



Usability Testing on Android-based KMS for Pregnant Women using the USE Questionnaire

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Abstract

An Android-based medicines knowledge management system (KMS) application has been built as a result of a research about the usage of medicines on pregnant women. Usability testing is needed to be used to measure the success rate of the implementation of this mobile application. In this study, the Usefulness, Satisfaction and Ease of Use (USE) Questionnaire method is used, with quantitative and qualitative analysis. Based on the test results, it shows that the KMS application for pregnant women has a high usability result, with each component score, namely Usefulness reaches 86%, Ease of Use of 86%, and Satisfaction of 84%. On average, 85% indicates that the Android-based medicines KMS application for pregnant women has high quality attributes in ease of use. In addition, this application already has criteria to meet the needs of users, especially pregnant women, to easily find information and knowledge about medicines that are safe to consume during pregnancy to relieve pain or pregnancy complaints.

Keywords: Usability, Usability testing, KMS, USE Questionnaire

1. Introduction

During pregnancy, pregnant women often experience complaints, such as: dizziness, nausea, vomiting, back pain and other complaints (Blenkinsopp et al., 2018). Due to the high cost of consulting a gynaecologist has caused pregnant women to consume medicines without a doctor's prescription. The use of drugs that are not in accordance with the rules of use can put the fetus at risk and can even cause fetal defects (MOH 2006 and New Guinea 2009).

Based on research conducted by Ratri et al (2015), it is known that pregnant women still have a lack of knowledge about medicines used during pregnancy. In addition, knowledge about the safety of medicines for pregnant women is still scattered and has not been collected in one container. Therefore, the KMS (Knowledge Management System) for Pregnant Women Medicines was developed using Android platform. KMS for Pregnant Women Medicine is a system that functions to create, store, manage and disseminate knowledge about pregnant women drugs based on the US FDA (United States Food and Drug Administration) (Grameia, 2018) (Sadiyah, 2015) (Laudon and Laudon, 2018). The KMS medicine for pregnant women that has been built needs usability testing.

According to Nielsen (2012), usability is a quality attribute that determines how easy it is for a user to use the interface of an application or system (Nielsen, 2012) (Nurhadryani et al., 2013). Usability is one of the indicators used to measure the success rate of implementing information system products (Nielsen, 2012) (Hendra, 2018). As for usability testing, which is a test to measure the ease of use of an application and to evaluate whether an application is in accordance with user needs or not (Bastien, 2008) (Nurhadryani et al., 2013) (Barnum, 2015). Usability testing can also be interpreted as testing to measure and determine how well people can operate information system products (Lyles et al., 2014) (Constantinescu et al., 2018).

According to Holzinger (2005) usability testing can be done by means of the field observation method, questionnaire, and thinking aloud (Holzinger, 2005; Kaikkonen, 2005; Masood and Thigambaram, 2015; Alhadreti et al., 2017; Mayhew et al., 2018). The method used to measure the usability of KMS for pregnant women drugs was a questionnaire. One of the advantages of measuring using a questionnaire is the ease of recording and data extraction (Faria et al., 2016). One of the validated questionnaires is the questionnaire Usefulness, Satisfaction and Ease of Use (USE) or abbreviated as USE Questionnaire (Faria et al., 2016).

The USE Questionnaire is one of the questionnaire packages used as a measuring tool in conducting usability testing (Rizal et al., 2020; Suskarniyadi et al., 2014). The USE Questionnaire was designed by Arnie Lund with the aim of analyzing and summarizing the graphical usability interface where the model uses 3 factors, namely usefulness, satisfaction and ease of use (Lund, 2001). This study aims to measure the usability of KMS for Android-based pregnant women medicines using the USE Questionnaire. Research on usability testing was conducted by Faria et al (2016) regarding Evaluating the Usability Using USE Questionnaire: Mindboard System Use Case. In addition, in 2020 Rizal et al. have also conducted a study on usability testing entitled Usability testing mozita application based on use questionnaire model.

2. Materials and Methods

2.1. Time and Place of Research

The KMS testing for pregnant women medicines was conducted in September 2020 in the Ciomas area, Bogor Regency.

