

USER INTERFACE AND USER EXPERIENCE DESIGNING IN THE KAPUSTAKAN SYSTEM USING USER CENTRED DESIGN APPROACH (CASE STUDY: KERATON NGAYOGYAKARTA HADININGRAT)

Mina Rofida Rahmatina¹⁾, Chanifah Indah Ratnasari*²⁾

^{1, 2)} Program Studi Informatika, Universitas Islam Indonesia

Yogyakarta, Indonesia

e-mail: mina.rahmatina@students.uui.ac.id¹⁾, chanifah.indah@uui.ac.id²⁾

ABSTRACT

The Kapustakan System is a digital collection management system for the Keraton Ngayogyakarta Hadiningrat. The Kapustakan System is being developed to present various museum collections in digital representation, facilitating access to knowledge search, cross-referencing, and encouraging research. This system needs an interface design that takes into account both the User Interface (UI) and the User Experience (UX) to make users feel comfortable when they use it. This paper describes the UI/UX design process for the Kapustakan System using the User Centered Design (UCD) method, which consists of five stages: planning the human centred design, specifying the context of use, specifying user and organizational requirements, producing design solutions, and evaluating designs against user requirements. The UCD method focuses on the direct involvement of prospective users so that they can influence the design results that meet their needs and desires. The result of this research is a prototype design of the Kapustakan System that has been validated through usability testing of potential users. The parameters tested in usability testing are success rate, efficiency, error rate, and satisfaction. The test's success rate is 93.75%, its efficiency is 90.27%, its error rate is 3.73%, and its satisfaction is 86.25.

Keywords: Sistem Kapustakan, User Centered Design, User Interface, User Experience, Usability Testing

I. INTRODUCTION

The rapid development of information technology resulted in a transition towards an all-around digital. Digitalization is the process of transforming analog information media into digital media processed through computers [1]. Digital technology has a variety of positive impacts on humans, including facilitating access to information faster using the internet, fostering digital technology innovation in various aspects, and improving the quality of human resources by developing and utilizing information technology. One of the uses of digitalization is the development of digital museums that aim to digitize various collections of heritage, artefacts, and historical archives in museums [2].

Since 2019, Ngayogyakarta Hadiningrat Palace has built a system of digitizing historical collections to care for cultural sustainability. The team in charge of carrying out this project is named Tepas Tandha Yekti Keraton Yogyakarta which is currently in collaboration with CV Lumintu Logic. The team was led directly by Gusti Kanjeng Ratu Hayu, the fourth daughter of Sri Sultan Hamengkubuwono X. The need to digitize Keraton's assets was motivated by the Geger Sepahi event that occurred on June 19-20, 1812. In this event, British troops led by *Thomas Stamford Raffles* sent troops to attack massively to the Palace of Yogyakarta until finally, Sri Sultan Hamengkubuwono II surrendered. With this event, the Yogyakarta Palace suffered a very large loss where material assets and intellectual assets in the form of more than 7000 manuscripts/manuscripts were looted and brought to England [3].

Manuscripts of the spoils at the Geger Sepahi event are kept in *the British Library*, London, England. In 2018, *the British Library* began digitizing the Keraton manuscript. Then in 2019, *the British Library* handed over 75 digital manuscripts to Sri Sultan Hamengku Buwono X at the opening of the *International Symposium on Javanese Studies and Manuscripts of the Palace of Yogyakarta*. However, the original form of the manuscript cannot be returned to Indonesia. Currently, the Yogyakarta Palace has digitalisation historical assets in the form of digitization of puppet collections, as well as eating and drinking devices used by sultans who have reigned in the Palace [4].

Based on the background above, the Kapustakan System was developed. This system is a system to display the digital collection of the Yogyakarta Palace Museum. This system can be accessed through the kratonjogja.id website on the Kapustakan menu. The digitization process is carried out gradually, while there are three categories of collections displayed on the page, namely *Kawedanan Hadeng Punakawan Nityakultur* which contains a collection of sultans eating and drinking devices, *Widyakultur* containing manuscript collections, and *Kridhamardawa* containing puppet collections [5]. The purpose of developing this system is to facilitate valid

access of information to the museum's digital collection through the official website of the Palace, as well as mapping management for physical storage where this information can be selected to be displayed in general or limited. The public can utilize various information obtained through the Kapustakan System for research or academic research purposes [4]. Currently, the Kapustakan System is being developed to improve performance and services to accommodate the needs of *users* when they want to access digital museums.

Kapustakan system requires careful interface design by considering aspects of *User Interface* (UI) and *User Experience* (UX). The purpose of *user interface* design is to make it easier for users when use the system effectively through the appearance of an attractive and easy-to-understand system interface [6]. While *the User Experience* aims to measure the level of user satisfaction and comfort with the system used [7]. This article explains the design of UI / UX system design up to validation of usability *testing* to prospective users.

Designing the Kapustakan System design using the *user-centred Design* (UCD) approach. UCD focuses on the direct involvement of prospective users in the system to be designed through *interviews* and *usability testing*. The UCD approach will affect the design of the system because it can adjust the needs and desires of prospective users of the system [6].

II. LITERATURE REVIEW

A. *User Interface*

According to the definition of ISO 9241-110, a *user interface* is a collection of all components of an interactive system that provides information and control for users to complete certain tasks through an interactive system [8]. *User Interface* is defined as the appearance of a user interface that has the function to connect *the user* and the system through a visual display [6]. *The user interface* includes a part of the information system that provides a means for users to input and *output*. A *User Interface* that has good quality will have a positive effect on user satisfaction [9]. The *User Interface* concept has several elements that need to be considered such as colours, letters, layouts, icons, illustrations, and navigation [6].

B. *User Experience*

Based on the definition of ISO 9241-210, *User Experience* is a perception of a person and his response to the use of a system, product, and service [10]. The entire process that users go through when interacting with the system will result in an assessment based on user experience. Therefore, the design of a user-oriented *User Experience* will provide convenience when the user operates the system [11]. *User Experience* design can consider *the Laws of UX*, a set of best practices that a designer can use when building a user interface. *Laws of UX* was created by Jon Yablonski who is a senior *UX designer*. There are 21 categories of *Laws of UX*, among which are: *Aesthetic-Usability Effect*, *Doherty Threshold*, *Fitt's Law*, *Law of Uniform Connectedness*, *Goal-Gradient Effect*, *Hick's Law*, *Jakob's Law*, *Law of Common Region*, *Law of Proximity*, *Law of Pragnanz*, *Law of Similarity*, *Miller's Law*, *Occam's Razor*, *Pareto Principle*, *Parkinson's Law*, *Von Restorff Effect*, *Postel's Law*, *Peak-End Rule*, *Serial Position Effect*, *Tesler's Law*, and *Zeigranik Effect* [12]. The design of the library system is carried out based on *user needs* and the *laws of UX* to improve user comfort.

