Usability Evaluation of KAI Access Application

Fatin Saffanah Didin* and Fandy Valentino

Department of Industrial Engineering, Institut Teknologi Sumatera (ITERA), South Lampung, Indonesia
*Email: fatin.didin@ti.itera.ac.id

Abstract. The Government of Indonesia develops some distribution of transportation especially land transportation, i.e. train. This transportation only available in Java Island, but now available in Sumatra Island. The existence of this train was supported by the development of the Industry 4.0 which is train tickets purchased by Applications that can minimize cash payment, increasing the efficiency and effectiveness of customers. User ratings for KAI Access Application on Google Playstore is not good enough, there are still a lot of users who give complaints and bad ratings on this Application. From the data, there is a usability issue in this application. The purpose of this research is to evaluate KAI Access application with a usability approach in Sumatera Island which can be used as a basis for Increase performance of KAI Access application after comparing with Java Island users. This evaluation using a usability approach with the System Usability Scale (SUS) questionnaire, mapping complaints and task completion time for user performance. The result of this research are alternatives to improve this application such as redesign interface for home page and improvement of the database. Positive correlation is found between type of user (novice and expert) and origin of user (Java and Sumatra) where results show significant difference.

1. Introduction

Indonesia has several transportation alternatives such as land, air, and sea. The Government developed the distribution of transportation in Indonesia, especially land transportation such as train. Lately, the train only available on Java Island. Route of train already available on Java island has reached all provinces on the island [1].

Travel activities by train are generally carried out using ticket purchases manually coming to the nearest station. But with the Industrial revolution of 4.0, PT. KAI follows the technology developments. PT. Kereta Api Indonesia Company presents "Official Mobile Application Kereta Api Indonesia" on July 26, 2013, which is the Indonesian railways Mobile Application Access [2]. This application comes from customer and community needs, especially the train users. People want convenience in buying train tickets with the application not with cash anymore.

This application facilitates the service process for costumers but some factor affect in mobile applications such as user-friendly aspects. The user will feel ease and satisfaction when the user-friendly aspect is noticed in the mobile application. The frequent problems that coming up are lack of information provided by the application, the difficulty of accessing applications and others. Usability is an important aspect of creating an app. Usability has a general definition of how far a product or service can be used by the user to achieve its purpose. Then how the users easily use the application, the interface can generate the value of users’s satisfaction in using the product [3].

KAI Access application is easily accessed due to previously measure by previous researcher. Users provide a positive response that can then simplify the process. The user interface is a complex system because it is user-controlled [4]. The purpose of the user interface is to make a good and pleasant
interaction between the user and the application. The user interface is associated with the display screen, meanwhile, good design becomes an important indicator to make the user use the application [5].

KAI Access application after the usability evaluation using the use questionnaire has a usability value of 47.58%. These values are derived from the calculation of usefulness criteria, ease of use, ease of learning and satisfaction. This evaluation was conducted in Java Island with 9 respondents classify based on age range including adolescents, students, and adults [6]. Then the usability value for the KAI Access app uses the SUS Questionnaire of 57.48%. The value is obtained from the evaluation conducted in Java Island with several respondents 15 people [7].

As time goes by, the train has been operating in Java and Sumatra islands. The use of trains on Sumatra is still relatively new because of the two provinces with the largest a population prioritized by PT. Kereta Api Indonesia to build rail access in Lampung and South Sumatera province with population of 7,594,465 and 7,427,752 people in each province [8]. Currently, trains are available in Bandar Lampung and Palembang.

User ratings for KAI Access Application on Google Playstore not good enough, there are still a lot of users who give complaints and bad ratings on this Application. The Rating in 2017 Playstore is 3.8 [6] and currently in 2019 the rating decreases into 3.7 from a scale of 1 to 5 [9].

Based on that result the usability of the KAI Access application’s user interface needs to be evaluated. Therefore this research aims to evaluate the usability of the KAI Access application’s user interface, comparing user in Java and Sumatera Island, and provide solutions that can improve its usability.

2. Method

2.1. Object
According to the preliminary result, most features of kai access application are booking, reschedule and cancelation tickets. Users access the application using android operation. Therefore this research evaluated 1 feature such as booking a ticket with an android operating system. The android operation system is currently the most used in Southeast Asia [10].

2.2. Procedure
Participants are given a task that has to be completed. The task is related to the main function of the KAI access application. The performance measurement method is used to measure the effectiveness, efficiency, and satisfaction of the user. SUS questionnaire is used to measure the usability computer system (mobile application) [11]. Participants have to do the task once using smartphone android based and measure completion time for that task. After finishing the task, an online sus questionnaire given to measure a participant’s satisfaction.

