



## Android Application for the Topic “Video Camera” In an Educational Technology Course

Hamzah, N.<sup>1</sup>, Rubani, S N K.<sup>2</sup>, Ariffin, A.<sup>3</sup>, Zakaria, N.<sup>4</sup>, Ahmad, F.<sup>5</sup>

Faculty of Technical and Vocational Education, Universiti Tun Hussein Onn Malaysia  
hasyimah@uthm.edu.my<sup>1</sup>

### ABSTRACT

Mobile learning (M-learning) involves the use of an application as a medium for delivering teaching and learning (T&L) activities. This method of learning has become a trend nowadays because the teaching tool can be used to enhance students' understanding of a given topic. This paper reports the development of an Android application for learning the topic “Video Camera” under an educational technology course and the assessment of functionality of the application. The design model is based on Hannafin and Peck's Model (1988) which proposes the following three phases of development: analysis phase, design phase, and implementation phase. All the three phases included an evaluation process. In developing this application, the following three multimedia application designs were adopted: information design, interaction design, and interface design. To evaluate the efficacy of the application, three experts comprising lecturers at the Faculty of Technical and Vocational Education (UTHM) were invited to evaluate the application. The assessment confirmed that all the experts agreed that the application meets all the three designs requirements (information design, interaction, and interface). In conclusion, the application for the topic “Video Camera” under the educational technology course is appropriate for the T&L of the course.

**Key words:** Mobile Learning; Video Camera; Educational Technology

### 1. INTRODUCTION

The development of wireless technology and mobile communication tools has contributed to the use of mobile devices in education [1] and hence the introduction of mobile learning (m-learning). M-learning can take place at any time and place with the use of wireless equipment, thus having an advantage over the e-learning method, which is limited to the teaching and learning (T&L) in classroom or with available infrastructure facilities [2].

As mentioned by [3] information and communication technologies (ICT) is a crucial platform for educational

development because the use of ICT can save energy and time for T&L. Such advancement has given a significant impact in the field of communication of education and therefore plays an important role in the development of a dynamic T&L process [4]. Also, the use of multimedia allows the convenience of getting information from the cyberspace, thus allowing repeatability of lessons via a smartphone and learning to take place at any place. The use of multimedia is also capable of stimulating students' sense of a positive direction and therefore is seen as an exciting alternative for learning in the twenty-first century. Nevertheless, attention needs to be directed to the development of materials for multimedia teaching so as to ensure that the design and development process runs according to procedure [5].

#### 1.1 Mobile Learning (M-Learning) in Teaching and Learning

Mobile learning involves the use of learning tools such as mobile phones [6], personal digital assistants (PDAs), and Palm Talk [7] the learning occurs when a communication between individuals takes place wirelessly [8]. In the context of T&L, m-learning is an exercise that uses tech-savvy gadgets such as PDAs, palmtops, laptops, and smartphones for T&L purposes, allowing thus learning to take place at a time and place convenient to the user.

M-learning is a subset of e-learning, which is a macro concept involving an online learning environment. The e-learning, on the other hand, is a subset of distance learning, which is a subset of flexible learning. M-learning was initiated from e-learning following the problems related to limited physical equipment in laboratories, which impedes students' learning.

According to [9], following the successful implementation of m-learning in other countries, the method was then introduced in Malaysia via the integration of technology in the teaching curriculum in several higher learning institutions. Such progress indicates that the Malaysians have accepted the new learning method and that the country has strived to achieve a level of education comparable to that in the developed countries. M-learning is one of the government's initiatives to improve the country's education system in a more competitive direction. The effort was geared towards making students more motivated to learn.

In [10] tests conducted through mobile devices, they found that 125 assessments that were conducted through m-learning tests were more effective and efficient. This discovery indicates that students are more interested in tests conducted through m-learning because the method allows them to reduce the time to respond to the quizzes and eliminate the need to use pencil and paper. The tests conducted through m-learning are also more interactive thus stimulating their senses. The m-learning concept is more self-taught and therefore is able to produce students who can think out of the box. Another benefit of using mobile technology for learning is that the method is easy to apply, interesting, and able to provide a comfortable learning environment to students. This positive impact can improve students' learning performance.