C. *User Centered Design*

User Centered Design (UCD) is an approach that places the *end-user at the core* of the system development process with a focus on accommodating the needs and desires of users towards the system. UCD aims to optimize *end-user* comfort and satisfaction with the use of the system [13]. Through the UCD approach, the designed design adjusts the characteristics and behaviour of the user so that the developed system does not damage the user to change his behaviour when using the system [6]. The UCD process is carried out through several stages iteratively or repeatedly, where the design and evaluation process is built from the first stage of the project through implementation.

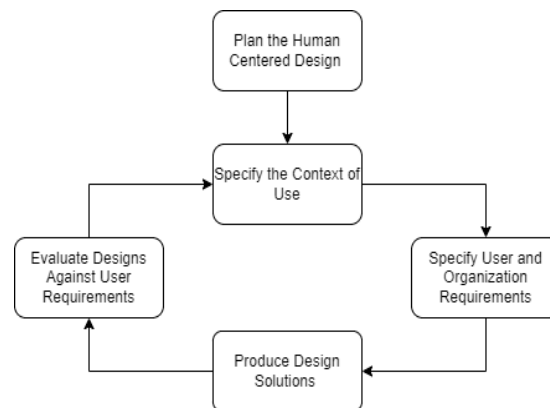


Figure 1. Stages of the *user-centred design approach*
Source: ISO 13407:1999

The *user-centred design* approach is carried out in five stages ranging from *the plan to the human-centred design*, *specifying the context of use*, *specifying user and organizational requirements*, *producing design solutions*, to *evaluate designs against user requirements* as shown in Figure 1. The final stage of the UCD approach is to evaluate the design that has been designed, if there are shortcomings in accommodating *end-user* needs, it is necessary to replicate back to the initial stage until the resulting design successfully meets *end-user* needs.

D. Usability Testing

Usability testing is a testing method used to examine the interaction between *users* and the system through a series of task scenarios related to *the interface* to prospective system users. The purpose of *usability testing* is as an evaluation to find out the level of usability, identify *errors*, measure efficiency and effectiveness, and determine user satisfaction with the system developed. Several parameters can be applied to *usability testing* [11]:

1) Success Rate

Measure the user's level of success in achieving the objectives of the task scenario given by *the tester*.

2) The Time a Task Requires

Measure how long it takes the user to complete *the* task scenario.

3) Error Rate

Measure *errors* or errors made by users when operating the system by calculating the number of click errors and analyzing the errors.

4) User's Subject Satisfaction

Measure the level of satisfaction that users feel when interacting with the system. One method that can be applied to reduce user satisfaction with the system is *the System Usability Scale (SUS)*.

III. RESEARCH METHODOLOGY

Work on the design of the Kapustakan Keraton System using *the user-centred Design approach*. There are five stages carried out sequentially following the stages set by the ISO 13407:1999 standard.

A. Plan The Human Centered Design

The first stage is to discuss with all parties involved in the work on the Kapustakan System project to get a commitment that the system development process is carried out by focusing on the user. The Kapustakan System project will engage users from the initial stage to the end of the processor where they are needed.

B. Specify Context of Use

Kapustakan System design is done by determining the context of the usefulness of the system through identification related to who will use the system, how the user characteristics, and what conditions cause *the user* to want to use the system. At this stage there are three points of work, namely determining prospective users, *focus groups*, and creating *user personas*. Research on prospective users is done through the *focus group* method, namely by providing many questions simultaneously to eight respondents who fit the criteria of prospective *users* at the same time and place. Focus group respondents are students who participate in Certified Internships and Independent Studies (MSIB) activities at *Travelxism*. The respondents were all from tourism departments who had visited the museum directly and had accessed the *museum's website*. *The focus group* lasts as many as three sessions with a

duration of 30 minutes in each session. The first session asked about respondents' experience and attractiveness to online museums, the second session reviewed the information and features needed, while the third session asked what kind of design users wanted. Jenis the questions given are open questions and closed questions. In open-ended questions, respondents were asked to answer questions by outlining their respective opinions. While in closed questions, respondents answered questions by choosing the available answer options. The results of the focus group respondents' answers will be analyzed to determine *user personas* and *user needs*.

TABLE I
FOCUS GROUP QUESTION LIST

No	Pertanyaan
1	Have you ever visited <i>the museum website</i> ? If so, what kind of information is found on <i>the Museum's website</i> ?
2	What is your purpose for visiting <i>the museum's website</i> ?
3	Where do you get information about the <i>Museum's website</i> ?
4	Of all the museum <i>websites</i> you have accessed, has anyone ever come to the location directly?
5	Have you ever had trouble visiting a museum <i>website</i> ? If ever why?
6	Of all the museum <i>websites</i> you've visited, is it the most memorable?
7	Would you like to recommend the <i>Museum's website</i> to others? Why?
8	What information do you want to get when accessing <i>the museum's website</i> ?
9	Is the museum ticket booking feature <i>Online Required</i> ? If necessary, do you prefer on-site or online payments ?
10	Do you think a feature to help search for collections on the <i>Museum's website</i> is necessary?
11	Do you think the feature to group categories of museum collections is necessary?
12	Do you think a feature to display <i>Event</i> information and <i>schedule</i> of events held in museums is required?
13	Of the few images displayed on the screen, do you prefer the look of the museum collection in 2D or 3D form?
14	Do you think the feature to change language preferences is necessary? If necessary, what language options should the museum <i>website</i> provide?
15	When in an <i>offline</i> museum, there are generally <i>tour guide</i> facilities to guide tourists to see the museum collection. Do you think the application of a <i>tour guide</i> is also needed on the <i>Museum's website</i> ? If yes, what kind of <i>tour guide</i> Featured do you want?
16	Do you think virtual <i>Tour</i> features are needed?
17	What kind of information do you want on the page about us/ <i>about us</i> ?
18	When you need to contact the museum, do you prefer to contact it via <i>live chat</i> , <i>Email</i> or social media?
19	Do you prefer the <i>dark/light/colorful website</i> color theme?
20	Do you prefer the appearance of a moveable website such as number 1 (displaying <i>websites</i> with right-left motion) or number 2 (displaying <i>websites</i> with top-down motion)?
21	Are you more used to seeing <i>the navbar</i> on the top/right/left side?
22	Do you prefer to see social media information with a <i>floating</i> display or placed at the bottom of the <i>website</i> Page?
23	Do you prefer the look of the collection such as number 1 (images and information are displayed directly) or number 2 (there are only images, but the collection caption information will be displayed when the image is pressed)?
24	What do you think the design of an interesting museum <i>website</i> looks like?
25	What is your response to a 3D visualized <i>Online</i> museum?
26	How do you respond to online museums visualized in 2D?
27	Would you rather open a museum <i>website</i> via via <i>mobile phone</i> or <i>desktop</i> ?