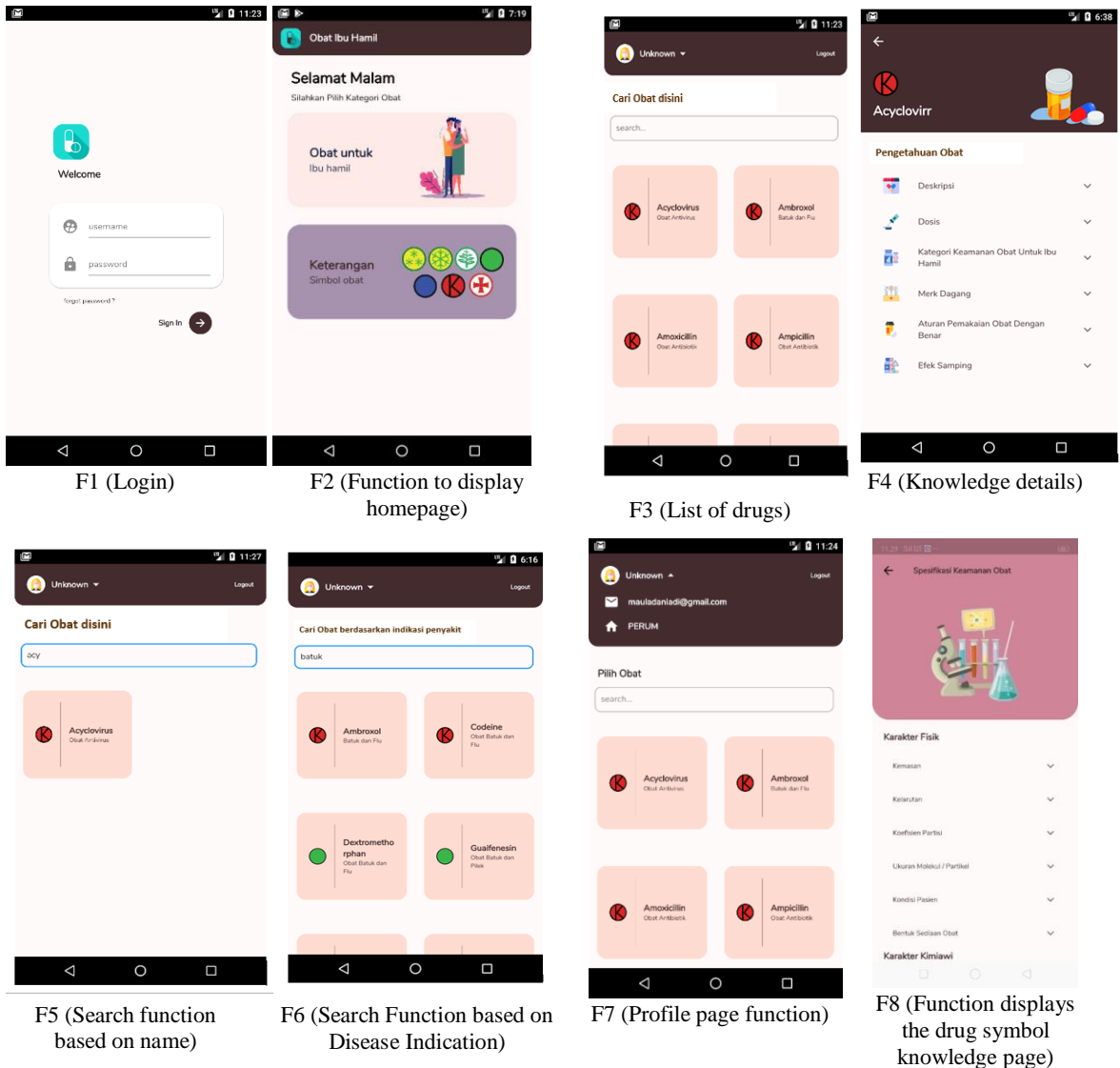
2.2. Tools and Materials

The application tested in this study was an Android-based KMS for pregnant women medicines. This application has several functions, namely: F1 (Login), F2 (Function to display the Home page), F3 (Drug List), F4 (Detailed Drug Knowledge for pregnant women), F5 (Search Function by Drug Name), F6 (Search Function based on Disease Indication), F7 (Function displays the profile page), F8 (Function to display the drug safety specification page), F9 (Registration Function), F10 (Function to display the drug symbol knowledge page). Figure 1 shows pregnant woman medicines KMS interface for F1-F8 function. The KMS application for pregnant women medicines can run on the Android Operating System version from Android 5.0, Lollipop (API level 21) and above. The measuring instrument used is the USE Questionnaire.