## 2. METHODOLOGY

The Hannafin and Peck's model (1988) was used as a basis for the development of the application for learning the topic "Video Camera." The models [11] emphasise repeated assessments and revisions for each phase to ensure that each phase meets required specifications. The phases consist of an analysis needs phase, a design phase, and an implementation phase. The use of Hannafin and Peck's model enabled the researchers to detect and minimize problems that may arise in each phase.

In the analysis phase, the researcher analyzed the users' needs in detail. Assessment was conducted on the characteristics of the target groups, the aim being to determine who will use the software, the level of user's existing knowledge, the learning objectives, and the necessary hardware and software. This process served to ensure that the design process has a direction. Once the analysis phase was completed, the researcher carried out the assessment and repetition process. The need analysis of the target group is based on the contents of the topic "Video Camera," which are necessary for the development of the application. Interviews were then conducted with the course lecturers to uncover the important topics to be included in the application.

The target user group in this phase was first-semester, undergraduate students of the Faculty of Technical and Vocational Education (FPTV), Universiti Tun Hussein Onn Malaysia (UTHM), particularly those who were undertaking the subject "Educational Technology." Interviews were conducted with ten students from diverse programs, such as general machining programs, building construction, catering, electronics and electronics, creative multimedia, refrigeration and air conditioning, and welding. The purpose of the interviews was to identify the requirements for learning the topic of video camera. Findings from the interview can inform whether most of the students (i) have an Android-based smartphone facility, (ii) have access to internet data, and (iii) how often they search for information using their smartphones. The researchers the developed the m-learning application using the software Adobe Flash CS6 and Adobe

Illustrator CS4. In the design phase, the researchers designed the application based on users' learning objectives. The elements considered in the development of the applications were content, screen design, and other elements determined in this phase.

The third phase was the development and implementation phase. In this phase, all the main elements designed in the previous phase were translated into a practical form. The ready-to-build application then underwent the implementation process, which involved observing how the application works and assessing users' acceptance of the application. The implementation phase began with the preparation of resource files and notes. The subsequent design phase involved the development of the content, interaction design, and interfaces as planned. The navigation buttons were then generated using Adobe Illustrator CS4 to ensure interactivity between screens. The implementation phase also involved interviews with experts to evaluate the functionality of the application. A review form containing five main sections (Table 1) was provided to the three experts for them to evaluate the application's design of content, interaction design, and interface design.

**Table 1:** Expert Confirmation Checklist Form

Section	Construct	Item
A	Respondent Demographics	1-4
B	Evaluation of Information Design	5-9
C	Evaluation of Interaction Design	10-15
D	Evaluation of Interface Design	16-22
	<b>Total of Items</b>	<b>22</b>

## 3. RESULTS

The three experts evaluated the three designs produced for the Android educational technology course, particularly for the topic "Video Camera." Table 2 shows the findings of the evaluation in regard to information design.

**Table 2:** Expert Evaluation of Information Design

No.	Statement	Frequency	
		Yes	No
1.	Does the contents of this android app meet the camera video learning guide?	3	0
2.	Is the language used in this android app is easy to understand?	3	0
3.	Is the use of audio in android app compatible?	2	1
4.	Is the content of learning easy to understand?	3	0
5.	Is the questions in this quiz section compatible with the content in the android app?	3	0

All the three experts agreed that the design of information of the application meets the video tutorials on the topic. The language used for each content is also easy to understand. However, one expert disagreed on item 7 regarding the clarity and suitability of the audio. The developers then improved the application by making the audio clearer and more relevant to the topic. All the experts agreed that the quiz questions are relevant to the content/information design of the application. The interaction design focuses on the functionality, order, shape, and link used by the developers. Table 3 shows findings from the six queries in regard to the suitability of the interaction design.