C. Specify User and Organization Requirements

After determining prospective users and getting the information needed in system design, the next stage is to determine *the user needs* and organizations in the business and the goals to be achieved. There are two points of work, namely creating *user flow* and *information architecture*. *User flow* is a visual representation of two-way interaction between the user and the system in the form of a flow that must be passed by *the user* from the beginning of the use of the system until the achievement of user goals [14]. *Information Architecture* is an arrangement in arranging structures on the content of elements by grouping them into categories or menus [15]. *Information Architecture* can make it easier for *designers* to design interfaces, as well as make it easier for users to understand the structure of information displayed by the system.

D. Produce Design Solutions

The next stage is to design the kapustakan system interface design by the analysis of *user needs results*. Interface designing is done by creating a *low fidelity wireframe*, a *high-fidelity wireframe*, and a system *prototype*. *The wireframe* is the design framework of a system that is carried out at the beginning of the design. *Wireframe low fidelity* is a basic design where there is no colour, as well as the size and distance between elements. While *high fidelity wireframe* is a detailed version of the development of *low fidelity wireframe* where there is already colour, as well as the size and distance between precise elements. Furthermore, design development is carried out by making a *prototype*, namely the original model that already has simulations when *the user* interacts with the interface [15]. *The prototype* is an example to be tested directly to users to get *feedback*. *The design tool interface* used in designing the Kapustakan System interface is *Figma*.

E. Evaluate Design Against User Requirements

The final stage of the UCD approach is the evaluation of design prototypes that have been designed through *usability testing* for prospective users. *Usability testing* is carried out using *the moderated UX studies* method, namely *usability testing* that requires active participation from moderators or researchers who will direct participants in conducting trials of *prototype* designs by testing provide a set of scenarios that lead to a specific task to be completed without being given instructions as well as steps in the use of the system [16]. The parameters tested in *usability testing* are *success rate*, *efficiency*, *error*, and *satisfaction*. The results of *usability testing* will be used as a reference in the evaluation and improvement of the kapustakan system interface design. The scenario in the *usability testing* process is shown in Table II.

TABLE II
USABILITY TESTING SCENARIO

Kode	Skenario
ST-01	You want to find information about the Yogyakarta Palace by by accessing the Solve the System System. Please use this <i>prototype</i> to find out what is meant by Capustakan System!
ST-02	Once you know what the Capustakan System means, you try to use this system to view the Keraton museum digitally in order to see the building as a whole and the collection in it. <ol style="list-style-type: none"> a) Please use the Kapustakan System to pass the Keraton profile video! b) You want to virtually look at the museum in 3D to find the lumping horse collection collection in the show collection room. c) You want to see the location of Siti Hinggil's floor plan.
ST-03	You want to look around the collection in the Keraton museum, please use the Kapustakan System prototype design to see the details of the Gagrak shadow puppet collection information.
ST-04	You are interested in visiting the Keraton museum in person. Therefore, you need to book tickets <i>Online</i> . Please use this system to purchase admission to the Palace museum!
ST-05	You want to research the collection of Gonda Kusuma fiber manuscript for scientific research purposes directly by visiting the Keraton. Please use this system to conduct research submissions!
ST-06	You are interested in participating in events organized by the Yogyakarta Palace, especially on how to make batik. Please use this system to book tickets for the how to make batik events!
ST-07	You are recommending a system of anonymity to foreign people. Please use the features on the system to change language preferences!
ST-08	You need to <i>live chat</i> with the Keraton admin to find information on how to reserve museum tickets. Please use the existing features to live <i>Chat</i> !

IV. RESULT AND DISCUSSION

The following is the result of the implementation of *the user-centred Design* method on the Kapustakan System which is described per stage by the UCD method.

A. Specify Context of Use

At this stage, there are three points of work, namely determining prospective users of the Kapustakan System, *user personas*, and analysis of *focus group results*. Here are the criteria for prospective users of the Kapustakan System:

1) Demography

The general public from the age of 15 to 64 years old is both male and female

2) Geography

Living in Indonesia and abroad

3) Psychography

Active using the internet, have an interest in the culture in the Yogyakarta Palace

4) Behavior

Looking for information related to the collection of the Yogyakarta Palace Museum

B. Specify User and Organization Requirements

At this stage, *a user needs* analysis is carried out to specifically identify the user's needs for the system. The results of the analysis are then processed *into information architecture* and *user flow*. Figure 2 is the result of designing *information architecture* made using *draw.io tools*.

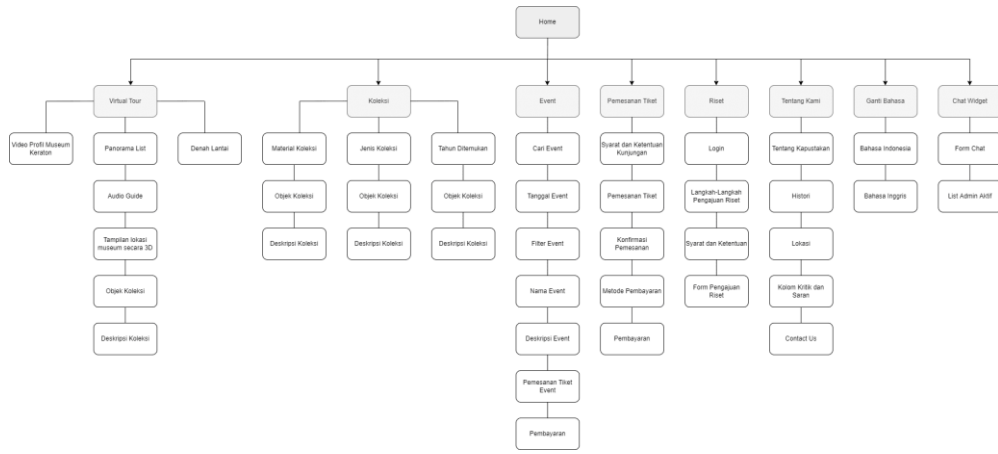


Figure 2. Kapustakan System Information Architecture

Based on the *information architecture* design above, eight features are on the *landing page* of the system. The *virtual tour* is a feature to see the Keraton museum virtually. The *event feature* is used to see various *events* held at the Keraton museum. Through this feature, *users* can also make reservations to participate in the *event*. The collection feature is used to view the keraton digital collection and its description in detail. The museum ticket booking feature is used as *online ticketing* so that users can buy Keraton museum tickets *online*. Research features are used to conduct research submissions on digital collections directly by following the applicable terms and conditions. Features about us contain information related to the Kapustakan System in the form of history, collections, and contacts of the Palace. The language change feature is used to match language preferences to Discuss Indonesia or Bahasa English. The *chat widget* feature is used for *live chat* with keraton admins. Hasil *user flow* design containing eight business process flows following the features contained in the Kapustakan System is shown in Figure 3.

