

Usability Evaluation and Recommendation of User Interface Design for e-HAC Application by Using User-Centered Design Method

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Abstract— Regarding the rapid spread of Covid-19 in Indonesia, the Ministry of Health of Indonesia has developed an e-HAC (Electronic – Health Alert Card) application to reduce the risk. That mobile application has a purpose to detect, prevent, and control public health emergencies through point of entries. Besides, the users of the e-HAC application have trouble on using the application. The issues are specifically on navigation between the menus, and the lack of aesthetics and appealing of user interface. Those issues lead to the main purpose of this research, which is to upgrade the interface design of e-HAC application to a suitable User Interface by using User-Centered Design (UCD) method. There are also specific objectives: first is to conduct usability testing in form of questionnaires and interview two times: one is a pre-survey, to evaluate the problems of the e-HAC application based on user experience; and the another one is a post-survey, to find out whether the upgraded design that has been made can ease the users to access the e-HAC application. Then, the second specific objective is to implement the System Usability Scale (SUS) method for measuring the system usability based on questionnaires. After the implementation of the UCD method, the researcher re-surveyed and obtained a test scores of SUS, from 53.87 previously to, 85.12. That means the acceptability ranges that were originally Low changed to Acceptable. Moreover, for the Grade Scale, which was originally D into category B.

Keywords— Covid-19, User-centered Design, User Interface, Usability testing, System Usability Scale

I. INTRODUCTION

Coronaviruses (Cov), or more commonly known as COVID-19, is a virus that infects the respiratory system, according to the World Health Organization (WHO) [1]. The spread of this virus is relatively rapid; presently, 188 countries have confirmed infection with the Coronavirus [2]. To help minimize the spread of this virus, the Republic of Indonesia's Ministry of Health developed an e-HAC (Electronic – Health Alert Card) application or the Health Alert Card. This application is for all domestic and international travellers during this pandemic [3]. This application will be utilized as a research object because it is a novel application that must be utilized. However, this program acquired 1.4 out of 5 rating

stars and numerous negative comments in the Appstore's review column. To validate the e-HAC application's problems, a Pre-Survey of users was conducted using questionnaires and interviews.

The respondents in the pre-survey were users of the e-HAC application on the iOS platform with the aim of obtaining valid information. As much as 20 respondents were involved in the Pre-survey [4]. Respondents must submit a google form available at <https://bit.ly/3xDUMj5>. The data was then analyzed in Excel to determine test scores using the System Usability Scale (SUS). SUS is an effective and reliable usability testing tool that can be used on a wide variety of products and applications, as well as websites. After completing the calculations, it was determined that the SUS score from the e-HAC application is 53.87, indicating that the grade D scale and acceptability range are still low [5].

The issue perceived by users is when they are about to fill in the e-HAC form, they are often confused about where to go, and the navigation is difficult to comprehend, making it difficult for users to understand this e-HAC application. Additionally, the aesthetics of the entire application are less appealing; thus, necessitating an upgrade to make the application more appealing to use.

According to the pre-survey results, it is necessary to enhance several of the existing User Interfaces in the e-HAC application. Thus, a method called User-Centered Design (UCD) is utilized to enhance the usability of e-HAC applications. The User-Centered Design (UCD) method is the most widely used method since it incorporates users in the research process and allows for enhancements to the e-HAC application's User Interface based on user feedback [6]. Additionally, it is popular because the iteration process continues until a satisfactory design is achieved and each level requires the user to clearly integrate.

With the hope that the research can focus on the formulation of the problems that have been determined, the limitations of the problem in this study are:

- The research concludes with the creation of a User Interface design in the form of a prototype utilizing the User-Centered Design method.

- The respondents for this study are users of the e-HAC application on the iOS platform.

Based on the formulation of the problem that has been described, this study aims to:

- Create a user interface that is suitable for users of the e-HAC application.
- Apply the User-Centered Design method in completing the e-HAC application's user interface design.
- Develop a solution for the User Interface design model that will improve the usability of e-HAC applications.

