

# A CONCEPT OF AUGMENTED REALITY MODULE FOR ELECTRONIC SUBJECT

Siti Hajar Johar & \* Nurhanim Saadah Abdullah

Faculty of Technical and Vocational Education, UTHM

\* Correspondence: nurhanim@uthm.edu.my

## **Abstract**

*Augmented reality is a popular technology used extensively in various fields and is also used in education. At the present time in the process of teaching and learning, there are a number of changes in terms of infrastructure and instructional materials. Today, the use of Augmented Reality applications is widely practiced in education because it does not require sophisticated and expensive hardware. However, its effectiveness is still not clearly visible, especially for Electrical and Electronics subjects. Hence, the aim of this study is to develop the Electronic module using the Augmented Reality application as one of the teaching aid tools. The expectations of the study is the Electronic module to be developed will attract students, especially those who enroll Electronic Subject. The study is also expected to be help student in understanding the basic concept of electronic topics such as semiconductors, transistors and diodes. At the same time it is expected to be able to assist students pursuing a Bachelor's Degree in Vocational Education (Electrical and Electronics) in particular to understand more deeply about the difficult topics in Electronic subject and to make improvements to optimize the effectiveness of the Electronic module using the Augmented Reality application.*

**Keywords:** *Augmented reality, TVET, electronic module, electronic subject, teaching and learning*

## **1.0 INTRODUCTION**

Augmented Reality (AR) is a technology that has been applied in a number of creative applications. AR term used to identify a combination of engineering sciences that permits real time combined with computer-generated content with the display live video. AR user perception and interaction with the real world. Virtual object displays information which users cannot directly detect with their own senses. The information presented by virtual objects helps users perform tasks in the real world. According to Siltanen (2008), AR is a field of computer science research that combines real world and digital data. The use of technology in education allows the learning process becomes more active, interesting and meaningful to students to be applied. Changes in the education system will change the memory-based learning to learning more motivated and creatively (Nischelwitzer, 2007). Integration of images is made by the use of information and communication technology (ICT), through handheld devices such as computers, tablets, mobile phones with android or IOS operating system that allows access to content that may be found in AR. According to O'Brien (2005), AR is an advanced technology that allows users to interact with the virtual world and the real world in real-time applications can bring more natural experience, improve attention and motivated students who have the potential to enhance the learning experience.

## **2.0 PRODUCT DEVELOPMENT MODEL**

In this study, the models used are Model ADDIE for AR of this development. ADDIE model is divided into five phases, namely, phase analysis, phase were clean, development phase, implementation phase and phase of the evaluation.

### **2.1 Phase 1: Analysis**

Analysis phase was needed is the first phase in the ADDIE model. In this phase, the target group, the problems that exist and the troubleshooting steps are identified in advance. The scope and objective of the study were also set in this phase. This phase is important because through this phase, information is needed in the development and implementation of this study can be obtained. The information obtained will be evaluated and reviewed. The first step is to identify the problem. To identify the problems that exist, two methods have been used, namely, thrombosis and method of reading from past research. By reading from past research, problems faced by students in the teaching and learning process for Electronic subjects were identified. By reading also no more use of Augmented Reality in education, especially in technical and vocational education in Malaysia. The information obtained is by reading journals, theses, books and the internet. Since this application is no longer used in the field of technical and vocational education, especially in the Electronic subjects 1, the initial target of the study carried out among two year students studying Bachelor of education Vocational (electrical and electronics). This is because the subject Electronic 1 included in the compulsory subjects in students year 2 a Bachelor of Vocational Education (electrical and electronics). The next method is the method of interview with students who have taken the subject. A session of interviews was conducted with a few students who have taken the subject Electronic 1 to obtain comment from them about problems encountered during the process of teaching and learning the subject take place. The result of the interview, conclude, students are hard to remember and understand the subject Electronic 1, especially for difficult topics such as the Transistor and Diode. In addition, the students are hard to memorize symbols, features, function of the transistor and diode and ABBM used cannot attract students to understand and remember the sub topics concerned.