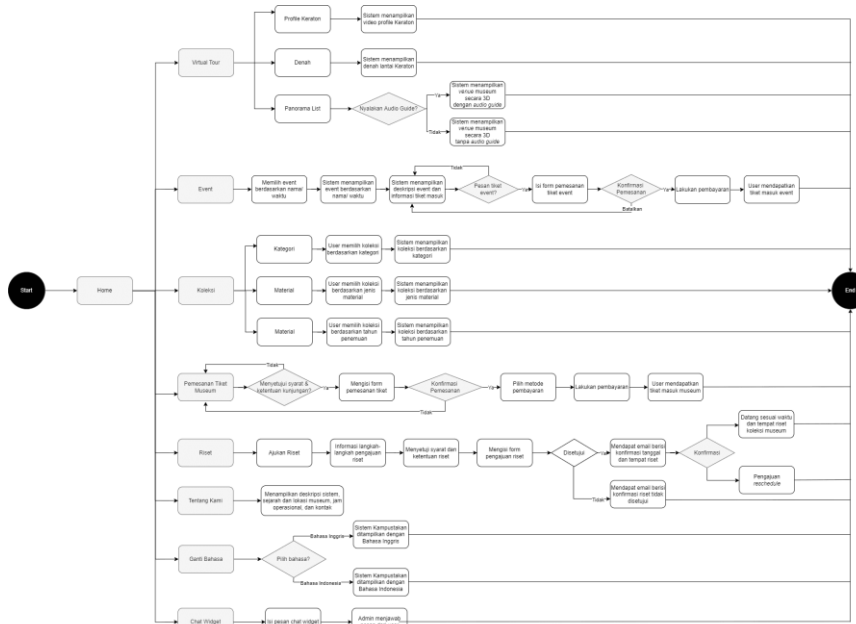


Figure 3. Kapustakan System User Flow

C. Produce Design Solutions

1) Landing Page dan About Us

The *landing page* is the main page of the Kapustakan System which contains some information related to features contained in the system such as *virtual tours*, collections, *events*, ticket bookings, research, research, about us, *subscribe*, *chat widgets*, change languages, and contacts and locations of the Palace. Halaman About Us contains an explanation of what is meant by the Kapustakan System itself, its history, location, and columns of criticism and suggestions.

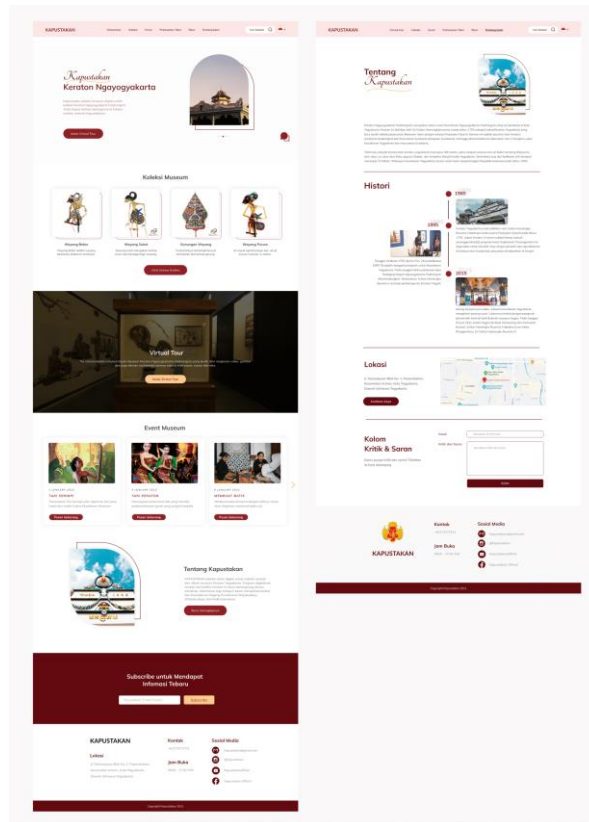


Figure 4. Design Landing Page and About Us

2) Virtual Tour

In this feature, users can see the Keraton museum digitally through a profile video, a 3D *virtual tour* accompanied by an audio *guide*, as well as a museum floor plan. Through this feature, users can get an idea of the real Keraton museum *venue*.

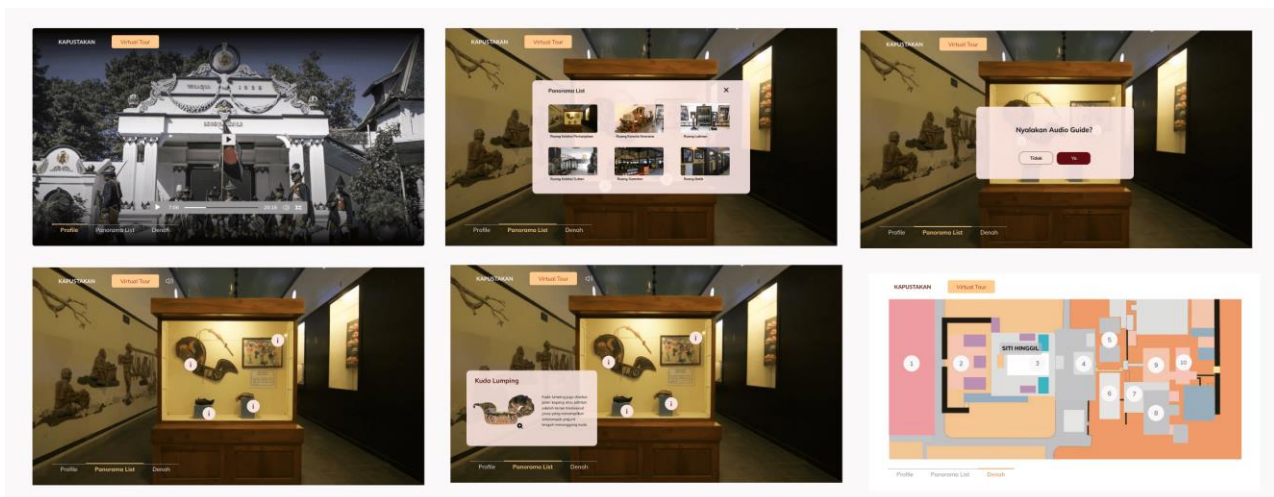


Figure 5. Virtual Tour page design

3) Collection

The collection feature is used to view the Keraton collection based on the type of category, material, or year found. Users can find references *to* the general collection owned by keraton in full with a detailed description.

