Analysis User Interface: Mobile Application to Blended Learning Model

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Abstract—This research is concerned with the use of development applications using mobile devices as a tool for blended learning models. However, in developing learning applications, one important concern is the user interface (UI). Therefore, the purpose of this research is to find out which UI design components are easy to use according to the user to be more user friendly, so that the purpose of using mobile applications for education can be realized. This study covers design principles that are appropriate for applications developed for platforms. Based on research, user interface testing has been carried out from 5 user interface principles and analysis using the System Usage Scale (SUS) given to 32 respondents. The results showed that the majority of respondents agreed that the mobile application developed had met the requirements of the user interface element.

Keywords—mobile application, blended learning, user interface

I. INTRODUCTION

The development of the industrial revolution of the 4.0 era created a generation that has the ability to communicate, collaborate, think critically, be creative and be innovative. Therefore, in the world of education there needs to be strategic direction, models and learning media oriented to the revolution era 4.0. One way is integrate the use of technology in the world of education. Educational technologists working with mobile learning solutions find themselves often in a situation to work with both, enthusiasts who will follow a new technological trend for the technologies sake and the pragmatists who reasonably argue that the existing technology is satisfying their and their students' educational demand [1]. The way the technology and teaching are conducted and combined to transform, improve and maximize the learning process, is explicitly included into numerous definitions of blended learning [3].

Blended learning is defined as structured opportunities to learn, which use more than one learning or training method, inside or outside the classroom [2, 3]. The development of blended learning by combining two modes of learning, face-to-face and online may occur at different organizational levels [2]. Based on these defined, the application of blended learning requires a platform. Usually a platform available in desktop view and in this research

"mobile application for blended learning model" will be developed, where mobile phones are being used as the platform for teaching and learning [1]. Mobile application grounds on the concept to educational designs that include mobile devices for special learning activities in combination with other learning educational approaches and technologies [4]. This developed application provide as service to support active learning with blended learning model. Therefore, the design menu features are designed as best start from the provision of teaching materials to evaluation. Benefit development this use a mobile phone to easier to use, flexible because can be used anywhere.

On mobile application development, one important thing that is of concern is the user interface. User Interface (UI) is the part of the system that acts as an intermediately between the user and system facilitating the user to interact with the system in an efficient manner [5]. The UI involves considerations of contexts, screen and user input and output mobility. The user manipulates the application via input and then the expected results are displayed via the output. There are mobile UI constraints such as limited screen size [6]. However, mobile application used for educational purposes have a complex user interface (UI) with many hidden options [1]. Mobile technology can be successful as an educational platform only when the future research into the area of m-Learning includes fruitful discussion in of all the aspects of usability: learnability, understandability, ease of use, effectiveness, and efficiency of mobile applications [1]. Therefore, the purpose of this research is to identify which UI design components are easy to use according to the user to be more user friendly, and the purpose of using the mobile application for education can be realized. In addition, knowing the interface design that is easy to use will make many people interested in using it.

II. LITERATUR REVIEW

A. Blended Learning

Blended learning is the concept that includes framing teaching learning process that incorporates both face to face teaching and teaching supported by ICT. The blended leaming it includes: face to face teaching; student interaction with course content; peer group; group discussion and exchange of ideas; accessing e-library; virtual classroom;

online assessment; e-tuitions; accessing and maintaining educational blogs; webinars; viewing expert lectures in Youtube; online learning through video and audios; virtual laboratories [7]. By definition, blended learning is a learning strategy that combines face-to-face learning with online learning using technological media where students can access theory, group discussions, virtual classroom (learning through video and audio, and virtual laboratories), until to online assessments. For this research, will development media for implementation blended learning model.

