INVENTOPIA 2025

FBM-SEREMBAN INTERNATIONAL INNOVATION COMPETITION (FBM-SIIC)

INNOVATION IN ACTION: TURNING IDEAS INTO REALITY

Chapter 10
AR-GREENBUILDING

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ABSTRACT

AR-Greenbuilding was developed as an innovative teaching aid that integrates Augmented Reality (AR) applications into the teaching and learning process for the DCA 2012 Green Building Technology course at Vocational Colleges. The idea for this innovation emerged when students found it difficult to understand theoretical concepts and generate ideas for developing green building model projects based on existing buildings. The objective of AR-Greenbuilding is to enhance student's understanding and visualization of the principles and applications of green technology elements in existing buildings, as well as to help them generate ideas in developing green building models. AR-Greenbuilding was developed using Sketch-Up software to create 3D models. Students are required to scan a poster to view the 3D image and explore the green technology elements in the model. Additionally, students can scan QR codes attach with green technology elements on the poster to display more detailed information via websites. The evaluation phase was conducted to gather feedback, involved 15 students from the Diploma in Construction Technology program. Findings show that respondents provided very positive feedback on this innovation. This innovation not only benefits students and teachers but also reflects a commitment to lifelong learning and environmental sustainability.

Keywords: Augmented Reality, Green Building Technology, Teaching Aid

1. INTRODUCTION

DCA2012 Green Building Technology course is a newly introduced subject under the Diploma in Construction Technology program starting in 2022. This course exposes concepts and applications of green technology in construction, particularly in buildings to students. Throughout observations indicate that students struggle to understand theoretical concepts and develop ideas for their green building model projects based on existing building inspections. This problem is supported by recent studies (Ismail et al., 2019), which found that students face difficulties completing practical assignments due to a lack of visualization skills. As a result, students struggle to apply theoretical knowledge learned in class to complete practical tasks.

The objectives of this innovation are:

1. To help students understand and visualize the principles and applications of green technology elements in buildings.
2. To assist in clearly identifying green technology elements in existing buildings.
3. To help students generate ideas for developing green building models.

2. DESIGN DESCRIPTION

The AR-Greenbuilding innovation was developed as a teaching aid for the Green Building Technology course, intended for use by lecturers and students of the Construction Technology Program at Vocational Colleges. The 3D building design was developed using Sketch-Up software, based on existing buildings, with added elements of green technology.

3. VISUAL

There are four main elements in the AR-Greenbuilding innovation project are the Augmented Reality element, Google Sites, QR Codes, and a Google Form for enrichment sessions. Figure 1 shows the poster highlighting these four features.

Figure 1 Features of the project on poster

Figure 2 shows the flowchart outlining the four main steps for using AR-Greenbuilding.

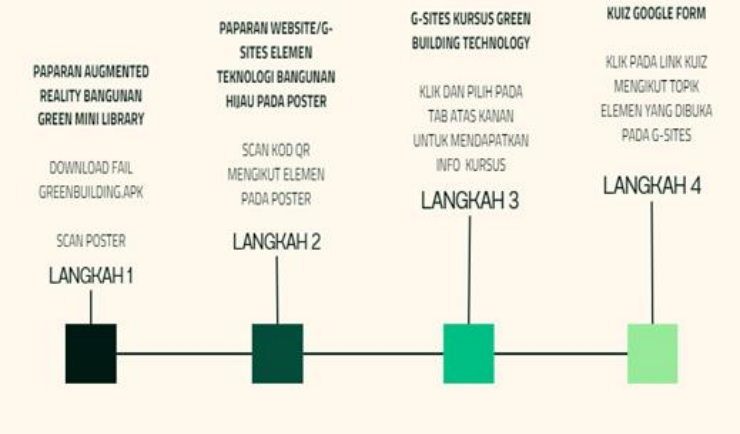

Figure 2 Application Flowchart

Figure 3 shows that students using the AR-Greenbuilding as a teaching aid during lectures and self-learning sessions for the DCA2012 course. The posters was distributes to students during group activities.

Figure 3 Students scanning the QR code on the poster

4. NOVELTY AND UNIQUENESS

The AR-Greenbuilding innovation is fully copyrighted by the Construction Technology Program at KV Port Dickson. The original idea and development of the innovation, including the 3D design, were fully developed by our team based on existing buildings at KV Port Dickson.

5. BENEFITS TO MANKIND

This innovation contributes to improving teaching and learning sessions, particularly for the Construction Technology Program at Vocational College, by enhancing student's understanding of the principles and applications of green technology elements. The AR application helps students visualize and clearly to see examples of green technology

elements in buildings. Other than that, AR-Greenbuilding fosters creative thinking in generating ideas for developing green building models and creates a more engaging and interactive teaching and learning environment in line with 21st-century Learning.

6. COMMERCIAL POTENTIAL

The use of the AR-Greenbuilding innovation is not limited to the Construction Technology Program at Vocational College. It is also suitable for courses or subjects related to Green Technology at various educational levels and age groups. Teaching aids based on Augmented Reality are increasingly popular today, as they are more engaging with 3D technology. Aligned with Education 4.0, this innovation holds high commercial value.

7. CONCLUSION

In conclusion, the analysis from the study found that the AR application in the AR-Greenbuilding teaching aid innovation aligns with the stated research objectives. Evaluation results indicate that the development of this innovation helps students increase their motivation to identify green building technology elements and subsequently develop their assignment models. This innovation also enhances their understanding and increase academic performance. The content presented via website helps engage students throughout the teaching and learning process. In the future, this innovation can be improved by diversifying building examples to strengthen student's understanding.

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