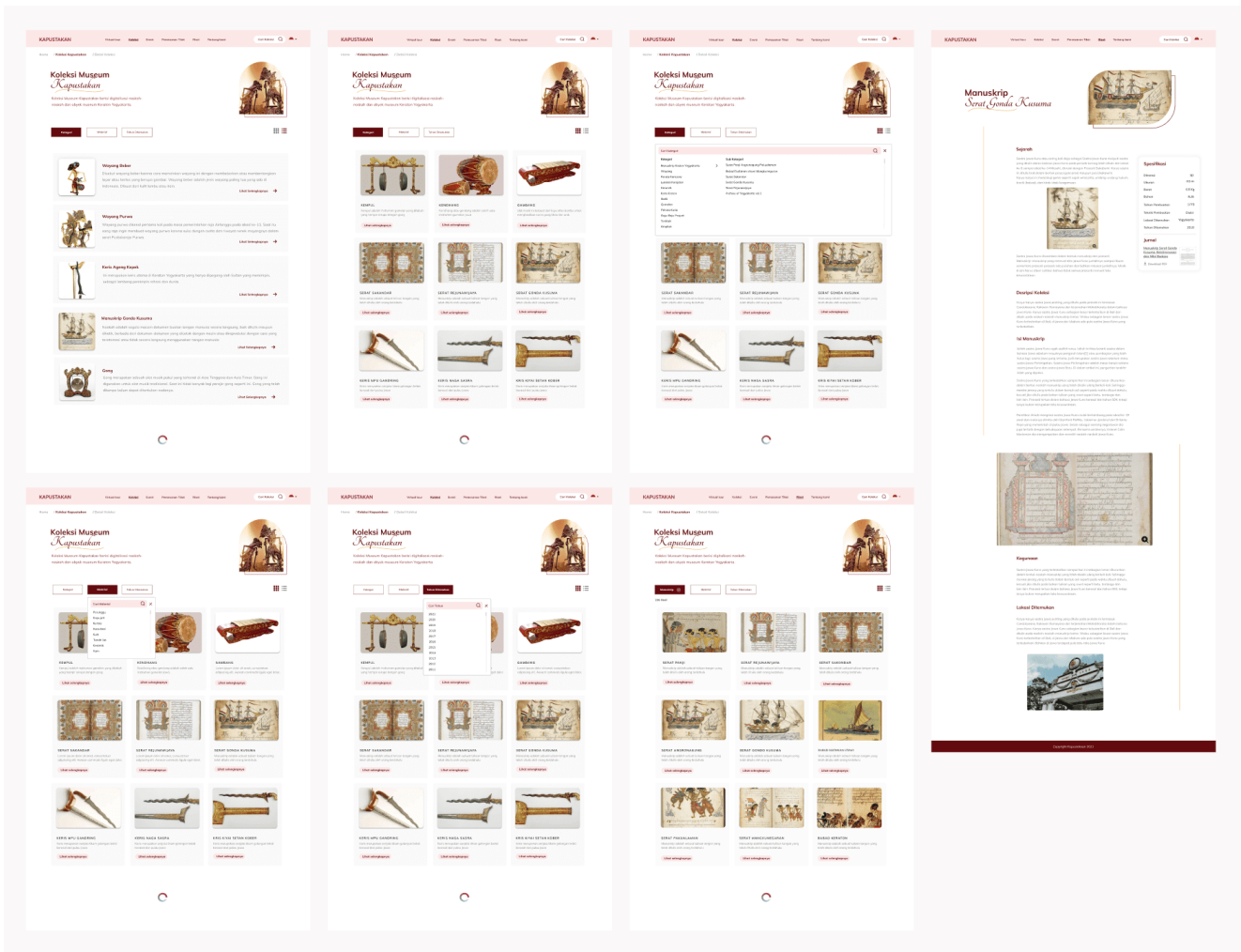


Figure 6. Collection page design

4) Event

The *event feature* is used to see various events organized by the Yogyakarta Palace. Users can search based on the name and time of the *event*. If users are interested in participating in the *event*, they can book tickets *online*.

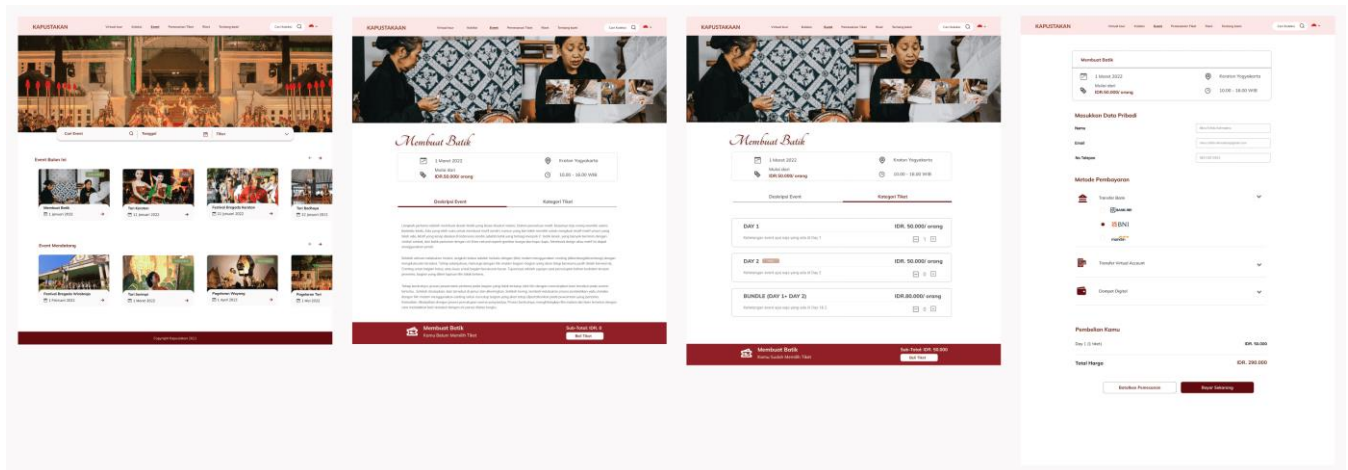


Figure 7. Event page design

5) Ticket Booking

This feature is used to book admission to the Yogyakarta *Palace museum online*. Users can book museum tickets by following the terms and conditions set by the Palace. On each page of the ticket booking process, there is a *progress bar* as a marker of the extent of the process that has been passed, as well as for instructions for the next step until the stage of the booking process is completed.

