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Usability Testing for Android Radio Streaming Apps of Songgolangit FM

Nur Aini Shofiya Asy'ari[1*], Dihin Muriyatmoko[2]

[1]University of Darussalam Gontor, Ponorogo Indonesia
[2]Department of Informatics Engineering, University of Darussalam Gontor, Ponorogo, Indonesia

[1]nurainishofia@unida.gontor.ac.id, [2] dihin@unida.gontor.ac.id

Abstract. Songgolangit FM Radio (SFMR) is one of Ponorogo pride information and solutions. Based on previous research, a few months ago, SFMR has an Android Streaming Apps launched on July 29, 2019, in the Google Play store (https://play.google.com/store/apps/details?id=com.amoled.radiosonggolangit&hl=en) As a newly launched application, usability testing needs to measure how easy to use its user interface. The research aims to measure ease of use using usability testing of SFMR based on five-factor: learnability, efficiency, memorability, error, and satisfaction. The usability testing used a questionnaire by nine people from five division in SFMR. The usability testing gets an average total score with a value of 88% by Likert scale. The error factor receives the lowest rating due to incomplete information about the SFMR. From all overall calculation can be concluded that it can be accepted and appropriately used by the SFMR management. In the next research, it can improve the error factor based on respondents' comments.

Keywords: Usability testing, Songgolangit, Android streaming, radio streaming, Ponorogo

1. Introduction

Radio, as an electronic mass media facilitates information facilities that can greet all levels of society. Radio has a reasonably wide range, especially when using streaming technology, so that information can also be touched to all public audiences throughout the world. Radio is also able to provide extensive benefits. The advantages of achieving space efficiency to produce information in a short time [1]. There are four factors which attract radio stations to radio listeners. One factor is that every radio station should have a link for radio streaming and promote it [2]. The results showed that there was a real relationship between radio streaming with perception, and there was a real relationship between radio streaming with listener satisfaction [3].

Songgolangit Frequency Modulator Radio or Songgolangit FM Radio (SFMR) is located on Halim Perdana Kusuma Street 12, Siman, Ponorogo. Its radio broadcasts at Frequency 99.2 FM. It radio has the motto "Information and Solution, Pride of the Ponorogo Radio". Its Radio has a varied program to entertain the Ponorogo community. Based on previous research on 29 July 2019, this radio has a streaming apps in the Android operating system [4]. As a newly released application, there is still no evaluation of Songgolangit radio, especially on the user interface by usability testing. This research aims to measure usability testing for application SFMR based on five-factor: learnability, efficiency, memorability, errors, and satisfaction.

| (a) | (b) | (c) | (d) |
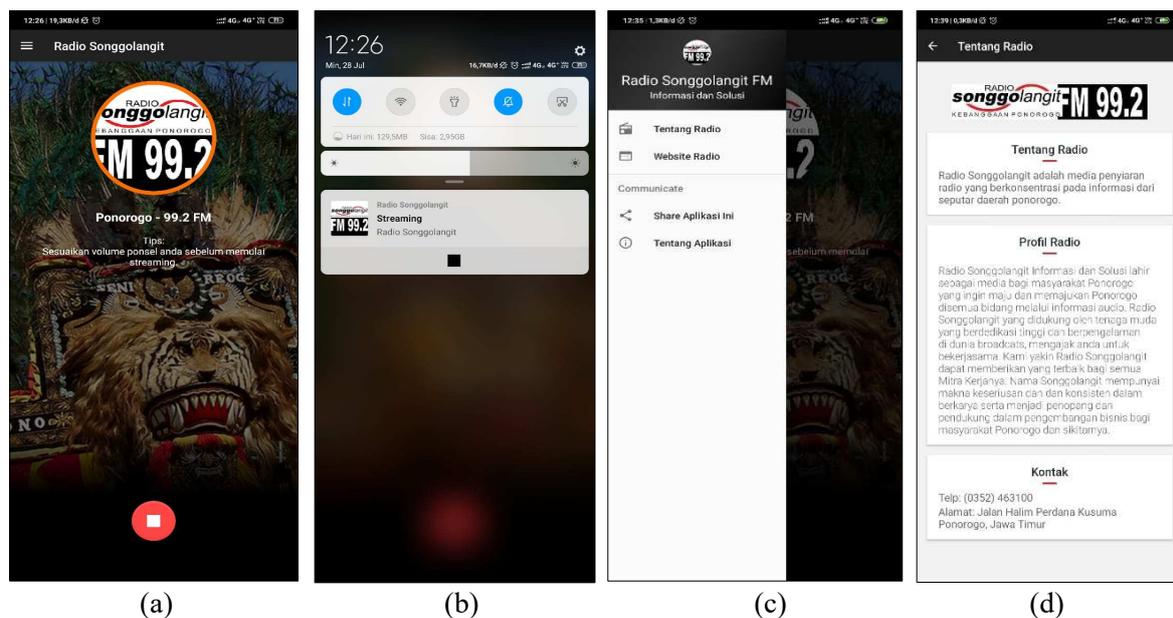
Figure 1. Songgolangit FM Radio Streaming Apps interface view

In Fig.1. Songgolangit FM Radio Streaming Apps show user interface when user-installed in their Android phone. Fig. 1(a) Is the SFMR streaming apps while the streaming is online. Fig. 1(b) Is the view of SFMR while launched in the background. Fig. 1(c) is a menu of SFMR while user clicks on the left navigation. Fig. 1(d) is a description menu of SFMR in "Tentang Radio" shows the information about its radio, profile menu and Contact Person information.

