

EFFECTIVENESS OF AUGMENTED REALITY INSTRUCTION IN TEACHING ICT SYSTEMS DESIGN

JUAN C MUÑOZ, PhD CANDIDATE

SUPERVISORS: DR MICHAEL A COWLING¹ | PROF BRIJESH VERMA² | DR JAMES BIRT³

¹CQUniversity, Senior Lecturer Mobile Applications and Computing. ²CQUniversity, Professor Computational Intelligence, Pattern Recognition. ³Bond University, Assistant Professor, Games and Multimedia

PROBLEM

Learners in Information and Communication Technology (ICT) classes find the complexities of System design thinking difficult to conceptualise and visualise without a simulated or real world reference model of the system.

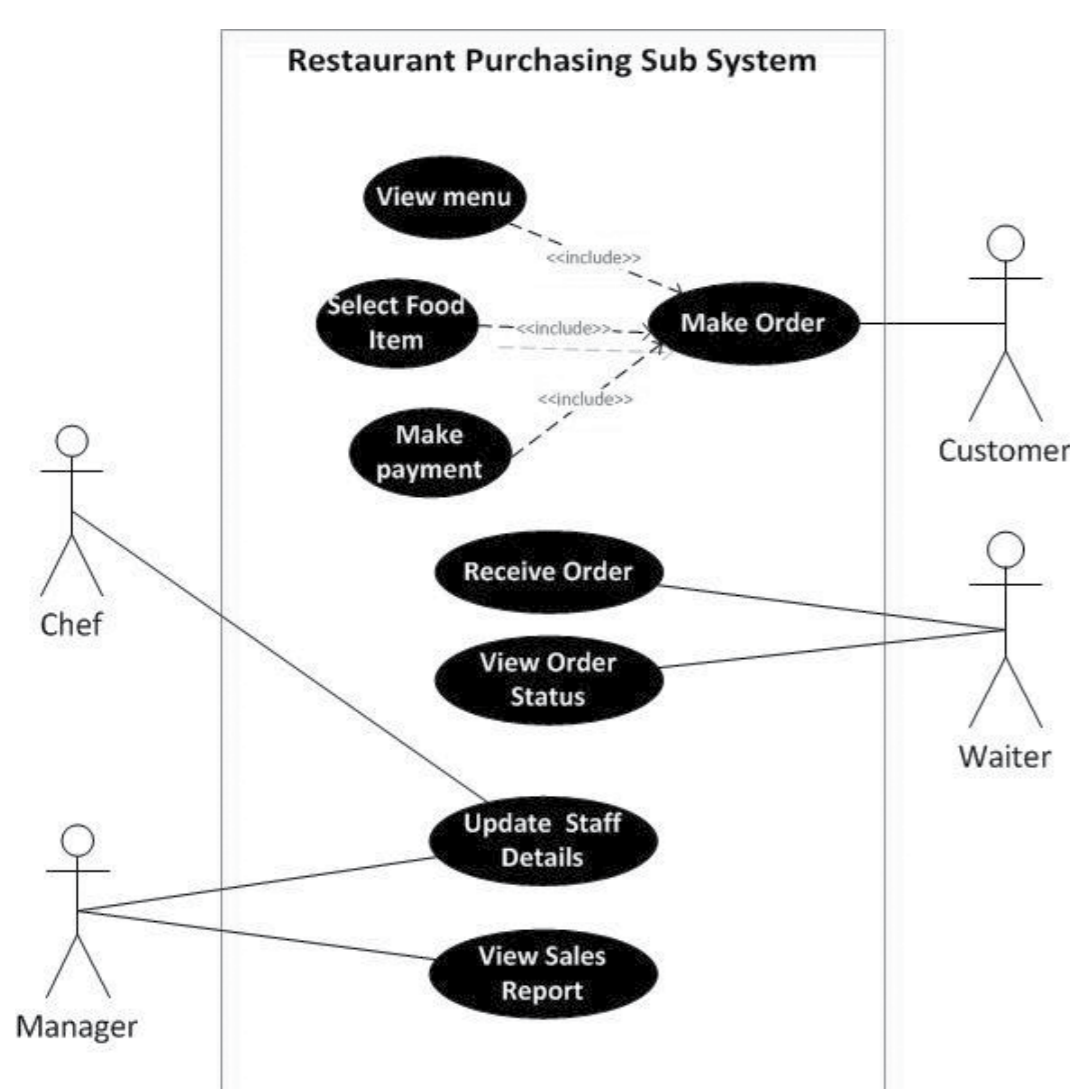
BACKGROUND



- » Technology has altered how learners engage in education activities by assisting them to obtain knowledge and awareness (Gutierrez & Meneses 2014).
- » Augmented Reality (AR) can provide instructional content that allows active engagement in the learning process (Wojciechowski & Cellary 2013).
- » Through virtual environments, learners can collaborate or work individually towards enhanced learning outcomes in a learning process activity (Wang et al. 2013).
- » Giving permission to multitask using mobile computing devices in a controlled fashion could benefit learners to improve learning outcomes, performance, and engagement.

OBJECTIVES

- » The aim of this proposed study is to assist students who face difficulties in translating and comprehending a system from a traditional theoretical paper based abstraction.
- » Assisting ICT learners in understanding Systems Design complexity using an Augmented Reality (AR) visualization intervention.
- » Encourage the learner to engage actively in the learning process when designing system diagrams.



HYPOTHESIS

- » Students who use AR intervention will be able to understand and visualise complex concepts at an earlier stage of the learning process.
- » The level of competency and knowledge of system diagrams and modelling will be improved using an AR approach.
- » Through the use of AR, learner's motivation will be increased by pursuing further studies in computational and design subjects.

PROPOSED INTERVENTION

- » Augmenting practice, using a smartphone/tablet application for a group of students studying Systems Analysis and Design.
- » Two modelling concepts: use cases and business process modelling (BPM).
- » System Analysis tutorial exercises embedded with and without an AR component.
- » Actors and data will be modelled to resemble a physical environment.
- » Using AR, students will be able to repeat their experiments to master modelling and design.



TECHNOLOGY/APPS

- » AR learning can run on standard mobile devices such as smartphones, tablets using a downloadable application.
- » Mobile technology and Qualcomms Vuforia AR tool for Unity3D will be used to develop the intervention.

RESEARCH METHODS

- » Pre-assessment interview and discussion with students to determine level of competency and knowledge.
- » Evaluation of learners level of knowledge and understanding using learning materials embedded with AR compared to students taught via a traditional approach.
- » Validation of all learning activities involved for consistency and effectiveness.

EXPECTED RESULTS

- » Overall student learning and engagement improvement and success compared to;
- » students using non AR embedded learning materials.
- » Significant benefits in terms of pedagogical effectiveness and experiential and;
- » collaborative learning processes by using AR.

REFERENCES

- Gutierrez, JM & Meneses, MD 2014, 'Applying Augmented Reality in Engineering Education to Improve Academic Performance & Student Motivation', International Journal of Engineering Education, vol. 30, no.3, pp. 625 – 635
- Wang, Y, Vicenti, G, Braman, J & Dudley, A 2013, 'The ARICE Framework: Augmented Reality in Computing Education', International Journal of Emerging Technologies in Learning, vol. 8, iss. 6, pp. 27 – 34
- Wojciechowski R & Cellary, W 2013, 'Evaluation of learners attitude toward learning in ARIES augmented reality environments', Journal of Computing and Education, vol. 68, pp. 570 – 585

RESEARCH in association with