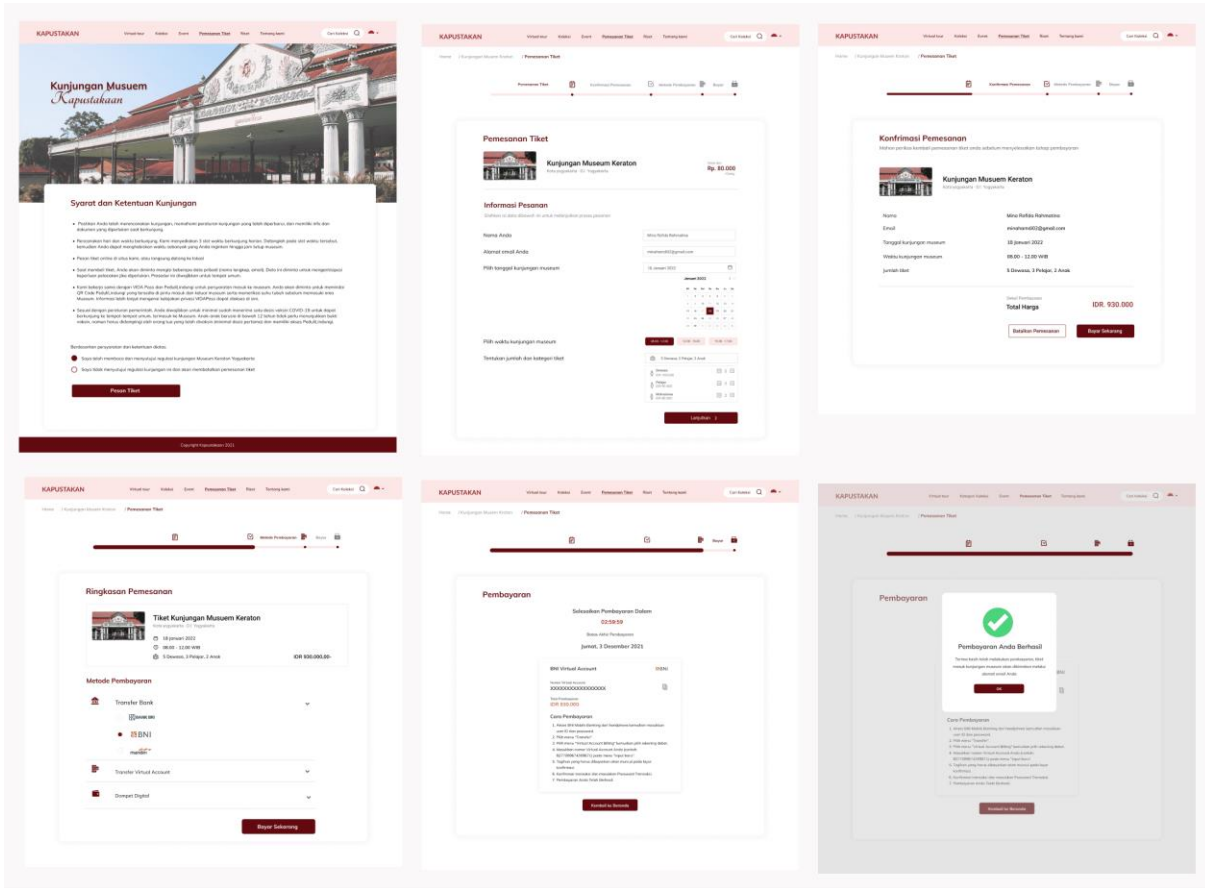


Figure. 8 Ticket Booking page design

6) Research

The research feature is used by users to submit research directly to the Keraton collection that they want to research. The research process must be carried out through a series of stages, including filling out the research submission form. If the research application process is approved, then the user will get a confirmation email containing the time and place to research the Keraton collection.

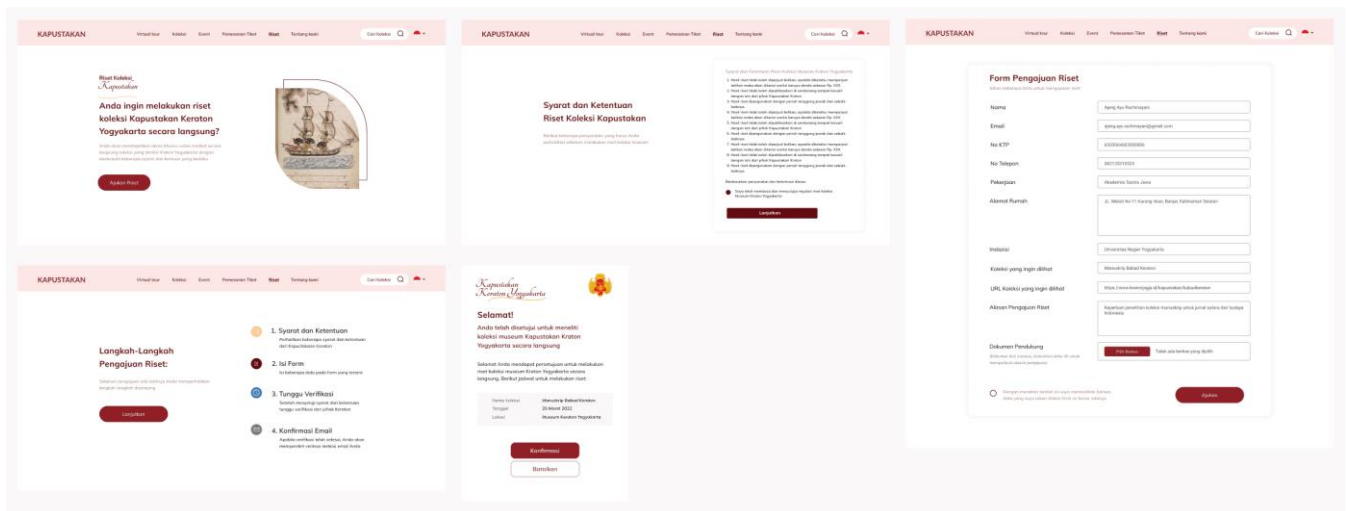


Figure. 9. Research page design

D. Evaluate Design Against User Requirements

1) Success Rate

Measure the success rate of respondents in completing a given task scenario. There are several criteria for measuring success rate [17]:

- a) Success (S): Indicates that the respondent completed the task from the given scenario correctly without any errors.
- b) Partially Successful (SB): Indicates that the user can complete a task from a given scenario when there is an error when working on it.
- c) Failed (G): Indicates that the user was unsuccessful in completing a given task.

