

**TEXTBOOK COMES TO LIFE: THE DEVELOPMENT OF INTERACTIVE  
TEXT BOOK USING AUGMENTED REALITY TECHNOLOGY FOR  
SEJARAH TAHUN 5 IN TOPIC IDENTITI SERANTAU**



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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TEXT BOOK USING AUGMENTED REALITY TECHNOLOGY FOR  
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This report is submitted in partial fulfilment of the requirements for the  
Bachelor of Computer Science (Interactive Media) With Honours

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY  
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2017

## BORANG PENGESAHAN STATUS TESIS

**JUDUL: TEXTBOOK COMES TO LIFE: THE DEVELOPMENT OF INTERACTIVE TEXTBOOK USING AUGMENTED REALITY TECHNOLOGY FOR SEJARAH TAHUN 5 IN IDENTITI SERANTAU TOPIC**

**SESI PENGAJIAN: SEMESTER II 2016/2017**

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## DECLARATION

I hereby declare that this project report entitled

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TEXTBOOK USING AUGMENTED REALITY TECHNOLOGY FOR SEJARAH  
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Date: \_\_\_\_\_

24/08/2017

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I hereby declare that I have read this project report and found this project report is

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(DR. MOHD HAQIZ BIN ZAKARIA)

## DEDICATION

The final year project of my degree is dedicated to my beloved parents for their supporting and encouragement in ups and downs of me. Their pray and useful advices make me enthusiasts and struggle to complete this project.



## ACKNOWLEDGEMENT

First, I would like to give the praise to Allah S.W.T for giving me strength, healthy and patience to complete this project successfully.

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I also would like to thank Dr Mohd Hafiz bin Zakaria, who give me opportunity to be under his supervise and give a lot of supports and guides me to improve my project to be more successful, interactive, and effective.

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Special thanks, to all my beloved and supporting friends who always help me from beginning until the end of this project.

Never to forget, thank you to my faculty as this project give me a lot of experience and enhance my skill to develop a technology who give a benefits to others.

## ABSTRACT

The textbook is designed as a main source of information and less interesting for student nowadays due to lack of interactivity. Students only see one perspective on a concept or issue. History subject, for example is one of the compulsory subject for students to learn in primary school. This subject area has many fact, which are hard for students to remember. AR application will be developed to investigate an alternative technique for Sejarah subject in Identiti Serantau topic. Besides, to develop an AR application using existing text book as markers and to evaluate the effectiveness of the AR implementation on students learning experience. Data for this study will be done through the observation and the understanding of students of this topic. It will be analysed using the response of the students and examine the remembering of the topic. The effectiveness of learning will consider by the response of students. In conclusion, the study is expected to contribute in developing technology of education to attract the students to more interactive in their learning.

## ABSTRAK

Buku teks ini direka sebagai sumber utama maklumat kepada para pelajar pada masa ini dan ia kurang menarik kerana kekurangan interaktif. Pelajar hanya melihat satu perspektif mengenai konsep atau isu. Subjek sejarah adalah salah satu contoh mata pelajaran wajib untuk pelajar belajar di sekolah rendah. Subjek ini mempunyai banyak fakta, yang sukar untuk pelajar ingat. Aplikasi AR akan dibangunkan untuk menyiasat teknik alternatif untuk subjek Sejarah dalam topik Identiti Serantau. Selain itu, untuk membangunkan sebuah aplikasi AR menggunakan buku teks sedia ada sebagai penanda dan untuk menilai keberkesanan pelaksanaan AR pada pelajar pengalaman pembelajaran. Data untuk kajian ini akan melalui pemerhatian dan pemahaman pelajar terhadap topik ini. Ia akan dianalisis menggunakan tindak balas pelajar dan mengkaji mengingati topik tersebut. Keberkesanan pembelajaran akan dipertimbangkan oleh respons pelajar. Kesimpulannya, kajian ini dijangka menyumbang dalam membangunkan teknologi pendidikan untuk menarik pelajar lebih interaktif dalam pembelajaran mereka.