II. RELATED STUDIES

A. Basic theory

1) E-HAC: e-HAC stands for Electronic Health Alert Card. This application is used as one of the e-Cards that must be used for aviation purposes in Indonesia. e-HAC is a modern health alert card developed by the Ministry of Health of the Republic of Indonesia. e-HAC is very much needed in line with the increasing problem of disease transmission, especially the Coronavirus, which is very endemic at this time. e-HAC is usually used for passengers who are traveling by plane. They must fill in their personal information and residential address as well as the destination address. This e-HAC application can be accessed on iOS [7].

2) User Interface: User Interface (UI) is part of an interactive computer system that communicates directly with users. The user interface is now completely growing with parts that are more advanced in terms of software on the computer system due to the more rapidly a person uses a computer [8].

3) Usability Testing: To see whether the results of the design solutions that we make meet users' needs and satisfy users. Usability is a parameter that influences the success of an application. In this research, we will measure and analyze the results of the three aspects of usability measurement [9], namely:

- Effectiveness: It can be said that an application has a high level of effectiveness if the application can be completed properly by its users.
- Efficiency: It can be a time calculation done by the user of the application. If time is used efficiently then the application is classified as good.
- Satisfaction: An application can be classified as good if the user is free from the discomfort of an application.

4) User-Centered Design: UCD is a web-based development system. The UCD concept is that the user serves as the center of a process development system. The system's goals/nature-nature, context, and system environment are determined by the user's experience. The term "User-Centered Design" was introduced by Donald Norman at the University of California, San Diego (UCSD) in 1980 and gained popularity with the publication of a book titled "User-Centered System Design: New Perspectives on Human-Computer Interaction." The UCD concept is that the user is the center of the process development system and that the

system's purpose/nature, context, and environment are all based on user experience [10].

The stages of making a user-centered design (UCD) based on ISO 9241-210, 2010 are described in the EASYREACH book by [11]. There are 5 processes in designing user-centered design (UCD) [7].

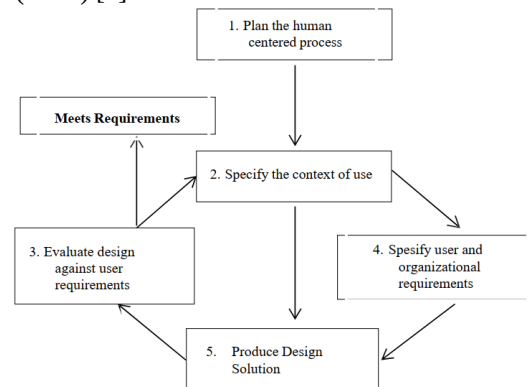


Figure 1. UCD process [7]

The following is an explanation of the UCD Process [2]:

- Plan the human centered process: At this stage, discussions are held with those who will conduct the research to ensure their commitment that the process development research is user-centered. Additionally, researchers must gain a thorough understanding of the User-Centered Design (UCD) process through literature studies, training, or seminars.
- Specify the context of the use: Identify the person that will use the product. This will explain what for and in condition as to what they are going to use the product.
- Specify user and organizational requirements: Identify user requirements and organization needs.
- Product design solutions: Build design as the solution from the product analyzed.
- Evaluate design against user requirements: To evaluate the design carried out that the user and organizational goals have been achieved.

5) System Usability Scale (SUS): System Usability Scale (SUS) is an information system method that provides superior measurement tools given to test users. This model is applied by using 10 questions arranged in the form of a questionnaire, followed by 5 options of answers for each. The question begins with Very Agree up to Very Disagree. This method can be used to evaluate various types of products and services, including hardware, software, mobile devices, websites, and applications. In the System Usability Scale, the test users are given 10 question items as follows [12].

- I think that I would like to use this system frequently.
- I found the system unnecessarily complex.
- I thought the system was easy to use.
- I think that I would need the support of a technical person to be able to use this system.
- I found the various functions in this system were well integrated.

- I thought there was too much inconsistency in this system.
- I would imagine that most people would learn to use this system very quickly.
- I found the system very cumbersome to use.
- I felt very confident using the system.
- I needed to learn a lot of things before I could get going with this system.

6) Covid-19: Coronavirus Disease 2019 (COVID-19) is a novel form of the disease that has never been identified in humans previously. The individuals most at risk of contracting this disease have frequent contact with COVID-19 patients, particularly those who care for COVID-19 patients [2]. The most common signs and symptoms of COVID-19 infection include distraction respiratory acute symptoms such as fever, cough, and congested breath. The typical period of incubation was 5 – 6 days, with a period incubation characterized by fever, coughing, and shortness of breath [1].

