

Project Summary for IAL Website

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Project Title:	Evaluating the effectiveness of digital game-based learning (DGBL) for professional upskilling: bringing construction safety knowledge into architects' and engineers' workplace
Project Number:	GA19-05
Year of Approval:	2020
Funding Source:	WDARF
Objectives and intended outcomes of the project:	<p>The objectives of this project are:</p> <ul style="list-style-type: none"> • Develop a digital game prototype of a construction safety digital game-based learning (DGBL) to teach Design for Safety (DfS) • Develop a DGBL protocol for professional upskilling • Develop a toolkit to assess the effectiveness of DGBL programs on construction safety education for design consultants. <p>The intended outcomes expected from this research are:</p> <ul style="list-style-type: none"> • A prototype of a design-for-safety DGBL software for construction professionals • A pedagogy or protocol for developing work-integrated DGBL programs for professional upskilling • A toolkit for assessing the effectiveness of DGBL programs for professional upskilling
Project Team	
Principal Investigator:	Dr. Goh Yang Miang, NUS
Summary of Project (up to 300 words)	
<p>There is a lack of studies to examine the effectiveness of Digital game-based learning (DGBL) on adult learners in the context of professional upskilling. To address this gap, we created SafeSim Design (SSD), a single-player digital game to educate construction professionals on the difference between design risks and occupational hazards, conduct risk evaluation, and design out issues through various design-related controls. The content in SSD is a collective effort from the authors and industry professionals. Through developing SSD, we can examine the effectiveness of DGBL for professional upskilling and create an avenue for participants to learn about different design risks and the possible mitigations for these risks. The project follows these research questions:</p> <ol style="list-style-type: none"> 1. How to design and develop an effective DGBL for professional upskilling? 2. How to measure the effectiveness of DGBL among working professionals in Singapore context? 3. What barriers do professional service firms face to adopt DGBL for staff upskilling in Singapore? What support is needed? 4. What barriers hinder professionals from participating in workplace DGBL programs? What support is needed? <p>The project hypothesises a three-factor model to capture the underlying structure of an authentic learning environment (ALE) to guide and assess the design of a DGBL. The three dimensions are task</p>	

authenticity, knowledge co-construction and expert modelling. The model will be validated through the test of two hypotheses:

H1: Authentic learning environment (ALE) is constructed in three dimensions, i.e., task authenticity, knowledge co-construction and expert modelling.

H2: In a DGBL context, the three dimensions of ALE predict cultural change (in the empirical context of this study, change of safety culture) and innovation (in this case, design innovation that addresses construction safety issues).

276 words