Peer Assessment of clinical decision making in the Otago Virtual Hospital

Project Team

Dr Phil Blyth
Senior Lecturer
eLearning in Medicine

Swee Kin Loke
Professional Practice Fellow

Aaron Griffiths
Virtual Worlds Developer

Snapshot

In order to develop medical students' ability to peer assess the process of clinical decision-making within a realistic situation without risk to patients a virtual hospital was created. Incorporation of this task into the medical curriculum depends on a robust and scalable platform, such that there is little requirement for involvement by teaching staff in the running of each scenario or patient care episode.
A 'holodeck' mechanism has been built which rezzes (creates) a new hospital ward for each group of students who partake in the scenario. A log of actions performed by the virtual doctors is automatically generated. At the conclusion of the scenario, the participants debrief 'in-world' providing peer assessment, using this log and a 'discussion prompt' template.
Detailed documentation of software coding will allow ongoing maintenance and development of further scenarios.
There have been expressions of interest by other institutions for use within their curriculi.

Introduction

Peer review is an obligatory competency within the medical profession, yet it does not feature prominently within existing medical curricula. Aiming towards peer review of clinical aspects of decision-making, the Otago Virtual Hospital was created. This thee dimensional virtual hospital provides an authentic role-playing environment in which medical students are responsible for evaluating and making clinical decisions in the acute care of virtual patients. Currently two patient scenarios have been developed. The first scenario involves students role-playing either the patient or the doctor in a medical presentation. The consultation involves text chatting with the patient to take a history, clicking to examine the patient, and ordering investigations or treatments via a virtual computer terminal. The second scenario involves the students working as a team on a multiply injured trauma patient. At the conclusion of the patient care episode, participants debrief in a separate part of the virtual world to allow reflection and peer-review.
This aim of this grant was to enable large numbers of students to use the virtual hospital at any time, without requiring teaching staff to be involved in the running of each instance. This involved both software improvements in the virtual world, as well as adaptions to the forms for promoting appropriate discussion on peer feedback.

Method

Booking System

Initially the concept of creating a web site to allow students to 'sign-up' for a session was investigated. However on further exploration it was felt that the complexity of matching real-world users with virtual world users, scheduling timeslots, and creating usernames was not a worthwhile use of funding resources. Students already have established means of communication (such as their Learning Management System, Facebook or other social networking sites), and different medical schools have different user management systems.
The booking system would have been required if there were a limited number of wards in which students could partake in the scenario. However the concept of the Holodeck provides a more flexible solution.

Holodeck System

The Holodeck system provides a near limitless number of ward instances. When two students meet in the foyer of the virtual hospital, they touch an object, which creates (rezzes) a new entire ward, complete with

all the objects required for the scenario, including ‘body shapes’ and surgical scrubs or patient clothes as appropriate. The students are then teleported to this world to commence their scenario. At the conclusion of the scenario, the summary action sheet is saved for their debrief, they are teleported back to the debrief area, and the ward is deleted.
With this system it is possible to have as many instances of the same scenario running as the server can cope with. An important part of the project was ensuring both objects and the scripts which make them function were as efficient and robust as possible.
In this manner the virtual hospital can be scaled to groups of tens or hundreds of students (with more servers added as required).

Action Summary Sheet

Each action that a student takes, such as examining a part of the body, ordering investigations, prescribing medications or fluids is recorded along with its timestamp. In addition a transcript of the chatlog is saved. At the conclusion of the scenario these are provided to participants to help facilitate their reflection and feedback.

Feedback Form

To encourage effective peer feedback, the instructional design of the feedback forms was adapted to align with the following pedagogical principles; *Validity*, with the help of the action summary sheet, *formative* with a focus on how to improve decision making, *iterative*, by allowing multiple attempts as required, a *dialogue* at the conclusion of the scenario taking place ‘in-world’, and with criteria which are *transparent*, by having part of the form available before the scenario. Part of the feedback containing some of the clinical diagnostic aspects is only available at the end of the scenario. This feedback deliberately does not include a ‘model answer’ to facilitate iterative participation.
The summary sheet, webform and debrief chatlog are recorded and made available to teaching staff.

Key Outputs

The framework described above including the holodeck system with action summary sheet has been completed, though unfortunately was not available in time for testing by senior medical students in 2014. Papers on the use of the virtual hospital for peer feedback and for assessment of clinical competence and clinical reasoning were accepted for publication. Presentations and discussions at seminars and conferences have sparked interest by members of faculty from schools in other parts of the University of Otago and overseas institutions.

Discussion and Implications

The development of software often takes longer than anticipated. Finding the correct balance between ‘nice to have’ features and having a robust deliverable product is always a challenge. This funding has taken us a long way forward, with the development of the frameworks which will allow further development of other cases, and allow the system to progress from being a research type project into one which is usable within challenges presented by delivering the opportunity of peer feedback in an authentic clinical decision making environment for large numbers of students.

References

Blyth, P., & Loke, S.-K. (2014). Designing virtual worlds for effective peer feedback: The case of Otago Virtual Hospital. In B. Hegarty, J. McDonald, & S.-K. Loke (Eds.), *Rhetoric and Reality: Critical perspectives on educational technology. Proceedings ascilite Dunedin 2014* (pp. 466-469).

Roy, M.,Walker, R.,Blyth, P.,Wilkinson, T. (2014). Virtual reality-based assessment of clinical reasoning ability. *Medical Education* 48 (11) (p 1123).

The Otago Virtual Hospital is available on the OpenSim platform with further details available at http://ovh.otago.ac.nz