It is believed that the SARS-CoV-2 virus is transferred from person to person by respiratory droplets formed during coughing. Additionally, these splashes might occur as a result of sneezing and normal breathing. Therefore, advised preventive measures include handwashing with soap and running water, wearing a mask, and maintaining a minimum distance of one meter from other persons.

One of the first steps taken by the government was to socializethe Social distancing movement for the community, do not make direct contact with other people, and avoid mass gatherings [13].

7) Mockup and Prototype: MockUp is a visual media or preview of a "flat" design conceptthat is given a visual effect so that the results are very similar to the real thing, mockUp can provide a real picture of a design concept howthe concept will look later if it has been applied to or into real objects.MockUps can also add visual value to a design concept [14].

Prototype, which is making a mock-up of information or requirements that have been obtained from the user. Another goal is to see what shortcomings the user feels when the application is incomplete. So, if there is a shortage, it can be corrected immediately [15].

8) Figma: Figma is design tool usually used to make applications view mobila, dekstop, website, etc. Figma can be used in system operationwindows, Linux, or Mac by connecting to the Internet [16].

B. Basic theory

In this study, researchers used literature of a pre-existing type.This is intended to evaluate literary works and find out the advantages and disadvantages of previous studies. The following table describesthe results of research related to research variables.

Based on the table 1, it can be concluded that the existingproblems can be resolved with design rules. The interface design is carried out using the User-Centered Design

(UCD) method by focusing on the primary needs of the user. Additionally, the Titip Masa website has a usability value of 64.5, which is at grade C. Afterthe repairs were made, it increased to 82.5 and was in grade A based on the system usability scale (SUS) score.

TABLE 1. TABLE OF LITERATURE STUDY

No	Research Title	Researcher	Year	Research Result
1	Using the User (UCD) Method in the Redesign of the Web Portal of the Psychology Department of the Faculty of Social and Political Sciences, Brawijaya University	[7]	2018	Result of the research that can be resolved with the design rules ones exist Standardization and HHS guidelines.
2	Cross-School Library Information System Interface Design Using the User-Centered Design (UCD) Method	[17]	2020	Design interface is using the UCD method, by focusing on the primary needs of the user. Design Interface System Cross Information School. This library is designed with Online Union Catalog, Maintenance Master Data Library Members, Registry Transactions of Borrowing. User Access Rights Settings Information Systems, and Recommendation Collection based on User Behavior.
3	Application of the UCD (User – Centered Design) Method in the Web-Based Putri Intan Shop E-Commerce	[18]	2017	Based on Usability Testing with System Usability Scale, Putri Intan Shop is in a very good range, which is, 86.8%.

III. SYSTEM BUILT

The following is the modeling flow depicted in Figure 2. namely, the stages of the method based on User-Centered Design (UCD). Researchers used five stages: Plan the Human-Centered Process, Specify the Context of Use, Specify User and Organizational Requirements, Produce Design Solution, and Evaluate Design.

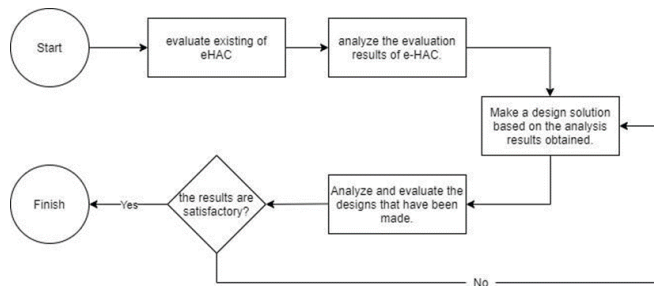


Figure 2. Modeling flow

A. Evaluation of Existing e-HAC

At this stage, the author will evaluate the current e-HAC application.

1) Participant: In this study, based on the User-Centered Design method at the Plan the Human-Centered Design stage, the involved participants have used the e-HAC application since they can provide more accurate input based on their experiences. Participants in this study consisted of 4 groups based on different age vulnerable groups. Each group has 4 - 5 vulnerable people of the same age. Group 1 ranges from the age of 17 to 21 years, group 2 ranges from the age of 22 to 30 years, group 3 ranges from the age of 31 to 45 years, and group 4 ranges from age above 45 years.