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## CHAPTER I

### INTRODUCTION

#### 1.1 Introduction

The textbook is designed as a sole source of information and less interesting for student nowadays. Students only see one perspective on a concept or issue. So, to solve this problem, the augmented reality technology will be improve the learning to attract the student be more attracted. Augmented Reality brings virtual information or object to any indirect view of user's real-world environment to enhance the user's perception and interaction with the real world. It is tries to augment virtual objects on the real ones or scenes for maximizing natural and intuitive user experience in real time. It is an interactive environment where real life is enhanced by virtual things real time. The Augmented Reality can apply in educations, games, GPS and so on.

## 1.2 Problem Statement

The topic of “Identiti Serantau” in Sejarah subject is difficult to remember because of the different design, colours and symbol for every nation flags and the way to teach are not interesting. Based on statement subject matter expert, learning based on textbook is less interesting and the information are not complete. Various solutions are trying to achieve but still the students difficult to remember about every flags of Southeast Asian Nations.

## 1.3 Objectives

The project objectives are:

1. To investigate the alternative technique of teaching for Sejarah subject in primary school.
2. To developed an AR application by using existing text book as marker.
3. To evaluate the effectiveness of the AR implementation on students learning experience.

## 1.4 Scope

The target user for this project are students in standard 5 which are taking “Sejarah” subject. It will focus on topic “Identiti Serantau”. In this project, the focus will be on the recognition of flags for every Southeast Asian Nations.

## 1.5 Project Significant

In this project, the augmented reality will develop by using existing text book as a marker and other cards as the marker too. It will investigate an alternative delivery of Sejarah topic. Last, to evaluate the effectiveness of the AR implementation on students learning.

## 1.6 Expected Output

The expected output of this project is an interactive textbook using augmented reality technology that can help to attract the student to learn and remember. Next, to enhance the memory of students about the colour and symbol of flags presented on the textbook.

## 1.7 Conclusion

This chapter explains overview about the project of an augmented reality application which can attract the student to learn Sejarah subject more fun and effective. In the project background, there is more details about the project, the benefits of project and how the project work. There are details explanations about the problem with the concentration students during study. The objectives for this project are stated. Next, in the scope section, there are explanations about target user and contents of this project. Lastly, the expected results have been decided.

## CHAPTER II

### LITERATURE REVIEW AND PROJECT METHODOLOGY

#### 2.1 Introduction

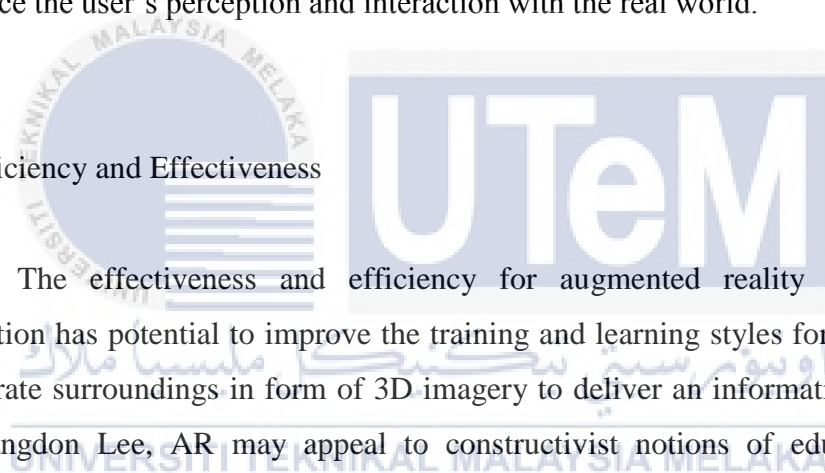
This chapter provides the literature review for any developed systems that related to this project. Comparisons will be made among the existing project. A comparison is based on the domain for this project, techniques for developing the project, current technology used, different multimedia skill and combining the interactive augmented reality technology development skill to achieve the effectiveness learning experience. This chapter also explains the methods that have been used to develop this project. Project's requirement list such as software and hardware are also available.