2. Literature Review
2.1. Previous Similar Research
Many types of research in usability testing to measure mobile apps. The first research is Usability Testing for Android-Based Applications "Jogja Smart Tourism" is based on five characteristics: learning ability, efficiency, memory, errors, and satisfaction. This research proves that the current level of reusability is at a percentage of 81.75%, which is the focus of improvements that display menus and the lack of use of images and colours [5].

The second is research for Android and Apple Smart Phones. The usefulness of cell phone testing seems to be a key factor contributing mainly to new technological innovations. It instruction unit, this work involves frequently finding differences in devices between Android and Apple phones [6].

Third research on evaluate of smartphone application using usability testing approach. Testing the usefulness of smartphone software applications is a promising research context that currently faces some challenges due to a single mobile feature, narrow bandwidth, various environmental factors and the unreliable wireless or network connection. Some questions were raised to gather user opinions about ongoing features. After the usability test survey, we became competent to find out the main differences between these two leading products in the smartphone market [7].

Forth research Infirmed as an android application can be used quite effortlessly by Faculty of Computer Brawijaya University academic community as a means to report infrastructure and facility complaints found around the Faculty of Computer Science. Based on the conducted usability testing, Infirmed is be considered above the average by achieving 97.14% in terms of effectiveness metrics and 89.9% in terms of efficiency metrics. Besides, the representation of the users also strongly agree that the system is easy to use which based on the satisfaction metric result by achieving 89.7% and then followed by interpreting that satisfaction result [8].

2.2. Literature study
2.2.1 Usability Testing

Usability testing is a research tool, used roots in classical experiments methodology. The range of tests that can be done is quite a lot, from the classic truth experiments with large sample sizes and complicated test designs for Qualitative study is very informal with only one participant. Every test approach has different goals and different times and resources requirements. The emphasis is casual and uncomplicated tests designed for fast turnaround results in an industrial product development environment. There are many aspects to doing this, which in turn is also very beneficial for users: design decisions are informed by data collected from representative users to describe design problems so that they can be corrected, thereby minimising or eliminating frustration for users. Such as Informing Design, Eliminating Design Problems and Frustration, and Improving Profitability. An operational definition of what makes your product usable may include Usefulness, Efficiency, Effectiveness, Satisfaction, and Accessibility [9]. Usability is the relationship with the learnability, efficiency of use, easy to remember, the ability to recover from, and user satisfaction [10]. In general criteria, it can conclude that five factors that must need for the ideal level of usability:

- Learnability: is part of effectiveness and relates to the user's ability to operate the system to the level of competence determined after several predetermined amounts and training periods.
- Efficiency: is the speed with which the user's goals can be accurately and are usually a measure of time
- Memorability: explain the degree of user convenience in using the application properly.
- Errors: Error rate among all participants or number of steps required to perform the task.
- Satisfaction: refers to the user's perceptions, feelings, and opinions about the product, usually captured through written and oral questions

2.2.2 Likert Scale

Likert scales are scales on which the participants register their agreement or disagreement with a statement. The judgments depicted quantified on a five-point scale. It includes strongly agree, agree, neither agree nor disagree, disagree and strongly disagree. Table 1 is the interval score interpretation using Likert range.

Table 1. interval score interpretation

| Interpretation	Interval Score
strongly disagree	1
disagree	2
neither agree nor disagree	3
agree	4
strongly agree	5

Next is to multiply the number of answers from all participant who answers on each answer point with the answers score weight to obtain the total answered score and index score.

$$\text{Total answer score} = (n \times 5) + (n \times 4) + (n \times 3) + (n \times 2) + (n \times 1) \quad (1)$$

$$\text{Index Score} = \frac{\text{total answerred score}}{\text{maximum score}} x100\% \quad (2)$$

3 Methods

Usability testing is processed using a questionnaire that involves five factors: learnability, efficiency, memorability, errors and satisfaction. Respondents included nine Songgolangit FM Radio staff from five divisions. Overall respondents use mobile devices with an Android-based operating system. A usability test is done by following the steps in Fig.2 as follows:
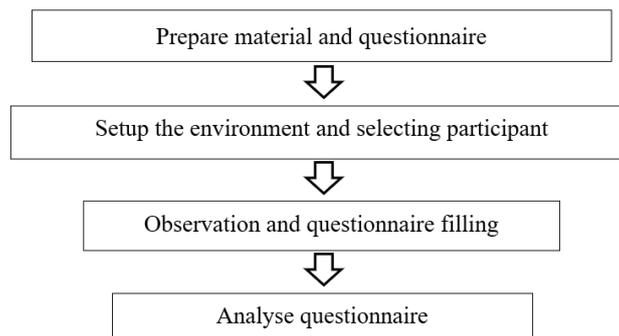
Figure 2. Usability Testing Steps on Songgolangit FM Radio Staff Division