2) Methode of Collecting Data: In the following stages, the authors used 3 methods to obtain evaluation results, namely as follows:

- **Interview:** In terms of interviews, the author will conduct online interviews via video conferencing with several people who have used the e-HAC application during this pandemic. The points that will be asked during the interview are about the use of the e-HAC application based on the experiences of the participants. Questions can be open-ended.

Before conducting the interview, a pre-interview will be conducted so that the questions asked are in accordance with the needs and are easily understood by the respondent to obtain appropriate answer. The type of interview used is semi-structured in which questions are planned but not necessarily asked in the same order as listed.

- **Questionnaire:** Next, to get the results of an evaluation of the current state of the e-HAC application. The author provides a questionnaire containing 10 questions based on the System Usability Scale (SUS), which provides a comprehensive view of usability and is carried out subjectively [12]. The results of this

questionnaire are in the form of scores that will be used as a result of later analysis.

B. Analysis of Evaluation Result

At this stage, the authors analyzed the results obtained after evaluating the current conditions of the e-HAC application, where the results of the analysis are obtained from feedback which can be seen from the results of the questionnaire and the results of interviews with the participants.

1) Evaluation Result: At this stage, the writer will conduct an analysis and see the results of the evaluation that has been done previously. The author identifies people who use the e-HAC application. This will explain what for and under what conditions they want to use this e-HAC application and in accordance with the User-Centered Design concept at the Specify the Context of Use stage.

The interview results, which include qualitative data, are usually processed first before they are ready for use. However, the qualitative analysis still uses words usually arranged into an extended text and does not use mathematical or statistical calculations as analytical tools. Hence, the interview results use data analysis techniques to include transcripts of the interview results.

After collecting data from the results of questionnaires and interviews related to the current conditions of the e-HAC application to create user personas, which is according to [19], in order to create an optimal understanding in a study in the specification of user needs, at least the survey uses 4-5 respondents for each age susceptible so that the information obtained is more potential. After the results of the data have been collected, they will be made into a persona portfolio. This stage is the Specify User and Organizational Requirements stage.

We will evaluate it from the questionnaire results distributed to several respondents, which will be measured using SUS. A questionnaire contains questions about Effectiveness, Efficiency, and Satisfaction where we can see the results of each respondent's scores and calculate the average of the results of these scores so that we will get the results of the evaluation of the current e-HAC application.

According to [20], If the results obtained are below 68, it can be concluded that the e-HAC application is still classified as bad and needs improvement.

C. Produce Design Solution

In this Produce Design Solution stage, the author will create a design solution based on the analysis results that we have done previously. After identifying usability issues, recommendations for improvement are made. This recommendation is made in the form of a prototype where the author will create Low Fidelity in the form of wired mockups. After that, the author will create a High-Fidelity Prototype created using the Figma application.

In the research solution design flow, interface design is made based on the results of the needs analysis. This stage is used to help users see how the product will work in the form of a mockup that describes the overall description and

operation of the system to be constructed. After completing the flow design solution, the findings are presented to potential users for evaluation, and iteration occurs here. An iteration might occur up to three times to achieve the best results. Repair is a priority, as it is a significant part of the application. The prototype demonstrates the difference between before and after the iteration process.

D. Evaluation Design

At this Design Evaluation stage, the writer will test the design that has been done. Based on the method used, the User-Centered Design is user-centered for each process. Participants who have been involved since the beginning of evaluating the e-HAC application will be given Usability Testing from the results of the improvised e-HAC application by using the Usability Testing technique, namely in the form of the System Usability Scale (SUS), so that they can feel the difference from the e-HAC application before and after improvisation.

1) System Usability Scale: System Usability Scale is a form of questionnaire coined by John Brooke in 1986. This questionnaire consists of 10 questions that provide a comprehensive view and assess subjectively from a Usability perspective [12]. The score obtained at SUS will determine whether the prototype already has a better usability value based on the needs and desires of the user.