**Table 3:** Expert Evaluation of Interaction Design

No.	Statement	Frequency	
		Yes	No
1.	Is the icon used in this android app is appropriate with menu?	3	0
2.	Is the size of the button displayed appropriate?	3	0
3.	Is the order of buttons organized consistently?	3	0
4.	Does the outgoing button make it easy for users to quit at any time?	2	1
5.	Does using the link button to the main menu make it easy for users to make a choice?	3	0
6.	Is the button used linked to the correct interface?	3	0

All the three experts agreed on the size of the button used for the icons on the menu. The three experts also agreed that the arrangement of the buttons was consistent. However, one expert disagreed on the use of the exit button, stating that this feature will make it easy for users to leave the application. All the experts agreed on the buttons used for linking to particular interface. Table 4 shows findings from the seven queries in regard to the suitability of the interface design.

**Table 4:** Expert Evaluation of Interface Design

No.	Statement	Frequency	
		Yes	No
1.	Is the background of the interface on each display interesting and appropriate?	3	0
2.	Does the use of the text color correspond to the background?	3	0
3.	Is the type of writing used appropriate?	3	0
4.	Does using content text size make it easy for users to read?	3	0
5.	Is the order of content organized consistently?	3	0
6.	Are video camera graphics used app compatible?	3	0
7.	Are android app background music users compatible?	3	0

All the three experts also agreed that all the items on the interface design section are organized consistently; the background of the interface is interesting and appropriately displayed; the use of the text color corresponds to the background; the type of writing used is appropriate; the font size can be read easily; the content order is organized consistently; the video camera graphics used are appropriate to the application; and the background music used is appropriate.

#### 4. DISCUSSION

Analysis of the interviews confirmed that the experts generally agreed that the development of the Android application for the subject “Video Camera” fulfills the design of content. In terms of language and content, the three experts also agreed that these two aspects are relevant to the topic. This finding resonates [12] recommendation that the use of audio or audio elements must be appropriate to a particular course software in order to meet user’s preference. In the case of the application, the selection of in-app audio was inappropriate. The selection of audio for an application cannot be underestimated because audio is one of the five most important multimedia elements.

All the three experts also agreed that the icons on the menu of the application and the size of the buttons used are appropriate. In regard to the layout of the buttons, all the experts agreed that the arrangement was consistent. One expert nevertheless considered the placement of an exit button will make it easy for users to quit the application. According to [13] the arrangement of navigation buttons on an application should look orderly, consistent, and functional. Improvements thus were made to the application prior to launching the product.

In terms of interface design, the three experts agreed that this element was interesting and appropriate. All the experts agreed that the text color used for the application is suitable. One expert nevertheless regarded the text size as too small for an Android platform. As indicated by [14], the appropriate size of an article on a multimedia slide must be at least 20pt. All the experts agreed that the graphics used are compatible with the application. After all the improvements were made, the m-learning application is considered to have met all the three design criteria of information design, interaction design, and interface design. The application was able to run smoothly without any error.

#### 5. CONCLUSION

In conclusion, the development of the Android application for learning the topic “Video Camera” is considered able to increase students’ knowledge and understanding of the subject. The 2D animation and camera-related titles can be attractive as they allow the students to learn traditionally. The

use of Adobe Illustrator CS4 for producing the graphics was able to enhance the presentability of the application. [15] stated level of student acceptance also varies by people and causes weak students to be left behind if they do not understand clearly and do not accept the input they have been given. The diversity of the animations, which was rendered using Adobe Flash CS6, was able to produce an application that can encourage students to learn independently.

## ACKNOWLEDGMENT

The authors would like to thank the University Tun Hussein Onn Malaysia (UTHM) for supporting this research under Program Pensiswazah Guru (PPG) Grant Vot No.K022.

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