Transforming Learning: Using a Multi-User Virtual Environment for simulation

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Abstract
Simulations are well known in education, including health professional education. Traditionally simulations have included role plays and demonstration rooms where skills can be practiced and more recently high-fidelity mannequins have lifted the level of simulation. The use of the Internet has allowed synchronous learning that permits sharing experiences and social interactivity. One specific option that has emerged which has the potential to transform health professional clinical education is the use of multi-user virtual environments for simulated learning. A pilot using Second Life, a web-based virtual environment, to teach haemorrhage management to undergraduate nurses is described. Findings include that with pre-simulation preparation student learning occurs. However, the greatest barrier to continued use of a multi-user virtual environment is the need for equal internet speed for all participants to support the participants’ interaction.

1. Introduction
A pilot of a new mode of offering simulation was trialled by two Schools of Nursing in 2009. Rather than using more traditional modes, a scenario was developed and used in a virtual world. Instead of having the simulation face-to-face, students interacted on-line. Second Life is an example of an on-line Multi-User Virtual Environment (MUVE), and provided the virtual environment for the simulation for undergraduate nurses on postpartum haemorrhage management.

2. Virtual Environments
Recent availability of educational applications has allowed the Internet to be used in ways that support sharing experiences and social interactivity [1]. A Multi-User Virtual Environment (MUVE) is an electronic virtual world which exists solely in cyberspace, where a number of people can interact together. A MUVE is described as an on-line environment that enables multiple simultaneous users to access virtual contexts where they can interact with digital artifacts, represent themselves through “avatars”, communicate with other participants, and take part in shared experiences which can be similar to those in real world contexts [2]. An avatar is a 3D “graphical self-representation” created by an individual participant [3, p 233]. Individuals interact through their avatar [4]. Once such virtual environment where avatars can interact is in a web-based world called ‘Second Life’.

3. Second Life
Second Life, developed by Linden Labs, is a free downloadable online 3D virtual world where users navigate and interact within the environment using their avatar (http://secondlife.com). Currently there are millions of users internationally who access and interact in this environment using the internet. For example, within the last month nearly one million individual users went onto Second Life [5]. As Second Life has capabilities for unlimited building in a 3D
environment and synchronous interpersonal interaction, there is potential to plan and develop environments for specific uses. While it is well known as a virtual world, the use of Second Life for educational purposes is in its infancy.

4. Simulations

Second Life can be used by educators to create learning experiences through the creation of specific environments where simulation can take place. Within Second Life, involvement is achieved by having an “immersive environment where users interact and construct knowledge” [4, p 156]. Individuals interact with objects and each other using their avatar and communicate with voice and/or text chat. Simulations are considered complex, interactive, and social experiences [6], and as such are based on notions of collaborative learning and constructivism. Using technology to mediate collaborative learning can allow students and educators in different locations to interact.

As a safe method to prepare health professionals, simulation, based on patient care scenarios in a realistic environment enables development of skills and competency, which can build confidence, through practice and repetition. It is not desirable for all learning to take place with a real patient, so simulation that mimics the essential features of real-life is an option that can take advantage of new and emerging technologies and provide learning in a safe environment. While some literature discusses the health educational uses of Second Life in positive terms [3, 4] citing its ability to support interaction and collaborative learning there is little research yet about actual projects.

5. Context

This paper draws on the experience from a small international project using Second Life for teaching undergraduate nursing students from two Schools of Nursing. The project was based around a simulation of a woman having a postpartum haemorrhage which for piloting purposes could be used in a simulated exercise in any medium and it was proposed that this exercise be available to students in a practice laboratory as a real simulation or as a Second Life virtual simulation. Ethics approval was obtained from each participating organisation and students were invited to participate in the Second Life simulation, with only small numbers being recruited. Therefore it is possible that students who volunteered were those more computer literate or comfortable using Second Life. This paper reports two sessions of the simulation, one from each School of Nursing. Each simulation session had three students who adopted the roles of student nurses, while the educators took the roles of patient and senior nurse.

The focus of the scenario was on recognizing abnormal presentation in a postpartum assessment, nursing interventions for haemorrhage, and communication between health professionals and the patient and family. The scenario included pre-simulation preparation for the students, participation in the simulated scenario (either in real or virtual world), and an educator guided debriefing.

6. Findings from our pilot

The outcomes of using Second Life to provide a virtual world to teach postpartum haemorrhage management are discussed to incorporate the perspectives of students, educators, and technological aspects. The responses from students were overwhelmingly positive. Students enjoyed the novelty of learning in Second Life and reported the experience as “weird and fun”. The clinical scenario of a woman having a postpartum haemorrhage “seemed real”. Students’ comments such as “We had to think and act quickly” and “Taught me about responding and thinking on my feet” indicate a sense of realism; of being in a realistic real-time environment, where they had to respond. Educators learnt some valuable lessons from the pilot including the need for adequate preparation of students. Preparation included information for access to and how to interact in Second Life; the theory of postpartum haemorrhage; and an introduction to the scenario. This project found that technological problems were likely to occur and that repeated testing was necessary. In addition, the creation of the clinical environment and props was time intensive. The students from the New Zealand had additional problems, related to internet speed, and these affected smooth access and ease of use.
7. Discussion

Despite the small number of students that participated, this project provided some useful information about the challenges of teaching within a MUVE. Due to our inexperience in using a MUVE, and the lack of research to guide our pilot an iterative approach was found very useful as it allowed for ongoing improvements and enhancements. In relation to technological aspects we found internet speed in New Zealand a problem. Our US students and collaborators did not experience the same issue. Students who did not have good internet access at home had the option of using the on-campus facilities. All New Zealand students came on-campus to participate in the pilot, as despite having broadband at home they reported difficulties in the preparation stage of the simulation. The ability to take advantage of technology is dependent upon nationally available, consistent, fast broadband access to the Internet. While computer capability has increased the communications bandwidth to make fast and inexpensive Internet access common for most households has yet to be realised in New Zealand. The feedback from students provides some evidence of learning, mostly due to the realism of the simulation. However, while this indicates that using a MUVE can provide a mode of teaching simulations we have not determined if the learning can be transferred to the clinical setting. Sound pre-simulation preparation was required for students to interact in the simulation. From the educator’s perspective the importance of orientating the students to Second Life and the MUVE was found to be important. Without an orientation and sufficient preparation the emphasis could be on the technology and not on the simulation and learning.

8. Conclusion

This project is an example of using technology to transform clinical education. Clinical education opportunities were extended by using a multi-user virtual environment as a platform for simulation scenario participation and synchronous on-line discussion. The use of Second Life, as a MUVE assisted students become immersed in the simulation because of the greater degree of realism. However, extended use of a MUVE is not viable in New Zealand until internet speeds are addressed.

9. Acknowledgments

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10. References