The following rules will be used to calculate the results of the improvisation test from the e-HAC application using the System Usability Scale. For each odd statement, the participant's answer scale is subtracted by 1. For each even statement, the value obtained is 5 minus the scale position. Then all the scores are added up and then multiplied by 2.5. After that, the total results are calculated on average [20].

The value range of the SUS questionnaire is 0-100, according to [20]. The average SUS score is 68. If the SUS score is above 68, it can be stated that the user is satisfied. Moreover, the Percentile Rankscore received Grade C.

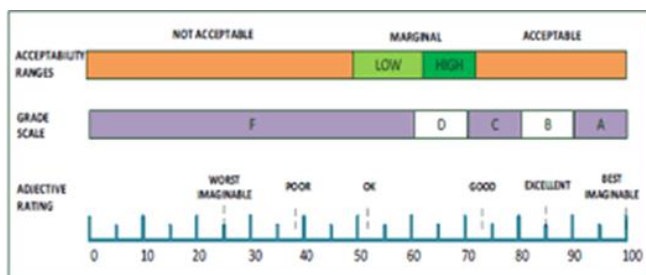


Figure 3. Determination of the assessment results [5]

IV. EVALUATION

A. Pre-evaluation Survey

At the initial test result stage, a questionnaire using SUS was given to 20 respondents who had used the e-HAC application on the IOS platform. From the initial evaluation results obtained the following results:

TABLE 2. PRE-SURVEY RESULT

Respondent	Rating Result	SUS Score
1	26 x 2.5	65
2	18 x 2.5	45
3	24 x 2.5	60
4	21 x 2.5	35
5	33 x 2.5	52.5
6	12 x 2.5	82.5
7	12 x 2.5	30
8	24 x 2.5	60
9	9 x 2.5	22.5
10	20 x 2.5	50
11	22 x 2.5	55
12	39 x 2.5	97.5
13	35 x 2.5	87.5
14	24 x 2.5	60
15	19 x 2.5	47.5
16	22 x 2.5	55
17	20 x 2.5	50
18	28 x 2.5	70
19	15 x 2.5	37.5
20	6 x 2.5	15
Average		53.87

Based on the results obtained, the usability of e-HAC applications is still relatively low and needs to be improved. Then, improvisation will be done using the User-Centered Design method to fulfill the user's wishes.

1) Specify Context of Use: The group of users of e-HAC application is people who travel domestically using air transportation and water transportation. Moreover, because this study only focuses on the scope of a user interface, the stakeholder group is not a respondent but only a group of users who are respondents.

2) Specify Requirement: The specification stage of user needs is done using the interview method with three users chosen from 20 respondents at the initial evaluation stage, considering that they feel the constraints when using the e-HAC application. It is expected that they will provide suggestions and inputs for the next stage of improvement in the e-HAC application.

TABLE 3. APP USERS

e-Hac User	Purpose
Citizen	As a condition of domestic travel to record data of each transport passenger

TABLE 4. INTERVIEW RESULTS

Interviewers	Summary
R1	On the registration page, the users feel less secure because registering in this application only uses an email and password. Hence, it affects the login page. Thus, changes are needed on the registration and login pages in order to provide security to each user.

R2	The UI design on the main page is quite confusing because there are 3 menus on the navbar that do not show the main features of this application, making this application inefficient and quite time-consuming. Also, the aesthetics of this application are less attractive, which makes this application less attractive.
R3	Filling out the e-HAC form takes a long time because the data requested is extensive and must be done manually. As a result, simplification is required when filling out the form and some additional information in order for this application to be effective.

3) Produce Design Solution: At this stage, after completing the previous stages, we can create a design solution that will be built to improve usability in this e-HAC application. In building a design solution, we will make it into 2 forms, namely:

- **Low Fidelity:** Low Fidelity is a prototype that has not been the final product or a product that is still unfinished. Low Fidelity is beneficial because it is very inexpensive in terms of finances, straightforward to work with, and swift to complete. So many ideas can be issued when designing an application without much loss. Sketches on paper, storyboards, and many others can be used to apply Low Fidelity.
- **High Fidelity:** High Fidelity is a more detailed form than Low Fidelity. Interaction with High Fidelity is much better at describing the design. In contrast to Low Fidelity, High Fidelity can make designers reluctant to explore design. Another difference between Low Fidelity and High Fidelity is that Low Fidelity focuses more on the basic elements, while High Fidelity focuses on colors, etc.