2.3. Participant
Participant consist of users who come from java (bandung, yogyakarta city) and sumatera ( bandar lampung and palembang city). There are 2 types of participants such as expert users and novice users who never used the feature before. There are 4 categories of participant such as expert java, novice java, expert sumatera, and novice sumatera. Range of age participants is 18-40 years old who involved by college students and adults categories [6]. In this research, total participants are 60 for each island, and half of them are expert and novice users. While minimum participants for research are 30 participants [12].

2.4. Tasks
Tasks in this research considered done when participants back to the home page. Tasks for booking ticket are:
1. Home page: intercity train.
2. Ticket booking: from tanjung karang station bandar lampung to kertapati station palembang on 10 October 2019, economic class, 1 adult.
3. Choose the ticket.
4. Booking confirmation.
5. Identity form.
6. Back to the home page.

2.5. Measurement
To evaluate kai access application’s usability, the effectiveness, efficiency, and satisfaction will be measured. In this research effectiveness is measured by the rate of success in doing the task, efficiency is measured by the time taken for doing the task in kai access and satisfaction is measured by the sus questionnaire.

3. Results and Discussion

3.1. Questionnaire
This research used the Indonesian questionnaire version which already using back translate method. After the questionnaire is translated, that questionnaire tested based on reliability and validity value. The result is all the statement shown Cronbach Alpha to be reliable (P>0.06). Validity test used Pearson correlation, the result of all the statements (P>0.05).

Based on the SUS questionnaire usability value for expert Java is 72.93% and novice Java is 61.93%. Meanwhile, the usability value for expert Sumatera is 60.93% and novice Sumatera is 58.66%. Recapitulation of data shown in Figure 1. All of the categories have different SUS value. The difference between each group will be tested. The data tested with Two-Way ANOVA to understand if there is an interaction between variables. Confidence interval 95% of the data shown (P<0.05) is a significant different. SUS value results in this research have different value with previous research because more participants and KAI Access version more update in this research.

![Figure 1. SUS Value](image)

The measurement using the SUS questionnaires have 10 dimensions that are measured. The first dimension of usage frequency is the only one that has significant differences between the original and the user factors. The results showed that the respondents from Java tend to use more often than the Sumatran respondents. This can be due to more rail routes available in Java and also the convenience factor compared to other land transportation where when using other land vehicles in Java may be jammed more often than Sumatra which tends more smoothly. The user factor is influential since the user will use the application. Dimensions that are only influenced by user factors or are not a significant difference in the dimensions of easy app browsing, assessments of the app's designed features and browsing speed. The dimensions generally relate to the application used. Ease and fluency in use will only be felt by people who are already users. The origin factor is not significantly influential meaning both respondents from Sumatra and Java both feel the same satisfaction of the application for its users.
Dimensions influenced by the original factors related to technical assistance, the number of inconsistencies in the application, complexity while browsing and the need to learn before browsing the application. In general, these dimensions discuss the desires and abilities of learning. The results showed that the average of Sumatra respondents was higher than that of Javanese respondents, meaning that Javanese respondents were easier and faster to learn the application. This can be attributed to the first dimension where respondents from Java more often use applications that have an impact on fluency in usage.

As for the dimensions of the level of assessment of application complexity and confidence in browsing applications, there is no significant difference between the origin and user factors. This means that this factor is a factor that is shared by all respondents. The difference in value given purely depends on each individual.

3.2. Effectiveness

Participants are classified as completing the task back to the homepage without asking questions then it classified as completed success rate. Participants who ask a question while doing the tasks, but finish the task back to the homepage will be count as completed not perfect. The not complete task is participants who cannot finish the task come until come back to the homepage. Table 1 shown the success rate of each category. All of the participants complete the task. The success rate for expert users higher than novice users because the expert users frequently using applications. User from Java has a success rate higher than the user from Sumatera. The existence of train and application existed first in Java.

| Categories     | Success Rate |
|----------------|--------------|
|                | Completed    | Completed not perfect | Not completed |
| Expert Java    | 92.67        | 7.33                 | 0             |
| Novice Java    | 88.67        | 11.33                | 0             |
| Expert Sumatera| 84.33        | 15.67                | 0             |
| Novice Sumatera| 76.33        | 23.67                | 0             |

3.3. Efficiency

Efficiency is duration users while the task can be accomplished and complete. In this research the average time for every participant. For participants from Java Island who did task booking tickets, the average time taken to booking is 91.56 second for expert Java and 139.73 second for novice Java. Participant Sumatera Java Island who did task booking tickets, the average time taken to booking is 140.70 second for expert Sumatera and 163.53 second for novice Sumatera.