2.3. Method

This study uses a questionnaire method based on USE Questionnaire. The USE Questionnaire in this study was adjusted according to the needs of pregnant women. There are 15 USE Questionnaire questions, where there are 5 questions for each usability component. Table 1 is the USE questionnaire package for Android-based KMS testing for pregnant women medicines. The USE Questionnaire that has been designed is then filled in by the respondent using a Likert scale of 1-5.

After the usability testing data is generated, the data is processed and analyzed using quantitative and qualitative analysis. Quantitative analysis is used to measure the level of ease of use of the KMS application for pregnant women drugs which is presented in the form of a percentage. Qualitative analysis is used to describe the obstacles found by pregnant women and as a means for users to provide suggestions for improving the KMS application for pregnant women drugs in order to meet user needs. The formula for calculating the percentage can be seen in equation (1).



F1 (Login)

F2 (Function to display homepage)

F3 (List of drugs)

F4 (Knowledge details)

F5 (Search function based on name)

F6 (Search Function based on Disease Indication)

F7 (Profile page function)

F8 (Function displays the drug symbol knowledge page)

Figure 1: Pregnant women medicines KMS interface

Table 1. The USE questionnaire package for testing Android-based KMS for pregnant women medicines

Criteria	Question code	Question
Usefulness	U1	KMS pregnant women medicine is useful for me in finding safe drugs
	U2	KMS for pregnant women helped me find safe drugs according to complaints or indications of illness
	U3	The drug information on the KMS application for pregnant women drugs helped me identify drugs that pose a risk to the fetus
	U4	KMS medicine for pregnant women is very useful for me because it provides knowledge of safe medicine
	U5	Medicinal symbol information is useful to me
Ease of Use	E1	KMS medicine for pregnant women is very easy to use
	E2	KMS medicine for pregnant women is very simple
	E3	KMS drug for pregnant women user friendly
	E4	KMS medicine for pregnant women is very easy to operate
	E5	I can use the KMS app for pregnant women without written instructions
Satisfaction	S1	I am very happy in using this application
	S2	I am satisfied in finding safe drug information for pregnant women
	S3	I feel like I have to have this application on my cell phone
	S4	I am very interested in the knowledge contained in this application
	S5	I recommended KMS android based pregnant women medicine to my friends

$$Percentage = \frac{Amount\ filled}{Total\ number} \times 100\% \quad (1)$$

3. Results and Discussion

The usability testing consisting of 15 questions in the Table 1, was given to 15 respondents of pregnant women in the Ciomas area, Bogor Regency where the respondent data were obtained from patient data at the Klinik Bidan Dame. The characteristics of the respondents are shown in Table 2. The results of usability testing are grouped by age group (Table 3).

Table 2. Characteristics of Respondents by age

Age (Year)	
Less than 21	13%
21-30	60%
31-40	27%

Table 3. Usability Testing results by age group

USE Criteria	USE Code	Respondents Answer															Percentage	
		Age (<21)					Age (21-30)					Age (31-40)						
		User 1	User 2	User 3	User 4	User 5	User 6	User 7	User 8	User 9	User 10	User 11	User 12	User 13	User 14	User 15		
Usefulness	U1	5	5	5	4	5	4	5	4	4	4	4	4	4	4	4	5	86%
	U2	5	5	4	4	4	4	4	5	5	4	4	4	4	5	4		
	U3	5	4	5	4	5	4	4	4	4	4	4	4	4	5	5		
	U4	5	4	5	5	5	4	4	4	4	4	4	4	4	5	5		
	U5	4	4	5	4	4	4	4	4	4	5	4	4	4	4	4		
Ease of Use	E1	5	4	4	4	5	4	5	4	4	4	4	4	4	5	5	85%	
	E2	5	5	5	4	4	4	4	4	4	5	4	5	5	4	4		
	E3	4	4	4	5	5	4	5	4	5	4	4	4	4	4	4		
	E4	4	4	4	5	5	4	5	4	4	4	4	4	3	4	4		
	E5	4	5	4	4	4	3	5	3	5	4	4	5	3	4	4		
Satisfaction	S1	5	5	5	4	5	4	4	4	4	5	4	5	4	4	5	84%	
	S2	4		5	4	5	4	5	4	4	5	4	5	4	4	5		
	S3	4	4	4	4	5	3	4	3	4	4	3	4	3	5	4		
	S4	4	5	5	4	5	4	5	4	5	4	4	4	5	4	5		
	S5	4	4	4	4	4	4	5	3	4	4	4	4	4	4	4		