After completing both design solutions, as shown in Figure 4, we will enter the evaluation stage to ensure the design improvements we make are appropriate and increase the usability value of the e-HAC application.

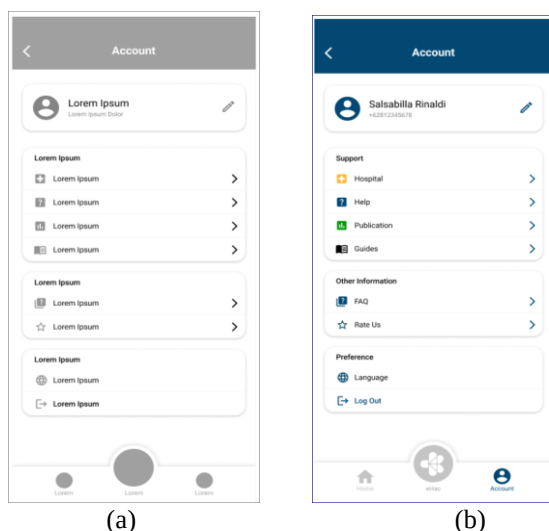


Figure 4. Low Fidelity (a) and High Fidelity (b) of Account page

B. Improve Design Solution

After conducting Pre - survey and getting a SUS score, it can be seen that the result of the SUS score obtained is still relatively low because it is still in the “Low” category. Therefore, we make design changes according to the feedback that has been given by the previous respondents which is to ease the use of the e-HAC application. The full improvement can be accessed at <https://bit.ly/3DjYuQ9>. Besides, here are some main pages that have been updated by using UCD:

1) Registration Page: Several changes were made to user information on the registration page, which initially only used email and passwords, was changed to some more detailed personal information such as phone numbers and verification numbers that will be sent to each user to increase their security.

2) Homepage: On this main page, significant changes will be made to improve the usability of eHAC application users. The UI Design on the main page of this application will be changed to make it more aesthetic and comfortable for users to see, and put the main features on the navbar to make it easy to see and make it easier for users to fill out e-HAC forms.

3) Form e-HAC Page: Filling out the form on the e-HAC form filling page is simplified, with each information converted into several steps. Furthermore, a scan feature for the mode of transportation can make it easier for users to fill out forms so that they do not have to fill them out manually one by one. Then, add some other information, such as health information, so that this application is effective and can track each user effectively to reduce the spread of the Covid-19.

4) Account Page: In the previous UI Design, the profile page contains the e-HAC form and eHAC history. The users can only view their email and change their password on the profile page, so this page is not functional enough because the users cannot see personal information. Therefore, changes were made to the profile page to improve the usability of this application and provide some assistance and information in order to complete this e-HAC application.

