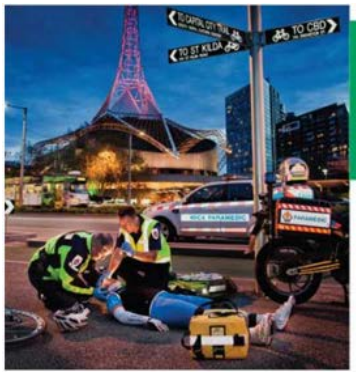

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# Using 3D Printed Tools and an Augmented Reality Smartphone App to Enhance Paramedic Skill Development

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**Abstract**

On the 16th May 2014, Christopher Pyne urged universities to prepare students for "jobs of the future", encouraging universities to train students for the new knowledge economy, where knowledge, especially of technology, is considered as vital an asset as practical skills. This innovation takes this approach, using a combination of a 3D printed Laryngoscope and Forceps, together with a special hat mount and a smartphone app that tracks these devices via 'augmented reality', to provide a sandbox simulation. This 'Mixed Media' visualisation enhances skills development in Laryngoscopy and foreign object removal for trainee paramedics in the CQUniversity Bachelor of Paramedic Science (BPS), building their awareness of new methods for training and widening their education beyond the scope of a traditional paramedic science curriculum. This simulation is useful because students in the CQUniversity BPS develop foundation knowledge in sciences, human body systems, research skills and paramedic practice and are expected to have developed the real world expertise and skills to work as health professionals in emergency medicine and retrieval. Yet despite these very practical requirements, the ability to practice practical skills in the program can be limited for many of the students, who study the program at a distance. The desire of students for more hands-on practice is reflected in responses to course evaluations. The aim of this research is therefore to provide more hands-on skill practice, as well as increase overall skill acquisition and retention for distance students, providing an expected overall improvement in skill level for all BPS students.

**Citation**

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# USING 3D PRINTED TOOLS AND AN AUGMENTED REALITY SMARTPHONE APP TO ENHANCE PARAMEDIC SKILL DEVELOPMENT

DR MICHAEL A COWLING | DR JAMES BIRT | EMMA MOORE

## PURPOSE TO PROVIDE MORE 'HANDS ON' SKILL PRACTICE TO STUDENTS, AS WELL AS INCREASE OVERALL SKILL ACQUISITION AND RETENTION, FOCUSING ON LARYNGOSCOPY WITH FOREIGN BODY REMOVAL.

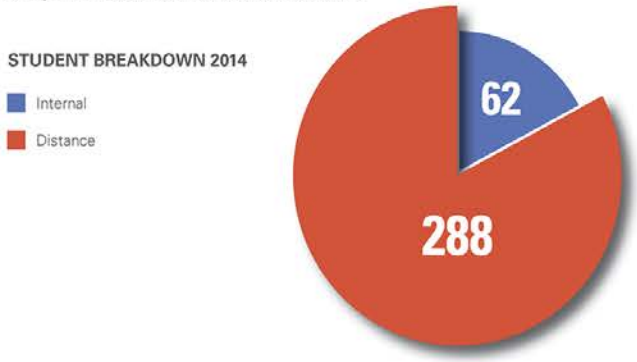
## BACKGROUND

### CQUNIVERSITY BACHELOR OF PARAMEDIC SCIENCE OVERVIEW

- Designed to equip students with the skills to become a Paramedic. They develop foundation knowledge in sciences, human body systems, study and research skills and paramedic practice.
- The program is three years full time with each year broken down into the following focus areas: Pre Clinical, Transition to Clinical and Clinical.


- High number of Distance Education students

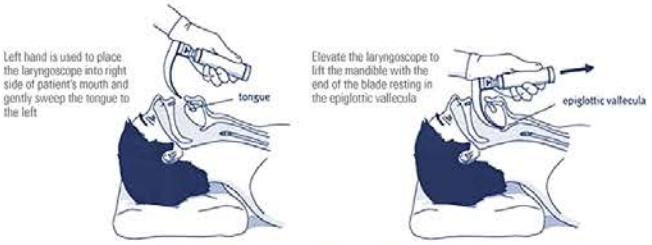
**STUDENT BREAKDOWN 2014**




### PROCEDURES AND SKILLS IN PARAMEDIC PRACTICE

- Students develop an understanding of paramedic care through investigation of the underpinning theory and practice of procedural applications in the discipline.
- Knowledge and skills are developed through a series of coursework exercises and practical laboratory sessions as well as a one week Residential for distance students.

## PROBLEM




*An example of the existing QAS training guide*

***'I believe that because this course is a 'skills' learning course, that there should be a way for us to actually get more time doing skills. I feel that as distance students we are at a severe disadvantage because we spend 5 days doing them in the middle of term and then don't do them again until we hit our placement.'***

***'There is no substitution for experience. Could the school look into either some kind of software or equipment that we could be supplied with so that we can at least go through the motions of doing the skills?'***

***'I believe that my confidence in performing the procedures and skills could have been improved with a little more 'hands-on' time.'***

***'I feel as an external that I am missing out – they do scenarios every week, I did one or two during res school'.***

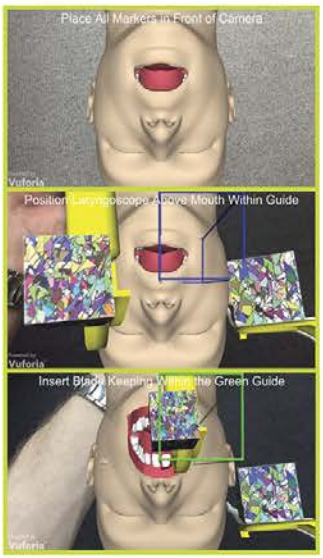
***'Studying by distance you can read the skills and kinda do scenarios but it's hard to get feedback and to know if what you're doing is still right.'***

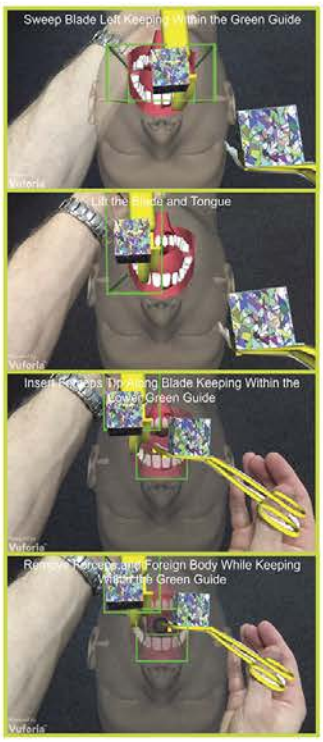
## PROPOSED INTERVENTION

- 3D printed Laryngoscope and Magill Forceps provided to Distance Students ahead of end of Term residential school.
- Smartphone/Tablet application developed for Augmented Reality training.
- Students use app and printed items to practice foreign object removal on a virtual 3D patient during semester.
- App helps students develop correct technique through visual and auditory feedback as the procedure is completed (red/green areas and notification noises).


## RESEARCH METHOD

- 3D objects sent to a random subset of student cohort.
- Pre-test performed on all students prior to residential school to assess skill competency.
- Standard training provided to all students.
- Intermediate test performed on all students to assess skills level.
- Non-selected students provided with extra training using tools during residential school.
- Post-test for final skills level.




## RESULTS

- Students using the 3D objects and app to perform better on the pre-test.
- Selected students will require less 'time on task' teaching at the Residential school.
- Outcomes of the project show an increase in skill level in placing and elevating the laryngoscope for students that trained with the 3D printed tools and AR app.

RESEARCH *in association with*

CQUniversity AUSTRALIA

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