## 2.2 Domain

History is one of the many subjects that are made compulsory for students to learn in primary school. This subject area has many facts, which make it hard for students to remember the information. Basically, there are learning by using conventional method such as text book, mind map and story-telling. But, this method is less interesting and not effective. So, to solve this problem, the augmented reality technology will introduce to the primary school students. This project will target standard 5 students. It will be an alternative technique of the learning method to attract the student be more interested with. Augmented Reality brings virtual information or object to any indirect view of user's real-world environment to enhance the user's perception and interaction with the real world.

### a) Efficiency and Effectiveness



The effectiveness and efficiency for augmented reality technology in education has potential to improve the training and learning styles for academic and corporate surroundings in form of 3D imagery to deliver an information. According to Kangdon Lee, AR may appeal to constructivist notions of education, where students take control of their own learning, and could provide opportunities for more authentic learning and training styles (Kangdon L, 2012). As we know, AR applications may attract, excite and stimulate the students to learn and support the cost-effective for the users. In addition, AR systems can make the learning be more entertaining, motivating, and engaging in conducive environments. Based on statement Mark Billinghurst, AR interfaces allow users to see the real world at the same time as virtual imagery attached to real locations and objects (Billinghurst, 2002). Therefore, this application is more effective and efficient in term of education for student.

## b) Features and Affordances

This application allow the students to explore more about the subject that they are learn. Although this application has the benefit to them but the awareness about it is less and insufficient funding to develop. According Kai Wu, Yu Lee, Yi Chang and Chong Liang (2013), features and affordances have five aspects which is learning content in 3D perspectives, ubiquitous, collaborative and situated learning, learners' senses of presence, immediacy and immersion, visualizing the invisible and bridging formal and informal learning (Wu, Lee, Chang and Liang, 2013). Using augmented reality in the school can give much benefit to teacher and student. Based on Shelton estimation in Kangdon Lee paper, AR has not been much adopted into academic settings due to insufficient funding by the government and lack of awareness regarding the needs for AR academic settings (Shelton, 2002). Therefore, the government has to do something to improve the teaching style in school.

## c) AR in Education

The augmented reality in education explained to us about the usage of AR-technology could be inserted in many subjects in school. For example, maths, biology, chemistry and so on. Based on statement from Pasareti and Hajdujo, AR is likely to be a new form of demonstration where no need to have any physical model presented, hence it should be available for students at home (Pasareti and Hajdujo, 2011). Mehmet and Yasin also state that Augmented Reality can be applied for learning, entertainment, or edutainment by enhancing a user's perception of and interaction with the real world (Mehmet and Yasin, 2012). This proves that, the subject will become more interactive, more interesting and more colourful for student to learn. Besides that, the AR development or logical games may profit in education. The writers also state about the AR Books. They stated that, the AR books can be supplemented with additional visual information uniting pictorial content of real book with virtual elements that ass educational content. This application can caught the student attention because the interactive display, stimulation, audio, three dimensional graphic and animation. It help the teacher to understanding their

students about the certain subject. The textbook can be improve the interactivity with AR technology.

#### d) Technology and Child-Driven Learning

The technology and child-driven learning describe about the comparison between traditional learning and using technology in learning. Basically, traditional learning in classroom using tool such as pencils, notebooks and textbooks. However, these tools are still important but inadequate for student to enhance the knowledge and get an extra information by using traditional method. For technology method, students use computer as a tool to watch information videos and surfing internet to get the related knowledge. Besides that, there are using other technology devices such as smartphone. The using of technology devices need the supervision from parents. According Lincoln, he state that technology takes a special place in the CDLE as a powerful tool for children's learning by doing (Lincoln, 1992). Technology allows the students to access the online information services and interactive video and audio. Based on Kaufmann and Schmalstieg statement, they also state that, this setup (AR technology) allows for first-class experiences on the students' side, the number of available AR sets significantly restricts the use in larger groups (Kaufmann and Schmalstieg, 2003). Therefore, technology in education play an important role to deliver information in advance way.