By using equation 1, the value of each of the usability testing criteria for the USE Questionnaire is generated, namely 86% usefulness, 86% Ease of Use, and 84% satisfaction. The percentage value of the Usefulness component obtained from usability testing, which is a value of 86%, this value is the average value of 3 age groups for 5 questionnaire questions as given in Table 1. Based on these results it can be concluded that the Android-based KMS application for Pregnant Women Medicines

has a positive influence on pregnant women. Users or pregnant women believe that the Android-based KMS application for Pregnant Women Medicines is very useful because it helps find knowledge of drug safety for pregnant women so that pregnant women have knowledge about the use of drugs they will consume. The Android-based KMS application for pregnant women drugs has functioned in accordance with user needs. However, to improve the usability of the application, there are suggestions from users, namely the addition of a bookmark feature so that users can save the medicines they have been looking for.

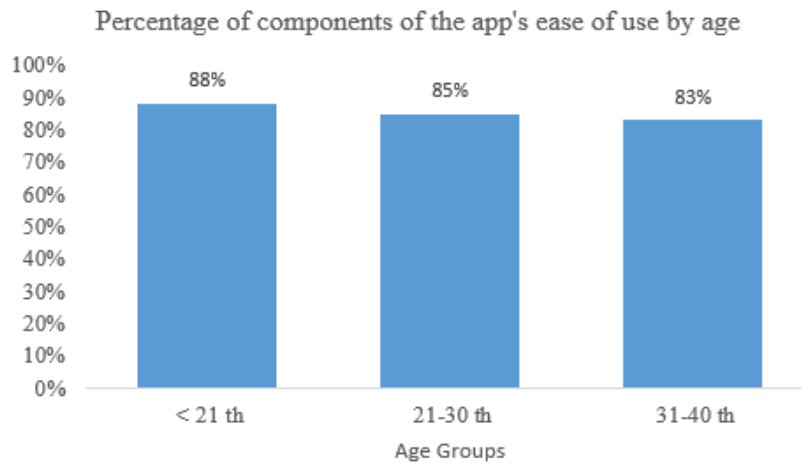


Figure 2: Percentage of components of the app's ease of use by age

The results of usability testing based on the operation of the KMS application for pregnant women by age group (Figure 2), showed that for 31-40 years the percentage value was 83%. Below 85%. This means that the age factor greatly affects usability testing. However, the average percentage of the ease of use component from the results of usability testing obtained a value of 85% (Table 1). Based on this value, it can be concluded that the Android-based KMS application for pregnant women drugs as a whole has ease in usage.

Based on usability testing, the Satisfaction component value was 84%. This score indicates a high enough satisfaction. However, the value obtained is still less than 85%. This is because 4 users or 4 pregnant women do not yet have smart phones that have Android Operating System specifications version Android 5.0, Lollipop so they are not satisfied because they cannot download and install directly on their smart phones.

$$Percentage = \frac{Amount\ filled}{Total\ number} \times 100\%$$

$$Percentage = \frac{956}{1125} \times 100\% = 85\% \quad (2)$$

Based on the results of calculation (2) analysis using equation 1, it is known that the results of

usability testing using the USE Questionnaire show a high value, 85%. A high usability value of 85% indicates that the Android-based KMS application for pregnant women drugs has high quality attributes in ease of use. In addition, this application already has criteria to meet the needs of users, especially pregnant women, in order to easily find information and knowledge about drugs that are safe to consume during pregnancy to relieve pain or pregnancy complaints.

4. Conclusion

To sum up, the Android-based KMS application for Pregnant Women Medicines that has been built has been tested using the USE Questionnaire usability approach. The results show that the KMS application for pregnant women medicines has a high usability value, with each component, Usefulness reaches 86%, Ease of Use of 86%, and Satisfaction of 84%. As a whole, the results of usability testing using the USE Questionnaire showed a high value, which is 85%. A high usability value of 85% indicates that the Android-based KMS application for pregnant women drugs has high quality attributes in ease of use. In addition, this application already has criteria to meet the needs of users, especially pregnant women, to easily find information and knowledge about drugs that are safe to consume during pregnancy to relieve pain or pregnancy complaints.

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