 1 | 2 | 0 | -1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | -1 | 0 | 1 | 0 | 1 | 1 | 1 |
| 2     | 3 | 2 | 1 | 3 | 1 | 2 | 2 | -1 | 2 | 2 | -1 | 3 | 2 | 3 | 2 | -1 | -2 | 2 | 2 | 1 | 3 | 0 | -1 | -2 | 3 |
| 3     | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 |
| 3     | 3 | 2 | 3 | 3 | 3 | 1 | 2 | 3 | 3 | 2 | 2 | -2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 |
| 2     | 3 | 3 | 1 | 0 | 1 | 2 | 2 | -1 | 3 | 1 | -1 | 2 | 1 | 1 | 2 | 2 | 3 | 2 | 2 | 1 | 2 | -2 | -1 | -1 | 2 |

In table 1 above you can see a total of 26 items with 8 answers that have been input into the Data Analysis Tools. From all this data it can be seen that the data has been converted to scale -3 to scale 3.

b) Key Results

After the data is converted, the conversion results are managed to obtain a result based on 8 respondents’ assessments. Values between -0.8 and 0.8 represent a neutral evaluation of the corresponding scale, values > 0.8 represent a positive evaluation, and values < -0.8 represent a negative evaluation.

Based on 26 questions from the questionnaire, results were obtained which were answered by 8 users of the cooperative application. The table above contains the average results of initial impressions of the cooperative application. Variance is used to determine how varied participant responses are on each UEQ scale. The higher the variance value on a scale, the more varied participant responses are to the aspects measured by that scale. Next there is standard deviation which is the square root of variance and is often used together with variance to provide an idea of the distribution of data. Standard deviation provides a measure of how far the data is spread out from the mean value. Next, the No column means the number of participants or respondents in the questionnaire. The left and right columns are questions from the UEQ while the scale is the 6 scales from the UEQ.

Table 2. Average Impression and Variance Based on 6 Scales

<table>
<thead>
<tr>
<th>UEQ Scales (Mean and Variance)</th>
<th>Attractiveness</th>
<th>Clarity</th>
<th>Efficiency</th>
<th>Accuracy</th>
<th>Stimulation</th>
<th>Novelty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attractiveness</td>
<td>↑ 1,854</td>
<td>1,38</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clarity</td>
<td>↑ 2,313</td>
<td>0,37</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
<td>↑ 1,906</td>
<td>1,66</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td>↑ 1,813</td>
<td>1,67</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stimulation</td>
<td>↑ 2,063</td>
<td>0,83</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Novelty</td>
<td>↑ 1,938</td>
<td>0,39</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The average impression data in the figure above shows that the assessment scale refers to positive results because the value is above 0.8 which represents a positive evaluation.

c) Benchmark Dataset
The benchmark standard is a comparison of products that have been evaluated using data collected by UEQ which contains data on 21,175 people from 468 studies. From the image of the benchmark dataset and the results table of the benchmark dataset, it can be seen that attractiveness produces a value of 1.85, clarity 2.31, efficiency 1.91, accuracy 1.81, stimulation 2.06 and novelty 1.94. These 6 categories produce an average value of 1.98, which means it is at a very good or excellent level, when compared to the previous cooperative application design which had an average value of -0.38 or represents negative or bad results.

5. Conclusion

The conclusions obtained from conducting research on UI/UX Analysis of Cooperative Applications at KSP Radha Krisna Using the Design Thinking Method, namely: 1) The design and construction of the prototype has been successfully carried out using the Design Thinking method which has several stages, namely Empatize, Define, Ideate, Prototype and Test. In the process of building prototypes, they are made using tools, namely Figma. Web-based application prototype that can be accessed with the help of gadgets such as laptops, computers, tablets or smartphones. 2) The web-based Cooperative Application Prototype has gone through a UI/UX testing process using the
User Experience Questionnaire (UEQ), which seen from the Benchmark Data shows that the attractiveness scale results have an average value of 1.85 with benchmark comparison results being Excellent, Clarity has an average value of 2.31 with benchmark comparison results at Excellent, Efficiency has an average value of 1.91 with benchmark comparison results at Excellent, Accuracy has an average value of 1.81 with benchmark comparison results at Excellent, Stimulus has an average value of 2.06 with benchmark comparison results being Excellent and Novelty having an average value of 1.94 with benchmark comparison results being Excellent.

References


