

THE EFFECTS OF DESIGN-BASED LEARNING IN TEACHING AUGMENTED REALITY FOR PRE-UNIVERSITY STUDENTS

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Highlights: This research project is about the innovation of a teaching and learning approach with the integration of augmented reality as the tool and the subject, named design-based learning (DBL), aimed to empower pre-university students' learning performance and motivation. Across three lecture groups ($n_1 = 114$, $n_2 = 98$, $n_3 = 95$), there is an increased in mean marks between two tests conducted prior to and post of DBL. The mean scores for learning motivation captured using instructional materials motivation survey (IMMS) for attention, relevance, confidence and satisfaction model are all above average of 3 out of 5.

Keywords: augmented reality, computer education, classroom technology practices, learning strategies, design-based learning, immersive participation

Introduction

The aim of this research is to investigate the effects of design-based learning approach in terms of performance and motivation for pre-university students to learn augmented reality in the ICT Competency course. However, most students in the pre-university level came from pure science stream during school with minimal ICT or computer science knowledge.

Content

Design-based learning is a variation of problem-based learning that enables the learners to apply the technology to solve a task to design and develop a science-themed learning material embedded with augmented reality. The design-based learning is implemented with 3 phases, namely planning, implementation and evaluation. The results show that there is an improvement in students' performance. Moreover, it is found that this learning approach shows a high motivation among students in the attention, relevance, confidence and satisfaction factors.

Based on the results, design-based learning empowers the students on self-directed learning by focusing on the goals of design and development, to master the content and directly apply the knowledge to enhance their higher order thinking skills. The feel of satisfaction to complete the product perfectly motivates the learners. Students also understand the relevance of the topic and project. This enable students to be attentive towards them. However, students' confidence factor is low due to the new technology. This seems to be like an uncharted area for the students. The practical implications and suggestions for future research is latter presented.

Table 1: Mean scores for students' motivation based on ARCS model.

Lecture Group	<i>n</i>	Attention	Relevance	Confidence	Satisfaction
F1	114	3.44	3.71	3.24	3.75
F2	98	3.30	3.64	3.18	3.67
F3	95	3.45	3.71	3.30	3.77

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