#### e) Learning and Training

Vocational education training is an institutions that allow a student to learn about the skill such as in mechanical, culinary, technician and so on. The AR learning scenarios has possibilities to improve and acquiring professional competences. Based on the writer statements, possibilities offered for AR could reduce the cost of carrying out some learning experience where expensive learning material is necessary (Paper, 2014). By using this application, they can learn to create a gem. It will allow a students to explore the combining virtual objects as

different kind of physical materials with the real objects. In this case, it will save the cost because to buy the material is too difficult and expensive.

### 2.3 Existing System

In this project, the existing system is divided into two categories which is modern technique and traditional technique. The four modern technique in existing systems have been evaluated to get an overview for designing our system. There are USA Capitals & Presidents, Quiver's Earth Map, Boardroom World & USA Map and I-Wow Atlas World. For traditional technique, the textbook always use in the schools. All the description will be explain below:

#### a) Modern technique

##### i. USA Capitals & Presidents

USA Capitals & Presidents is an educational Augmented Reality education application from Popar Toys. The user can install the application through Google play store and iTunes. In this application, the user can explore each President of the United States. The students can learn about geography and culture of the United States, fun facts and history about each state including mottos, state culture and more with the 3D models, pictures and the greatest videos detailing.



Figure 2.1: A screen grab from USA Capitals & Presidents

ii. Quiver's Earth Map

The map skills grade has been introduced by Brian Bobby Lewis from Puteko Limited. The user can get this application through Google play store. The objective the developer for this application is to locate on a world and regional political-physical map which is Amazon River, Caribbean Sea, Gulf of Mexico, Pacific Ocean, Panama Canal, Andes Mountains, Sierra Madre Mountains, and Atacama Desert. In this application the user can colour the map of each region. Then, the application can detect the regions that we have coloured. The user also can change the colour mode to night view, day view, seamed and etc. the user can rolling the earth on the screen and discover the map world.