### **2.2 Phase 2: Design Phase**

After successful analysis, design phase will be done. This phase of the process to build more graphic designs, video, audio, text and pictures for the following topics. This phase also takes into account the requirements of hardware and software that will be used by developers as well as users, namely students. Hardware and software is imperative in developing an application development. It is also defined as a group of commands for controlling, managing and supporting activities and computer system. The hardware consists of components can be controlled physically. Examples of hardware used by developers, is that laptop computers are one of the hardware used in this AR development. It is a necessity of a material in which all software will be downloaded in this laptop to launch the process of the development of AR is. Next is the printer one of the devices that are able to produce printed materials such as reports and documents. The printer can print plain paper (A4) paper or a variety of measurements. The printer used in this development to print front page showing that contains "Zap Code" for the purpose of scanning. The others are smart phones that let users install the sophisticated applications in it such as Android, or Windows Phone. Smartphones to be used in the development of this to scanning to target Jeff marker and video and multimedia elements are displayed on the screen smartphone. While the software did use application Zappar. Zappar need

to download app on Appstore for developers PlayStore to integrate elements developed to become AR like video, graphics and audio.

### 2.3 Phase 3: Development Phase

Development phase is executed after the design phase has been completed. This phase involves a number of activities involving the development of interface applications, content development, development of multimedia elements such as text, graphics, audio and video. The development phase is carried out based on from storyboard produced at design phase. Development of the interface is the main page that influence students use the users modules to be produced as shown in figure 1. The interface design is very important because it involves an initial picture of the module against the students. The development process of this interface should be implemented cautiously so that it fits with the theme Electronic 1 subjects and in accordance with the target students. Next is the development of content. Content development will be carried out carefully. The content of the Electronic module must be compliant Electronic syllabus 1. This process should be carried out carefully so that the objective of the study is inaccessible. Last but not least is the development of multimedia elements. Multimedia elements are an important element in the development of the electronic module 1 using an Augmented Reality app, this module contains a lot of multimedia elements to produce a method of learning more fun among students especially in understanding components difficult. Between multimedia elements contained in the Electronic module 1 this is video, graphics, audio and text. Text elements are also not included too much in this module as is feared to cause feeling bored to students. Graphic elements will also be included, namely, images of beautiful and interesting included in order to attract students. The quality of graphics that effectively able to increase student motivation and stimulation of students to continue the current session focus on teaching and learning.



Figure 1: Interface of module

## **2.4 Phase 4: Implementation**

This phase will be implemented after the completion of the development phase is carried out. In this phase, it involves a process to test the effectiveness of students who will use it. Before this module the validity of expert needs to be done to determine the validity of either the module is appropriate and in line with the Electronic syllabus 1 taken by students or not. The validity of the will done by lecturers who teach subjects Electronic 1. Upon completion of the validity of the expert, then this module will be implemented for students by using quasi experimental methods. In this study, quasi experimental chosen to implement and evaluate the Electronic module 1 uses Augmented Reality app. In the quasi experimental, students will be divided into two groups, the treatment and the control group. The treatment group was made up of those who will use the Electronic module 1 using an Augmented Reality app while the control group was composed of those who will use teaching methods and learning normal that is conventional. The test will be carried out in advance to both groups before the experimental method and conventional method are carried out. After that, students' achievement will be assessed. Afterwards, experimental methods and conventional method will be carried out and the students again will face a test post, i.e. after the experimental method and conventional method is performed. After that students will be assessed again and will be compared with the pre-test.

## **2.5 Phase 5: Evaluation**

The evaluation phase is the last phase in the development of the electronic module 1 using Augmented Reality app. In this phase, the effectiveness of this module will be evaluated in terms of achievement of pre-test and post-test for both the treatment group and the control group. Students will determine whether Electronic module 1 using an Augmented Reality app is effective or not to student achievement. After that, the questionnaire will be distributed to the group of treatments that have been using the Electronic module 1 using an Augmented Reality app to get their feedback on the effectiveness and for improvement of the module.

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