Title of project:
Using 3D simulation environment to enhance student communication skills and interdisciplinary learning across multiple disciplines

Project leader: Associate Professor Jenny Sim

School/service unit name/college:
Medical Radiations/School of Medical Sciences/SEH

Day Month Year: 15 February 2013

Strategic objectives addressed:
- To be global in reach and impact
- To be work relevant and industry-partnered

Internal order number: 360301

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1 Executive summary

The 2012 LTIF study continued to build on and consolidate our 2011 LTIF project of three-dimensional (3D) simulated learning. The study aimed to further validate the 2011 findings on the effectiveness of a 3D simulated environment as a learning strategy and assessment tool. Our study expanded from three programs in 2011, (Medical Imaging, Midwifery and Chiropractic) to include Exercise Science, Radiation therapy (School of Medical Sciences), Chinese medicine (School of Health Sciences) and Social work (School of Global Studies, Social Science and Planning) in 2012. The study also involved participation from our clinical partners from Andrew Love Cancer Centre (Geelong) and Austin Health.

Specifically, the 2012 study aimed to:

- extend the use of a 3D simulated environment as a learning platform for health care students to develop effective communication skills with patients as part of student pre-clinical preparation;
- promote interdisciplinary learning and understanding amongst students from multiple disciplines;
- promote work integrated learning and industry partnerships in education and research; and
- assist staff in adopting innovative educational practice through professional development.

Case based scenarios were used to contextualise student learning. Using Second Life platform, students role-played the interactions that occurred between the healthcare practitioners and patients. Reflection was incorporated as part of their learning activities to encourage students to reflect on their communication and interactions with patients. To promote interdisciplinary learning and understanding, students were required to meet with peers from other disciplines at the virtual clinic. Issues discussed included the dynamics of healthcare teams, professional roles and responsibilities in the context of interdisciplinary healthcare. As part of interdisciplinary learning, students were given the option to observe and reflect role plays from other disciplines.

Findings from this study supported the 2011 LTIF conclusions that Second Life was an effective learning strategy in not only improving student communication and history taking skills but also in assisting them in identifying and connecting with patients. As per our 2011 study, the opportunity to assume the role of a patient enabled students to develop empathy for patients, an important attribute for healthcare practitioners and social workers. As a consequence of their role play activities in Second Life, students reported increased confidence and being better prepared for clinical practice due to their better understanding of patient’s perspectives.

In terms of interdisciplinary learning and understanding, students valued the opportunity to learn more about other disciplines with many indicating that the interactions changed their pre-conceived notions of other professions. This better understanding had resulted in an increased confidence in their referral of patients plus a greater appreciation of the need to work together for the benefit of patients. While many still preferred face-to-face dialogues, students readily acknowledged that virtual meetings in Second Life provided the flexibility for interdisciplinary dialogues which are not possible in real life due to time table clashes.

This Second Life project has also resulted in increased engagement with industry partners. Both Austin Health and Andrew Love Cancer Centre (Geelong) are working alongside with the RMIT Academic Team in our 2012 LTIF project. Based on the 2011 and 2012 LTIF projects, the Project Leader was successful in securing a 2012-2013 Health Workforce Australia (HWA) simulated funding to implement Second Life across Victoria oncology centres.
2 Outcomes

Provide a brief overview of the project’s outcomes and impact.

Key project learning outcomes

A total of seven programs participated in the 2012 project. In addition to the three programs from 2011, Medical Imaging, Chiropractic and Midwifery, students from Exercise Science, Chinese Medicine, Radiation Therapy and Social work also participated in this study.

Our 2012 LTIF project reinforced the findings of the 2011 study: adopting Second Life as part of student learning activities resulted in the following learning outcomes:

- improved communication skills in terms of student history taking and patient interviewing skills;
- assisted students in developing greater empathy for patients;
- assisted students in their transition from university learning to clinical placement; and
- improved interdisciplinary learning and understanding.

Key project impact

- In this project, Second Life was successfully embedded across seven programs as part of student pre-clinical preparation. Our study confirms that Second Life can serve as an effective learning strategy in improving clinical communication skills, interdisciplinary understanding and assisting students in developing empathy for patients.

- The successes of the 2011 and 2012 projects formed the foundation for another study, funded by HWA, which aims to promote simulated learning across all major oncology centres in Victoria. The Discipline is now actively engaging Victoria radiation oncology centres in simulated learning, thereby strengthening the link between RMIT and industry partners in education research.

Scholarly dissemination

2012 LTIF project engaged dissemination


We presented our 2012 LTIF project in December, focusing on our experiences in the delivery of Second Life:

2011 LTIF project dissemination: peer reviewed publications

As we have just completed the 2012 data analysis in February, the final findings of the 2012 project are yet to be published. However, there have been 2 peer-reviewed publications from our 2011 LTIF project, with another paper in the pipeline:


2011 LTIF project dissemination: conference presentations

The 2011 LTIF project was also presented by team members:


Sim, J., James, J., McDonald, M. Maude, P., Ryan, T., Scutter, S. and Wood, D (2012). “Learning via Avatars: An experiential journey for Medical Imaging students.” In 2012 17th ISRRT Congress (International Society of Radiographers and Radiological Technologists) and 70th CAMRT (Canadian Association of Medical Radiation Technologists) Annual General Conference, Picture Yourself Here, Toronto, Canada, June 7-10.