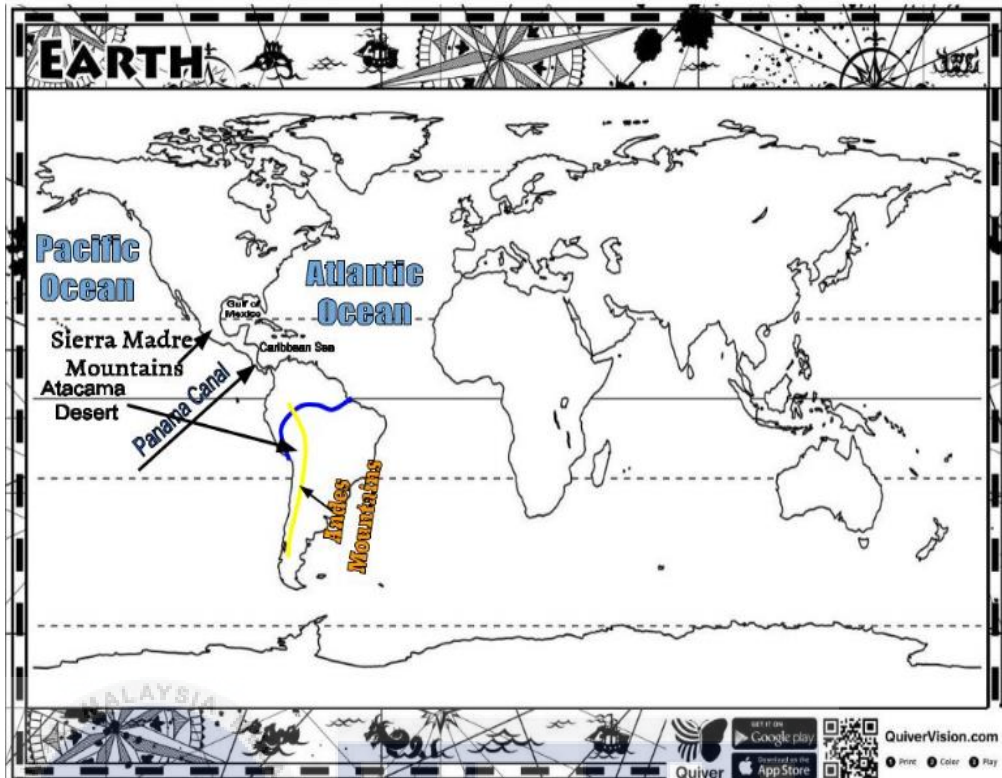


Figure 2.2: A screen grab from Quiver's Earth Map

iii. Boardroom World & USA Map

Boardroom World & USA Map is educational Augmented Reality application from Round World Products. The user can get this application from Google play store and iTunes. This application the user can explore the countries around of the world or states of USA. They can simply select or tap the countries to start learning and get the information about its culture, economy, government, and etc. There are many features for world and USA. For world features, it provided a proper audio for each country and capital, country emblem, animated 3D flag and national anthem, inspect and play with a 3D model of the country with major cities and rivers marked and more. For USA features, the user can see the pictures or 3D models of each flag, bird, and flower, it also provided an audio with clear pronunciation for each state and capital and more.



Figure 2.3: A screen grab from Boardroom World & USA Map

iv. Telaga Biru Aura

Aura is an Augmented Reality application that is customised for magazines and books published by Telaga Biru Sdn Bhd. Aura was published on 18 December 2014 for iOS only. Then followed by Android was published on 25 March 2015. Aura augments the static magazine and book contents with multimedia and interactive contents to enhance readers' experience with Telaga Biru published material. There are introduce AR in three local magazines which is Solusi, Gen-Q and al-Ustaz. Based on Kosmo Online was published on 24 December 2014, statement from Fikri, the magazines reader stated that, this technology was attract his interesting to buy the reading materials because it very interactive and interested.

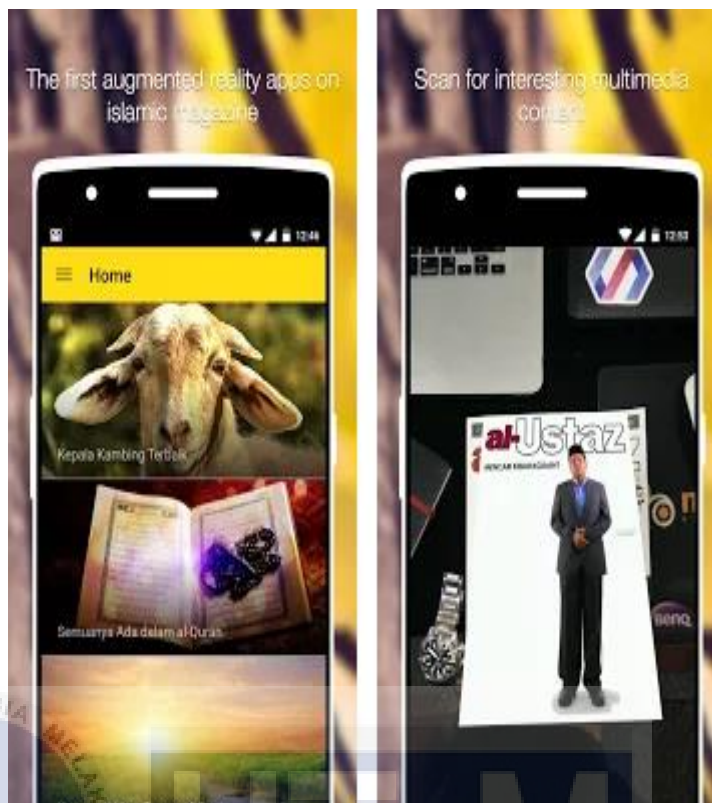


Figure 2.4: A screen grab from Aura

## b) Traditional technique

### i. Textbook

Textbook is compulsory material in school. It is a manual for a teacher to guide the students in the class. Textbooks are teaching materials and learning resources that are easily found and used. In use is also very simple, learners enough to read and understand the material covered in the book, do not need special skills are required to use textbooks. It also is widely used print materials. However, the content of information in the textbook is not complete. Therefore, teachers and students need to explore and search the information in another resources for example reference books or surfing internet.