Questionnaire material comes from the experience of researchers after reading several things related to articles about usability testing. The Respondents came from nine Songgolangit FM Radio employees from several divisions. Filling out the questionnaire is closed without being accompanied by researchers. The employees are one training division, two marketing division, one administration division, three broadcast division, and two gatekeepers, division. Filling out the survey was conducted at the Songgolangit FM Radio office on 18 and 19 September 2019.

4   Result and Discussion

Data taken from each respondent is declared valid if this respondent completes and fills all assignments and questions. Table 2. is a recapitulation of answers from respondents:

Table 2. Summary of Respondents Entry from all division of SFM Radio

No	Question	Usability Factor	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5	Respondent 6	Respondent 7	Respondent 8	Respondent 9
1	Easy to knowing the user interface	Learnability	4	4	4	5	4	5	5	4	5
2	Easy to use		5	4	5	5	4	5	4	5	5
3	Easy to know the menu	Efficiency	3	4	4	5	4	4	5	5	5
4	The font and letter easy to read		5	4	4	5	4	5	5	5	5
5	Logo and symbol is easy to understanding		5	4	4	5	5	4	5	5	5
6	Easy to access and download	Memorability	5	4	4	5	4	5	4	5	5
7	Easy to access the streaming service		4	5	4	5	4	4	4	5	5
8	Easy to remember the menu and user interface		3	4	4	5	5	4	5	4	5
9	No error when use the apps	Error	3	5	4	3	4	3	4	4	5
10	The colour is comfortable looking and have no boring	Satisfaction	3	4	4	4	4	5	4	4	5
11	The apps are suitable with the aim and function		4	4	5	5	4	4	5	5	5

$$\text{Learnability / Efficiency / Memorability / Error / Satisfaction} = \frac{\sum_{i=1}^{n}=x_i}{n} x 100\% \qquad (3)$$

The calculation formula of five aspects is same included learnability, efficiency, memorability, error and satisfaction (3). While x_i = amount of respondent * amount of question * amount of score and n = amount of respondent * amount of question * maximum score.

$$\text{Learnability (\%)} = \frac{82}{90} x 100\% = 91\%$$
$$\text{Efficiency (\%)} = \frac{123}{135} x 100\% = 91\%$$
$$\text{Memorability (\%)} = \frac{120}{135} x 100\% = 89\%$$
$$\text{Error (\%)} = \frac{35}{45} x 100\% = 78\%$$
$$\text{Satisfaction (\%)} = \frac{78}{90} x 100\% = 87\%$$

$$\text{Usability Score (\%)} = \frac{\text{Learnability+Efficiency+Memorability+Error+Satisfaction}}{5} x 100\% \qquad (4)$$

$$\text{Usability Score (\%)} = \frac{91+91+89+78+87}{5} x 100\% = 88\%$$

In addition to using the Likert scale, the questionnaire also uses columns of suggestions and comments for improvement Advice or comment from Administration division: "Add access menus, studio locations, contact people, and other views". Another comment from broadcast division: "Add Cellphone / Whatsapps number and Songgolangit radio fan page". The last comment from gatekeeper and broadcast division: "background photos are good, but they don't reflect Songgolangit radio. If you can change it with pictures or images about Songgolangit radio". The usability score for five aspects is getting an average score of 88%. With detail learnability is 91%, efficiency is 91%, memorability is 89%, error is 78% and satisfaction is 87%.

In general, the results of usability testing meet the requirements. This research uses five aspects as used by Harwati and Widodo, which results in the average value of the five characters [5]. The difference with this research is in the respondents' comments. Likewise, the study of Wicaksono et al. Produced three aspects of shows that the level of effectiveness and satisfaction of Infirmed each is 97.14% and 89.7%, whereas for the efficiency score is 89.9% [8]. The research of Wicaksono et al. uses only three aspects while in this study, it uses five characters. The strengths of this research are that they are in the comment's column as suggestions for application development so that errors in writing and image errors can be corrected.

5   Conclusion
The test results on five-factor of learnability (91%), efficiency (91%), memorability (89%), satisfaction (87%), and error (78%). Based on the SFMR comment in questionnaire prove that the error factor gets the lowest score because of incomplete information about the SFMR. From the overall calculation, it can conclude that the total score of usability testing of SFMR currently on the percentage of 88%. Its means that this application can be accepted and appropriately used by the SFMR management. In the next research, it can improve the error factor based on respondents' comments.

Acknowledgements

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