B. Mobile Application

Mobile devices are portable, lightweight devices such as mobile phones (cellphones, or handphones), smartphones, palmtops and handheld computers (Personal Digital Assistants or PDAs), tablet PCs, laptop computers and personal media players. These devices can be carried around easily and used for communication and collaboration, and for teaching learning activities that are different from what is possible with other media [8]. Crompton (2013), in the context of education, these mobile devices offer diverse learning opportunities such as portability, social interactivity, context sensitivity, connectivity, individuality and affordance to people in academic settings or non-academic settings [8]. By definition, mobile devices are portable for communication, easy to use and can be used for teaching and learning activities. Therefore, this research used mobile to devices platform implementation blended learning model.

C. User Interface

Interface is a tool, and for digital mapping this tool enables the user to manipulate maps and their underlying geographic information. UI design describes the iterative set of decisions leading to a successful implementation of an interactive tool. By definition, the user interface is combines graphical and system navigation, and an effective UI if the interaction of subjects and objects can be focus. Therefore, user interface design requires guidelines and principles.

Based on theory, in this research development of mobile application was created to implementation blended learning model. The previous research, Kundan and Lucy (2018) developed application mobile base learning on Android platform, they developed application contain learning modules and quiz [9]. Then, C Huda et all (2017) conducted research analyzing the implementation of tutorial video on blended learning model based on result tutorial video was revealed that students conceptual understanding skills, and creativity in designing computer program or animation improved significantly. Based on the previous research will the development of this application menu features include flipbook (module learning), tutorial video, and practice [10].

Therefore, the previous research analysis, there are various principles of user interface assessment. Hashim and Wan Fatimah (2010) conclude the summary of user interface principle for m-learning development model that is: (1) Content, m-learning application structure needs to be in small consistent information partial; (2) Natural usage, the application should be user friendly; (3) Navigation, consistent in all prepared pages; (4) Consistency, Similar information and action need to be inserted in the similar position; (5) Flexibility, The alternative display can be added to perform the same function[11].

Wang and Hung (2015) who conducted research analyzing the attributes of an interactive mobile e-book

interface by referring to four principles, namely visibility summarized four interface attributes: simple presentation, obvious prompts, visible button, and readable color scheme, ease of use summarized four interface attributes: easy to use, easy to read, easy to understand, and easy to return, efficiency summarized four interface attributes: smooth operation, cognitive match, consistent processes, and memorable operation, and enjoyment summarized four interface attributes: graphic design, overall visualization, rich content, and interesting operation [12].

III. METHODOLOGY

In designing this research to build mobile application used thunkable app. After the mobile application was developed, user interface testing was conducted. The survey questions of 5 user interface principles based on research by Hashim and Wan Fatimah (2010). The aspects include: content, natural use, navigation, consistency, flexibility. Questionnaire analysis use System Usability Scale (SUS) given to 32 respondents. The respondent try to install the application and open all the features of the application then he needs to rate each question from 1 to 4 (1 = strongly disagree, 2 = disagree, 3 = agree and 4 = strongly agree). The data collected was analyzed descriptively as the mean. The final results of this survey will show the level of user interface of the prototype that was developed.

IV. RESULT AND DISCUSSION

The stages of application design, first, planning the application features that support the learning process with a blended learning model. Moreover from main menu there are link include: a book with swipe navigation (flipbook), then an explanation of audio and video learning from lecturers, and there is also an evaluation test (quiz). Table I shows the component of the application menu

TABLE I.   COMPONENT MENU OF THE APPLICATION

Component	Details
Selection Screen	Display selection Indonesia or English version
Main Menu	Indonesia Version : Flip Book, Video, and Student Center menu (link platform e-learning) English Version : Flip Book, Video, and Practice (General visitor)
Flip Book Menu	Display the learning sub-menu theory (Indonesia Language for Indonesia version and English Language for English version)
Video Menu	Display video learning from lecturer linked on Youtube (Indonesia Language for Indonesia version and English Language for English version)
Student Center	Display e-learning for FKIP UHAMKA's students (Indonesia Version)
Practice	Display evaluation test for general visitor students (English Version)

The following are some screen design application screenshots.