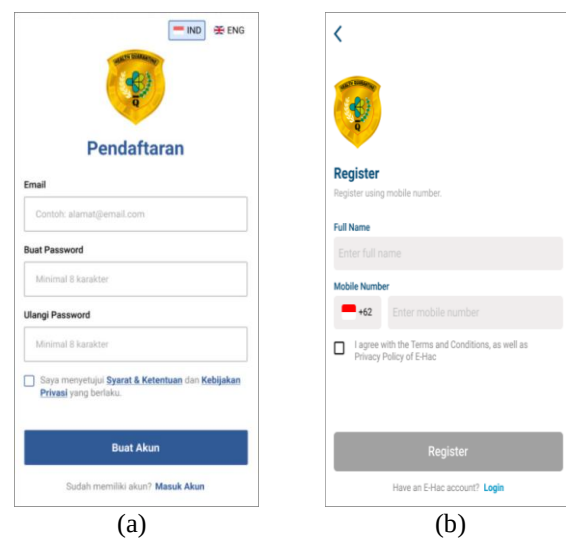


Figure 5. Before (a) and After (b) of re-design the Register page



Figure 6. Before (a) and After (b) of re-design the Home page

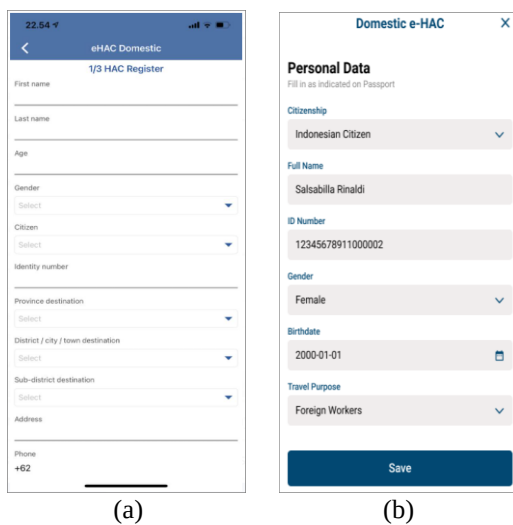


Figure 7. Before (a) and After (b) of re-design the Create e-Hace Document

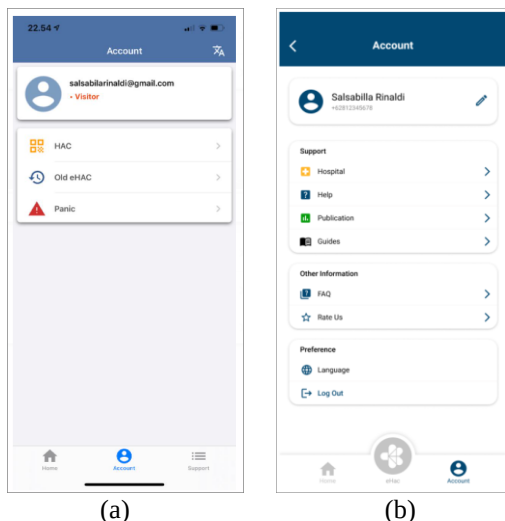


Figure 8. Before (a) and After (b) of re-design the Account page

C. Final Test Results

The test result stage is the same as Pre - the initial survey conducted using the System Usability Scale (SUS) questionnaire. This SUS questionnaire will be distributed to 20 respondents who are the same as the initial Pre -survey respondents. Before completing the SUS questionnaire, respondents must test the prototype e- HAC application developed using the User-Centered Design (UCD) method. The results of the answers from the respondents can be seen in Table 5.

TABLE 5. FINAL TEST RESULTS

Respondent	Rating Result	SUS Score
1	37 x 2.5	92.5
2	33 x 2.5	82.5
3	34 x 2.5	85
4	36 x 2.5	90
5	34 x 2.5	85
6	37 x 2.5	95
7	34 x 2.5	92.5
8	36 x 2.5	85
9	36 x 2.5	90
10	37 x 2.5	92.5
11	34 x 2.5	85
12	37 x 2.5	92.5
13	35 x 2.5	87.5
14	36 x 2.5	90
15	37 x 2.5	92.5
16	38 x 2.5	95
17	35 x 2.5	87.5
18	35 x 2.5	87.5
19	37 x 2.5	92.5
20	37 x 2.5	92.5
Average		85.12

Based on the results of the final usability test conducted after making improvements, it can be seen that the sus score obtained is 85.12, which includes Grade B and Acceptability Grade, which is Acceptable.

D. Analysis of Final Test Results

Based on the Pre - survey and final survey results conducted after making improvements using the UCD method. It can be seen that sus score gets an increase of 31.25, which is the initial survey result of 53.87, and the final survey result gets a score of 81.12. In the Pre - survey stage, where before the improvement, the value obtained at the Acceptability Ranges level is Low because the score obtained is below 70. After the final evaluation and improvement in the UI in this e-HAC application, the value obtained becomes Acceptable because the score obtained is above 73. Grade Scale level before evaluation and improvement get category D because the score obtained below 68. After the evaluation and improvement of the Grade Scale level, the SUS score obtained is in category B at 80 and above.

V. CONCLUSIONS

In the early stages, a pre-survey involving 20 respondents using system usability scale (SUS) get an average score of 53.87, which gets Grade D and Acceptability Ranges level falls into the low category. The main problem obtained from observations, interviews, and questionnaires conducted to measure usability in e-HAC applications is the layout of this application that is not neat, so it is not user friendly. E-HAC application before the repair, many cause difficulties to the user, especially when filling out the form in creating the e-HAC application. After being done using the user-centered design method, the e-HAC application has improved its usability. Re-surveyed after making improvements with the same respondents in the Pre - survey, now sus score obtained by e-HAC application increased to 85.12 from 53.87, which means acceptability ranges that were originally Low to Acceptable. Moreover, for the Grade Scale, which was originally D into category B.