TABLE III
SUCCESS RATE RESULT

Code	R1	R2	R3	R4	R5	R6
ST-01	B	B	B	B	B	B
ST-02	B	SB	B	B	SB	B
ST-03	SB	B	SB	B	B	B
ST-04	B	B	B	B	B	B
ST-05	B	B	B	B	SB	B
ST-06	SB	B	B	B	B	B
ST-07	B	B	B	B	B	B
ST-08	B	B	B	B	B	B

$$\begin{aligned}
 \text{Success Rate} &= \frac{\text{Success} + (\text{Partial Success} \times 0.5)}{\text{Total Task}} \times 100\% \\
 &= \frac{42 + (6 \times 0.5)}{48} \times 100\% = 93,75\%
 \end{aligned}
 \tag{1}$$

Based on Table III, the success rate calculation was carried out with (1) and obtained a success percentage result of 93.75%. This indicates that out of a total of eight scenario test tasks, the average success percentage of each user in completing the task is 93.75% which means the success rate of the Kapustakan System prototype is high.

2) Efficiency

Measure the efficiency level of the Capustakan System based on the duration of time required by the user to complete a given scenario.

TABLE IV
EFFICIENCY RESULT

Code	R1	R2	R3	R4	R5	R6	Total Time
ST-01	7(1)	7(1)	5(1)	4(1)	3(1)	3(1)	29
ST-02	28(1)	42(0.5)	27(1)	34(1)	26(0.5)	38(1)	161
ST-03	31(0.5)	23(1)	30(0.5)	21(1)	34(1)	21(1)	129.5
ST-04	34(1)	15(1)	23(1)	25(1)	29(1)	44(1)	170
ST-05	23(1)	21(1)	20(1)	21(1)	30(0.5)	34(1)	134
ST-06	42(0.5)	26(1)	48(1)	39(1)	38(1)	41(1)	213
ST-07	11(1)	13(1)	9(1)	3(1)	3(1)	7(1)	46
ST-08	10(1)	3(1)	9(1)	7(1)	8(1)	13(1)	50

The calculation of efficiency criteria is indicated in (2).

$$\begin{aligned}
 \text{Time-Based Efficiency} &= \frac{\sum_j^R \sum_{i=1}^N \frac{N_{ij}}{t_{ij}}}{NR} \times 100\% \\
 &= \frac{932.5}{1033} \times 100\% = 90,27\%
 \end{aligned}
 \tag{2}$$

Based on Table IV, efficiency calculations were carried out, the results of which showed that the percentage of time speed required by users in achieving the objectives of the scenario was 90.27%.

3) Error

Measuring the number of errors respondents find when using the Kapustakan System by measuring how many errors respondents find when using the system. If there is an error in the test, it is calculated and entered at the

wrong value (S), otherwise, if the respondent can perform the steps of solving the scenario without error then it is entered at the correct value (B).

TABLE V
HASIL ERROR RATE

Kode	R1		R2		R3		R4		R5		R6	
	B	S	B	S	B	S	B	S	B	S	B	S
ST-01	1	0	1	0	1	0	1	0	1	0	1	0
ST-02	7	0	6	1	7	0	7	0	6	1	7	0
ST-03	3	2	5	0	4	1	5	0	5	0	5	0
ST-04	5	0	5	0	5	0	5	0	5	0	5	0
ST-05	6	0	6	0	6	0	6	0	5	1	6	0
ST-06	7	1	8	0	8	0	8	0	7	1	8	0
ST-07	2	0	2	0	2	0	2	0	2	0	2	0
ST-08	3	0	3	0	3	0	3	0	3	0	3	0

The equation used to calculate the error rate is shown in (3).

$$\begin{aligned}
 \text{Error rate} &= \frac{\text{Total kesalahan}}{\text{Total kesempatan}} \times 100\% \\
 &= \frac{8}{214} \times 100\% = 3,73\%
 \end{aligned}
 \tag{3}$$

Based on Table V, the calculation of the error rate carried out by the user is 3.73%, which is where the error tends to be lower. Thus it can be concluded that the error rate that occurs in the Kapustakan System prototype is low.

4) Satisfaction

Measuring the level of satisfaction of respondents to the Kapustakan System based on the *System Usability Scale* (SUS) by providing ten questions that have a scale of 1 to 5. Scale 1 means strongly disagree, scale 2 means disagree, scale 3 means neutral, scale 4 means agree and scale 5 means strongly agree. Odd questions (P1, P3, P5, P7, P9) are positive questions. While even-ranking questions (P2, P4, P6, P8, P10) are negative questions. The results of the respondents' answers are shown in Table VI.

TABLE VI
SYSTEM USABILITY SCALE QUESTION ANSWER RESULTS

Kode	Pertanyaan	R1	R2	R3	R4	R5	R6
P1	I think I will use this Capustakan System again	5	4	5	4	5	5
P2	I feel this Capustakan System is complicated to use	1	1	1	1	1	1
P3	I feel this Capustakan System is easy to use	5	5	4	5	5	5
P4	I need help from others to use the Capustakan System	2	1	2	1	2	2
P5	I feel that the features of the Kapustakan System are running properly	5	4	5	5	5	5
P6	I feel that there are many things that are inconsistent with the Capustakan System	1	2	1	2	2	2
P7	I feel that others will understand how to use the Capustakan System quickly	4	4	5	4	4	4
P8	I find the Capustakan System confusing	1	1	1	2	1	2
P9	I feel that there are no obstacles in using the Capustakan System	4	4	4	4	3	3
P10	I need to get used to it first before using the Capustakan System	2	1	2	2	2	3

The calculation of satisfaction score is calculated on a scale of 0 to 4. On odd-numbered questions, the score is calculated by the way the answer scale minus 1. While on even-numbered questions, the score is calculated in a way of 5 minus the answer scale. The SUS score is calculated by summing the entire score of each question multiplied by 2.5 and then dividing the total score by the number of respondents so that the average SUS score is obtained as shown in Table VII.

TABLE VII
SUS RESULT

Respondents	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Total	x2,5
R1	4	4	4	3	4	4	3	4	3	3	36	90
R2	3	4	4	4	3	3	3	4	3	4	35	87.5
R3	4	4	3	3	4	4	4	4	3	3	36	90
R4	3	4	4	4	4	3	3	3	3	3	34	85
R5	4	4	4	3	4	3	3	4	2	3	34	85
R6	4	4	4	3	4	3	3	3	2	2	32	80
Average												

Based on the value account user satisfaction level obtained the average value SUS overall questionnaire score is 86.25 which is the value show valuation level *acceptable* or acceptance of use falls into the category *high marginal*, ting upscale *grade scale* or scale values belonging to category Band *adjective rating* included in the category *excellent*. With the results of this assessment, the *design prototype* of The Kapustakan system can be said to be good and worthy to be developed by the *developer* system.