Based observation during the test, the difference between expert user and novice user are processing the application. Novice user takes more time rather than expert user, because they have to analyze something new, and takes time for learnability process. Some participants have difficulty in finding where is menu booking on the first page.

For the different time duration for the user from Java and Sumatera, generally the user from Sumatera needs more time did the tasks booking tickets by application rather than Java user. Research finding even the expert user in Sumatera still needs more time rather than a novice user in Java. Train application exists first in Java rather than Sumatera. Participant in Java has a long duration for knowing that application before [13].
All of the categories have a different average time. The difference between each group will be tested. The data tested with Two-Way ANOVA to understand if there is an interaction between variables. Confidence interval 95% of the data shown (P<0.05) is significantly different.

3.4. User Interface Problems
After finish the tasks, participant give some comments about this application. There are some findings problems from this application such as Hard to find booking menu, name of the station not available, hard to understand language and interface not attractive. Figure 2 shown frequently of each problem from all participants.

3.5. Proposed Designs
Based on user interface problems, this research findings most frequently problems find is hard to find the booking menu and the name of the station not available. This problem based on the Pareto chart that shows the significant problem in this application. For the first problem alternative solution for improvement that application to move the menu booking on the homepage to the center or top page. An alternative solution for the second problem is improvements in the database between departures to the destination station. The result of usability evaluation from this application is shown in Table 2.

![Figure 2. Exist Problem in Application](image)

| Categories          | SUS value (%) | Efficiency (second) | Effectiveness    |
|---------------------|---------------|---------------------|------------------|
| Expert Java         | 72.93%        | 91.56               | Almost Perfect   |
| Novice Java         | 61.93%        | 139.73              | Good             |
| Expert Sumatera     | 60.93%        | 140.70              | Good             |
| Novice Sumatera     | 58.66%        | 163.53              | Poor             |
4. Conclusions
Evaluation of this application is done by usability evaluation measuring satisfaction, effectiveness, efficiency and usability value. There are some comments and alternatives to improve this application such as redesign interface for home page and improvement of the database. Meanwhile, correlation from the type of user has a positive correlation, different user from Java and Sumatera significant different.

Conflicts of interest
There are no conflicts to declare.

Acknowledgment
The authors would like to thank everyone that made this research possible; the Industrial Engineering staffs of Institut Teknologi Sumatera, the students participated in the study and Kereta Api Indonesia Company. This Research is funded by “Hibah Penelitian ITERA B/315/IT9.C1/PT.01.03/2019”.

References
[1] KAI 2016 Kereta Api Indonesia; Accessed 10 August 2019
[2] KAI 2019 Api Indonesia; Accessed 10 August 2019
[3] Nielsen J 2012 Usability 101: Introduction to Usability (online) available in https://www.nngroup.com/articles/usability-101-introduction-to-usability/ (Accessed 10 September 2019)
[4] Sabariah M K 2013 Implications of user profile performance against software interface design UNIKOM Journal 7 (1)
[5] Larasati I 2010 Review Web Usability (MyHobbyTown.com); Accessed 12 March 2019
[6] Hadi K R Az-zahra H M and Fanani L 2018 Analisis Dan Perbaikan Usability Aplikasi Mobile KAI Access Dengan Metode Usability Testing Dan Use Questionnaire J. Pengemb. Teknol. Inf. dan Ilmu Komput. 2 (9) 2742–2750.
[7] Nioga A Brata K C and Fanani L 2019 Evaluasi Usability Aplikasi Mobile KAI Access Menggunakan Metode System Usability Scale (SUS) Dan Discovery Prototyping (Studi Kasus PT KAI) J. Pengemb. Teknol. Inf. dan Ilmu Komput. Univ. Brawijaya 3 (2) 8952–8958.
[8] Statistik Indonesia. https://www.bps.go.id; Accessed 12 March 2019
[9] Playstore 2019 Google Play KAI Access; Accessed 12 March 2019
[10] Widyant A and Qurratu Ainizzamani S A 2018 Usability evaluation of online transportation’ user interface 2017 Int. Conf. Inf. Technol. Syst. Innov. ICITSI 2017 - Proc. 82–86
[11] Brooke J 2013 SUS: A Retrospective (Journal of Usability Studies 8 (2) 29–40)
[12] Sekaran U 2006 Metodologi Penelitian untuk Bisnis, 4 edition (Jakarta: Salemba Empat)
[13] Grossman T Fitzmaurice G and Atar R 2009 A survey of software learnability: Metrics, methodologies and guidelines Conf. Hum. Factors Comput. Syst. - Proc. 649–658