Although the usability results in e-HAC applications obtained in this study have improved, they are still not perfect and can be improved for future research. Additionally, due to the limited information from users who need further research, especially on observation to see the actual condition of using e-HAC application at the airport or port. Therefore, further evaluation and improvement is needed so that the score obtained can get the highest score in each category.

REFERENCES

- [1] W. World Health Organization, Corona Virus (2019-nCoV), Situation Report 10, 2020.
- [2] D. R. Buana, "Analisis Perilaku Masyarakat Indonesia Dalam menghadapi Pandemi virus Corona (COVID-19) dan Kiay Menjaga Kesejahteraan Jiwa," National Research Toms State University, Universitas Mercu Buana, 2020.
- [3] A. Yuri, Dampak Jejaring Sosial pada customer relationship management (CRM) dalam lingkungan bisnis., 2015.
- [4] A. Bangor, P. T. Kortum and J. Miller, "Determining what individual SUS scores mean Adding an adjective rating scale," Jurnal of usability studies, pp. 114-123, 2009.
- [5] I. O. f. Standardization (ISO), "Human-centered design for interactive (formerly known as 13407)," Ergonomics of human system interaction-Part 210, 2009.
- [6] Kemenkes, "Info Infeksi Emerging Kementerian Kesehatan RI 2020," 2020. [Online].
- [7] J. Brooke, "Journal of Usability Studies 8," SUS: a retrospective, pp. 29-40, 2013.
- [8] J. Sauro, "Measuring usability with the system usability scale (SUS)," 2011.
- [9] I. S. Saputri, M. Fadhli and S. Ibnu, "Penerapan Metode UCD (User Centered Design) pada E-Commerce Intan Shop Berbasis Web," 2017.
- [10] A. Krisnoanto, A. H. Brata and M. T. Ananta, "Penerapan Metode User Centered Design pada Aplikasi E-Learning Berbasis Android (studi kasus sma 3 sidoarjo)," 2018.
- [11] D. Pratiwi, M. C. Saputra and N. H. Wardani, "Penggunaan Metode User Centered Design (USD) dalam Perancangan Ulang Web Portal Jurusan Psikologi FISIP Universitas Brawijaya," Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer, vol. II, no. 7, pp. 2448-2458, 2018.
- [12] E. Rahmawati, "Perancangan Design Antar Muka Sistem Informasi Cross-School Library Menggunakan Metode User Centered Design (UCD)," 2018.
- [13] N. L. Prihartini, "Perbaikan User Interface Fitur Personal Shopper pada Website Menggunakan Metode User Centered Design," 2020.
- [14] M. O. Leavitt, "Research-Based Web Design & Usability Guidelines," Departement of Health and Human Services, 2006.
- [15] L. A. a. G. Lombardi, "User Centred Design for EASYREACH," 2010. [Online].
- [16] E. a. D. H. A. Ralston, User Interface, in Encyclopedia of Computer Science, 4th ed., London: Nature Publishing Group, 2000.
- [17] A. Z. O. N. e. a. Sohrabi C, "World Health Organization Declares Global Emergency : A review of the 2019 novel coronavirus (COVID-19)," Internasional Journal Of Surgery, pp. 76, 71-76, 2020.
- [18] M. R, "How To Specify the Participant Group Size for Usability Studies: A Practitioner 's Guide," Journal of Usability Studies, vol. (5)1, pp. 34-45, 2009.
- [19] A. A, Rancangan Sistem Pameran Online menggunakan Metode UCD (User Centered Design), STMIK AMIKOM, 2012.
- [20] Z. A. Khoir, "Apa Itu Mockup dan Bagaimana Cara Memakainya?," [Online]. Available: <http://www.kelasdesain.com>.
- [21] A. Segara, "Penerapan Pola Tata Letak (Layout Pattern) pada Wireframing Halaman Situs Web," vol. 3, pp. 452-464, 2020.



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