3. Project outcomes and impacts

List and discuss the outcomes the project was designed to achieve and the outcomes the project has achieved, including any literature review and evidence of the impact the project has had on students

3.1 Participant information

Students enrolled in the seven programs across both Bundoora and City campuses of RMIT were recruited for this study on the basis that effective communication with patients and interdisciplinary learning and understanding are core competencies for healthcare practitioners. A module was designed focusing on promoting interdisciplinary learning and communication within the 3D virtual world of Second Life.
Of the 337 students taking part in this module, 153 volunteered to have the data from their learning activities included in this study. All students were enrolled in one of seven disciplines from six healthcare programs offered within the Schools of Medical Sciences, Health Sciences, and Social Sciences. The number of participating students from each of the disciplines were as follows; Medical Imaging (n = 9), Radiation Therapy (n = 24), Exercise Science (n = 27), Chinese Medicine (n = 11), Midwifery (n = 28), Chiropractic (n = 28), and Social Work (n = 26).

Of the participating students, 106 (69%) completed the pre-module version of the Interdisciplinary Attitudes Survey, while 87 (57%) competed the post-module version. Qualitative data, in the form of written reflections about the module, were received from 115 students (75%), while 17 students (11%) participated in focus groups. A further 73 students completed an anonymous and voluntary Module Evaluation Survey at the conclusion of the semester.*

*Due to the anonymous nature of the Module Evaluation Survey, students were not required to give their consent to participate. Therefore this sample of students possibly includes students outside of the 153 who originally volunteered to participate.

Demographics
Data collected using the Module Evaluation Survey provided demographic information for 73 (22%) out of the 337 students who participated in the module. The majority of students within this sample were females (67.1%), aged 19 to 24 (45.2%). Most students appeared to be regular computer users, with 64.4% claiming that they used their home computer ‘all of the time’, and 30.1% stating that they did so ‘often’. Furthermore, 84.9% of the sample acknowledged having access to a high speed Internet connection at home.

In terms of specific uses of computers, social networking sites were very popular among this sample of students, with 35.6% admitting to using them ‘all of the time’, and 31.5% using them ‘often’. Students also appeared to use podcasts and/or webcasts fairly regularly, as 30.1% claimed to use them ‘sometimes’ and 13.7% used them ‘often’. However, the use of other forms of online applications was quite low; instant messenger (37% ‘never’, 32.9% rarely), multi-user computer games (72.6% ‘never’), 3D virtual worlds (74% ‘never’), and social bookmarking sites (76.7% ‘never’).

3.2 Project Outcomes
The expected outcomes listed in the 2012 LTIF project were:

- To enhance student learning in the context of patient care and communication with patients/clients;
- To assist students in their transition from university learning to clinical workplace;
- To promote interdisciplinary learning, understanding and collaboration amongst health care students across multiple disciplines;
- To contribute to our understanding of 3D simulated environments as learning, teaching and assessment tools;
- To enhance staff development in the use of 3D simulated environments as experiential forms of learning; and
- To engage industry partners in research and educational activities.

3.2.1 Enhance communication skills with patients and clients
The use of virtual worlds for the purpose of allowing healthcare students to practice communication skills in clinical contexts has been well documented in educational literature (e.g., Boulos,
Hetherington & Wheeler, 2007; Gao, Noh & Keohler, 2009; Rogers, 2008). However, many authors involved in such research have pointed to the need for more extensive research in this area. The current study adds to the literature by providing further evidence of the benefits of virtual worlds for conducting educational activities aimed at improving practitioner to patient communication skills. After taking part in role-plays using Second Life, our students expressed increased confidence with history taking, and acknowledged how the activities have allowed them to identify with patients in ways they had not previously experienced. Many also felt that their clinical practice would be enhanced as a direct result of the virtual role-play activities.

3.2.2 Assist students in their transition from university learning to clinical workplace
One clear theme that stood out within the data was that, after completing the role-play activity, students found themselves able to develop a much stronger sense of empathy with their patients. By putting themselves in the shoes of an anxious young mother as she visits a number of healthcare professionals, students were able to reflect on how their behaviour as a practitioner impacts on their patients. Many students acknowledged that this perspective was completely new to them, and they recognised that the acquisition of such insights would be of great value to their future clinical practice. As empathy is not an attribute that can be ‘taught’, designing learning activities to promote the development of empathy is therefore highly desirable in health sciences education.

Another theme, found predominantly among medical radiations students, was that the role-play simulation in Second Life enabled them to learn more about a procedure (mammography) that they otherwise may not have been exposed to. Due to the sensitive nature of this procedure, most student radiographers do not get the opportunity to watch or perform a mammography while on placement. By role-playing this scenario, students were expected to conduct extensive research into this procedure, both to understand how it is performed and to gain an appreciation of how nerve-wracking mammography can be for patient. Several students admitted that, as a result of taking part in the role-play, they would now feel more comfortable if they were faced with viewing or performing a mammography in a real life clinical context.