Fig. 1. (a) Loading Screen; (b) Option menu screen

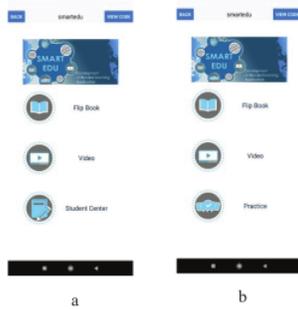On the option menu there menu choices which include Indonesia and English Language

Fig. 2. (a) Main menu Indonesia version; (b) Main menu English version

On the main menu Indonesia there are Flip book (module learning use Indonesia Language), Tutorial video link on Youtube use Indonesia Language), and Student center (platform e-learning only UHAMKA students) inside there assigment, resources, and forum to learning and similar to the main menu English version there are Flipbook and Tutorial Video use English Language and the difference is there is an evaluatioan with a multiple choice quis (for public)

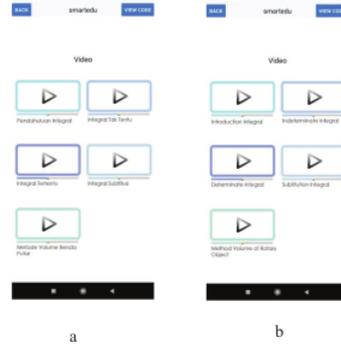Fig. 3. (a) Flip book menu Indonesia version; (b) Flip book menu English version

Fig. 4. (a) Video menu Indonesia version; (b) Video menu English version

The application is given a user interface rating. Based on the findings from the Fig. 2, Fig. 3, and Fig. 4, it can be concluded that respondents have a high level of agreement on the mobile application development user interface. This is indicated by the overall mean scores for 5 user interface principles at a high level (mean Content = 3.59; mean Natural Use = 3.63; mean Navigation = 3.53; mean Consistency = 3.51; and mean Flexibility = 3.58).
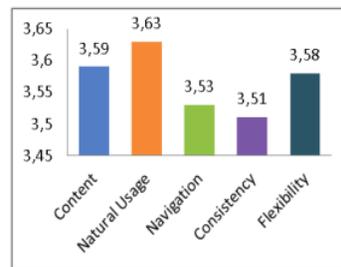

Fig. 5. Mean scores for 5 user interface principles

Based on the principle of the results of the user interface identified (Fig. 2, Fig. 3, and Fig 4), below are several of discussions about the mobile application being developed. The first principle, the overall application of the content presented is relevant to competencies for students. The contents of the application are also designed in the form of points so that students can easily find out important information. However, because this content is a mathematical theory, there are some inaccurate notations and symbols.

Then, second principle, the application installation process is easy to do and process can be used in all Android versions with all screen resolutions. But, the application has big size memory. The third principle is navigation. The button display works good but advice for revision are given additional buttons on the screen to move to another page or to move to another part with only one or two key presses. After that, the consistency, all page layouts are designed the same. However, the size and font are not consistent for all pages. And then, the principle of flexibility the suggestion is to make the menu button back on the screen so that users can jump from one section to another easily.

Therefore, based on the results of data analysis and suggestions for revision, namely a more consistent designs both in color selection, font size. Then, the navigation buttons are made to function to make it more flexible to move from one page to another. However, the overall mean score of the user interface element is 3.57 which is considered high. The results showed that the majority of respondents agreed that the application developed had a good user interface. However, some input from respondents for design revisions was made to improve the application user interface.

V. CONCLUSION

Evaluating the user interface is important in developing mobile applications. By knowing the achievement of the principle of the user interface can improve the quality of the functions of the application made so that it is easier and more interested to use. In this study the results obtained from the assessment of 5 user interface principles were 3.57 which were considered high. The results showed that the majority of respondents agreed that the application developed had a good user interface.

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