Developing a Virtual Reality (VR) App for Theory of Flight & Control as a Teaching & Learning Aid

Mohammad Anuar Yusof, Abdul Malek Ya’acob, Mohd Azman MohdZaki, Zuriana Abdul Rahman, Nurul Husna Zainal Abidin, Irna Fazana Padil, Muhd Khudri Johari, Ismail A. Bakar, Hanif Faiq Mohd Hashim

Abstract: This research focuses on how a group of lecturers, specialists, and final-year undergraduates developed a virtual-reality app from scratch. By utilizing a combination of software (Autodesk Maya and Unity 3D) and hardware (custom-made VR goggle and an Android-based smartphone), an app was designed to be used as a teaching/learning aid for the Theory of Flight & Control course for aircraft maintenance undergraduates in Malaysian Institute of Aviation Technology. A concept of pre-test-post-test analysis was carried out with the custom app being the treatment for the 46 students involved after they have taken their pre-test. The results attained from their post-test were then compared to pre-test results. The comparative analysis has indicated that the undergraduates were not only satisfied with the advantages of the app (saves learning aid costs, reduce learning time while increasing effectiveness of learning acquisition, provide extra, digital, demonstrative knowledge), but they also highly recommended for digital apps like this to be developed for other courses as well. This is in line with the IR4.0 demands not only throughout Malaysia, but also worldwide.

Keywords: Theory of flight & control, virtual reality, android app, Autodesk Maya, Unity 3D

I. INTRODUCTION

In Malaysia, there are still research of using VR technology in education but there are enormous used of VR technology for gaming, and tourism purposes. Nevertheless, it is important to investigate the technological and social issues underlying VR before its spread through global community. Conventional teaching methods and learning aids are still being largely practiced among educators and students respectively in this country. As globalization and developments wait for no one, this study prioritizes on how to initiate and popularize VR app as an alternative for learning acquisition and teaching processes.

Although our current teaching and learning (T&L) technology includes realia which have been proven to be effective for educational(Johari & Jamil, 2014) and commercial purposes(Bardai, Er, Johari, & Mohd Noor, 2017)/(Zainal Ariffin, Johari, & Ibrahim, 2018) such as smartboards, designing software(Ya’acob, et al., 2018)(Ya’acob, et al., 2017), live and non-airworthiness aircrafts(Ishak, Johari, & Dolah, 2018), operational aircraft parts(Johari, Jalil, & Mohd Shariff, 2018), etc. VR is an excellent alternative for in-class tutorial or demonstrations to complement certain processes that cannot be done by the current T&L technology.

For this study, the aims are to develop a virtual reality, android app as a T&L aid for Flight Control course and subsequently carry out a survey to measure students’ satisfactory levels for using this technology. Although it is a trial version and the actual VR content is only a few minutes long, both lecturer and students can use their android smartphones for this technology.

II. LITERATURE

Currently in Malaysia, there have been several attempts of using VR in the field of tourism, sports, theme park, health research, and others. Examples such as VR/AR theme park in Midvalley Megamall (Fun, 2017), VR roller coaster(The Star, 2017), badminton (Zahari, Yashim, Muhammad, Yap, & Wee, 2018) and games for disabled-friendly people (Devinder, et al., 2017), and preserving heritage values (Swinburne University, 2018) to promote cultural tourism.

Not excluding education, ongoing research in developing VR technology is heard among the academia community(Diwan, 2017). Hence, our team has decided to focus on the T&L of the Theory of Flight & Control course (Yusof, 2018)for undergraduates. Theory of Flight Control subject was chosen because there is some crucial part for student to remember which is the movement or position of primary flight control such as aileron, rudder and elevator during take-off, landing, turning aircraft to right or to the left. It is more efficient if student can actually see the movement parts of primary flight control as in reality. Instead of using self-imagination, which is more tiring and possibilities of becoming more confusing in remembering the facts learnt, the VR platform will help student through visual aids and more interactive way by transferring reality into virtual.