Universiti Teknologi MARA

Solar Learn: Learning The Solar System Through Application of Augmented Reality for Elementary Students

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ABSTRACT

Augmented Reality (AR) is an advanced technology that can be used in education that offers immersive, engaging, and interactive learning. The current method of learning is using the textbooks and only depends on two-dimensional (2D) diagrams when learning the solar system like the sun, the planets, the moon, and the constellations. To address the issues, the application of augmented reality named Solar Learn will help the students to explore the concept of the solar system in three-dimensional (3D) diagrams. The Solar Learn application aims to help the elementary students in understanding the concept of the solar system. The students that can use the Solar Learn application are the students who are aged 9 to 12 years old since they learn about the solar system in their syllabus at the school. The Solar Learn application provides 3D diagrams to visualize the celestial bodies, provide the multiple-choice questions (MCQs) where respondents select the best answer from a list of options in the quizzes section, audio with voice narration of the content, and monitor the result of the quizzes for the teacher dashboard. The suitable features are included in the Solar Learn application to make the students learn in a fun way. Rapid Application Development (RAD) methodology is also applicable for this project since it focuses on interactive design with user feedback for determining functionality and accessibility to meet the user requirements. Overall, results observed during usability testing with the System Usability Scale (SUS) showed very high satisfaction levels, while students perceived that the application was good and enjoyable for learning purposes, and teachers liked the idea of tracking student scores. Future work may include extending application for the iPhone Operating System (iOS) system, add *Bahasa Melayu* language option, gamified aspects by including badges or levels and there could be a expanding the AR to show full solar system simulation with orbits.

Keywords: application, augmented reality, solar system

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CHAPTER 1

INTRODUCTION

This chapter introduces a background and motivation for developing an Augmented Reality (AR)-based learning application called Solar Learn that would better assist elementary students with the comprehension of the solar system. It discusses the disadvantages in using current methods to learn, where abstract scientific concepts are involved. Other than that, it covers the problem statement, research questions, objectives, scope, significance, expected outcomes, and limitations of the project to provide a clear foundation for the study.

1.1 Background of Study

Education is a series of systems which is interactive with the components, supports one another. Education plays an important role in creating mindsets for young people. Nowadays, the students learn in elementary school only by using textbooks. The abstract concept like the solar system is hard to capture since it only uses textbooks that use two-dimensional (2D) diagrams. The quality of education implementation is influenced along by the mechanistic advancements in technology, during the period of digitalization. Education needs to be updated according to the new times. Teachers can implement the quality of learning by properly selecting the learning strategies, resources, and media greatly. There are a few subjects in elementary school that students need to learn using abstract material to make them see the content clearer such as learning about the solar system for science. However, current education in school also causes problems. Problems can happen in two aspects, which are the problem observed by the teacher and the problem which exists in the