V. CONCLUSION

The design of the Kapustakan System UI / UX is carried out using the *user-centred Design* approach so that the resulting design can accommodate the needs and desires of prospective users. The *user-centred design* process is carried out through several stages, namely determining prospective users, creating *user personas*, *conducting focus group* activities, making *information architecture* and *user flow* designs, designing *low fidelity wireframe* designs, *high fidelity wireframes*, up to the system *prototype*, then conduct a *prototype* validation Kapustakan System which is carried out through *usability testing* by involving six respondents who match the criteria of prospective users. The results of *usability testing* obtained a *success rate* of 93.75%, *efficiency* of 90.27%, an *error* of 3.73%, and *satisfaction* with a value of 86.25. Based on the scores on the four parameters, it can be concluded that the *prototype* design of the Kapustakan System is considered good so it is feasible to be developed at the actual implementation stage in the form of the Kapustakan *website*.

REFERENCE

- [1] Siregar, Y. B. (Maret 2019). Digitalisasi Arsip untuk Efisiensi Penyimpanan dan Aksesibilitas. *Jurnal Administrasi dan Kesekretarisan*. [Online]. 4(1), hal. 1–19. Tersedia: <http://journal.starki.id/index.php/JAK/article/view/192/135>
- [2] Kustanti, M. R., & Nugrahani, H. S. D. “Museum dalam Budaya Digital: Ketika Seni dan Budaya Menjadi Lebih Bermakna di Masa Covid-19 (Studi Kasus: Tur *Virtual Reality* Museum dalam Platform *Google Arts & Culture*),” dalam *ISoLEC Proceedings*, 2020, hal. 77-86.
- [3] Keraton Ngayogyakarta Hadiningrat, (2018, Juni 19) “Geger Sepehi” dikutip pada 7 Maret 2022: <https://www.kratonjogja.id/ragam/11/geger-sepehi>.
- [4] Keraton Ngayogyakarta Hadiningrat. (2021, September 14) “Digitalisasi Koleksi, Upaya Merawat Kekayaan Budaya di Keraton Yogyakarta” dikutip pada 8 Maret 2022: <https://www.kratonjogja.id/ragam/55/digitalisasi-koleksi-upaya-merawat-kekayaan-budaya-di-keraton-yogyakarta>
- [5] Keraton Ngayogyakarta Hadiningrat. (2022) “Kapustakan” dikutip pada 8 Maret 2022: <https://www.kratonjogja.id/kapustakan>
- [6] Amimah, “Evaluasi *User Interface* (UI) dan *User Experience* (UX) aplikasi JRku menggunakan *User Centered Design* (UCD),” skripsi, Fakultas Sains dan Teknologi, Sistem Informasi, UIN Syarif Hidayatullah, Jakarta, Indonesia, 2021.
- [7] Auliazmi, Rizki; Rudiyanto, Ganal; Utomo, R. Drajatno Widi. (November 2021). Kajian Estetika *Visual Interface* dan *User Experience* pada Aplikasi Ruangguru. [Online], 4(1), hal. 21–36. Tersedia: <https://trijurnal.lemlit.trisakti.ac.id/jssr/article/view/9968/6778>
- [8] Ergonomics of Human System Interaction-Part 110: Interaction Principles, ISO 9241-110, 2020
- [9] Priswara, “Analisis dan Perancangan *User Interface/ User Experience* Aplikasi *MNC Trade New* Menggunakan Metode *Double Diamond* pada PT. *MNC Sekuritas*,” skripsi, Fakultas Teknologi Informatika, Sistem Informasi, Univeristas Dinamika, Surabaya, Indonesia, 2021.
- [10] Ergonomics of Human System Interaction-Part 210: Human Centered Design for Interactive Systems, ISO 9241-210, 2010
- [11] Shirvanadi, Elda Chandra, “Perancangan Ulang UI/UX Situs *E-Learning* Amikom Center dengan Metode *Design Thinking* (Studi Kasus: Amikom Center),” skripsi, Fakultas Teknologi Industri, Informatika, Universitas Islam Indonesia, Yogyakarta, Indonesia, 2021.
- [12] Crum, L. (Oktober 2020). Laws of UX: Using Psychology to Design Better Products & Services. *The Journal of the Design Studies Forum* [Online]. 12(3), hal. 357–359. Tersedia: <https://doi.org/10.1080/17547075.2020.1822074>
- [13] Savira, Yordan Patra; Papatungan, Irving V; Suranto, Beni. (Juni 2020). Analisis *User Experience* pada Pendekatan *User Centered Design* dalam Rancangan Aplikasi Placeplus. *Automata*. [Online]. 1(2), hal. 28-32. Tersedia: <https://drive.google.com/drive/folders/19q79eeLRTCe0EDZ81soYAIwoZiiTQ1SF>
- [14] Kathleen, Annette; Sutanto, Ryan P; K. Aristarchus Pranayama. (2021). Analisis Perbandingan *User Flow* dari Aplikasi E-Catalogue Ifurnholic. *Jurnal DKV Adiwarna*. [Online]. 1(18), hal. 1-9. Tersedia: <https://publication.petra.ac.id/index.php/dkv/article/view/11269>
- [15] Solichuddin, Ramadhana Bagus; Wahyuni, Elyza Gusri. (September 2021). Perancangan *User Interface* dan *User Experience* dengan Metode *User Centered Design* pada Situs Web Kalografi. *Automata*. [Online]. 2(2), hal. 285-291. Tersedia: <https://journal.uii.ac.id/AUTOMATA/article/view/19477>
- [16] Molich, R; Wilson, C; Barnum, C; M. Cooley. (Agustus 2020). How Professionals Moderate Usability Tests. *Journal of Usability Studies*. [Online]. 15(4), hal. 184-209. Tersedia: https://uxpajournal.org/wp-content/uploads/sites/7/pdf/JUS_Molich_Aug2020.pdf
- [17] Pramono, Willy Arief; Az-Zahra; Hanifah Muslimah; Rokhmawati, Retno Indah. (Maret 2019). Evaluasi *Usability Testing* pada Aplikasi MyTelkom-sel dengan Menggunakan Metode *Usability Testing*. *Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer*. [Online]. 3(3), hal. 2951-2959. Tersedia: <https://j-ptiik.ub.ac.id/index.php/j-ptiik/article/view/4853>