3.2.3 Promote interdisciplinary learning and understanding
Collaboration between healthcare staff from multiple disciplines can lead to benefits for both patients and employees. Dillon, Noble, and Kaplan (2009) report that interdisciplinary co-operation improves outcomes among patients, as well as improving satisfaction for both patients and staff. Due to benefits such as these, tertiary educators have begun to research the potential of simulation-based activities as a means of providing healthcare students with opportunities to engage in interdisciplinary interaction (Baker et al., 2008; Bandali, Parker, Mummy & Preece, 2008; Reece, Jeffries & Engum, 2010).

The current study takes this idea one step further by employing virtual worlds to encourage interdisciplinary communication and understanding. Qualitative data collected throughout this study supports the notion that virtual worlds can be successfully used to promote interactions between disciplines. Students who participated in ‘interdisciplinary community dialogues’ using Second Life recognised the importance of such interdisciplinary activities, and reported the following benefits; enhanced communication between disciplines, the opportunity to learn more about other disciplines, acknowledgment of the need to work together for the benefit of patients, and increased confidence when referring patients to other disciplines. Students also spoke of changing their pre-conceived notions of other disciplines after engaging in interdisciplinary discussions. While students would have preferred face-to-face interdisciplinary dialogues, they readily acknowledged that existing timetable
commitments will render face-to-face interactions impossible. Consequently, students supported the adoption of such virtual engagements.

3.2.4 Contribute to our understanding of 3D simulated environments and staff development

The use of Second Life for educational purposes has been found to be associated with several educational benefits, such as increased student engagement (Baker et al., 2009) and flexibility (Hansen, 2008). Through analysis of written reflections and focus groups, the data collected within the current study has confirmed these benefits. For instance, many students stated that they found Second Life to be interesting and engaging, and that they appreciated the ability to complete their learning activities in a flexible way. Students also spoke positively about being given the opportunity to apply the knowledge that they have received throughout their degrees in a comfortable and safe learning environment.

All team members have benefited greatly from our involvement in this interdisciplinary project. Despite the clear benefits associated with using Second Life for educational applications, it is also important to acknowledge the many challenges that may be encountered when using such technologies (Baker et al., 2009; Bhati, Mercer, Rankin, & Thomas, 2009; Warburton, 2009). Overwhelmingly, students alluded to experiencing problems with lag when they tried to use Second Life on university computers. Some felt that, due to these technological issues, the burden placed upon them was greater than that from traditional forms of assessment. Furthermore, some students found the technological learning curve associated with Second Life to be too high. In extreme cases, students were unable to complete the assessment activities using Second Life, and instead had to submit audio or video recordings. Despite their negative flavour, these results are extremely valuable as they add to the limited literature regarding the potential pitfalls of using virtual worlds in education. Results such as these will also inform other educators of best practices associated with virtual world technologies.

3.2.5 Engage industry partners in research and educational activities

Based on our 2011 LTIF and 2012 LTIF projects, the Project Leader has been successful in securing a HWA simulated learning funding of $192,113 (Using a 3D simulated environment to enhance patient care and communication skills of radiation therapy students and health care practitioners in cancer care setting). This is a state wide project involving major oncology centres in both public and private sectors. RMIT is taking the lead in engaging our clinical partners in using virtual learning to enhance communication skills in oncology setting. While the use of Second Life in educational setting is not new, using virtual learning to enhance communication skills and promote interdisciplinary understanding in oncology centres is a first in Victoria. Consequently, this project has generated tremendous interest among practitioners across the sector. Participating oncology centres include Andrew Love Cancer Centre (Geelong), Austin Health, Peter MacCallum Cancer Centre, Alfred Hospital, Radiation Oncology Centre Victoria and Epworth Radiation oncology.

3.2.6 ‘Digital natives’ and Second Life

A major finding that can be gleaned from the data is that while students admit to using computers ‘often’ or ‘all of the time’, they are not always comfortable with using online applications to compete learning activities. As indicated earlier, several students felt the learning curve associated with using Second Life to be too steep for them. Furthermore, many students claimed that the learning activities performed throughout the module would have been more advantageous for them had they been completed face-to-face, especially given the extent of technical difficulties encountered. This is an area that will benefit from further investigation, but it may support Selwyn’s (2009) view that the
current generation is not ‘digital natives’, but instead limit their use of technology to applications that are user-friendly.

3.3 Technical issues encountered

Describe briefly any issues that may have prevented you achieving all the original outcomes stated in the application.

3.3.1 Success in addressing 2011 technical problems

The Project Team was well prepared for the roll out of the project in Semester Two. With the increased number of students participating in the Second Life module, 127 in 2012 to 337 in 2013, the Team successfully sought permission from School of Education, Pharmacy and Bundoora Library for our students to use their computing laboratories. With the assistance of IT, all computers were installed with the necessary software to enable completion of Second Life activities prior to start of Semester Two.

All strategies designed to address the technical problems encountered in 2011 were in place by May, two months prior to the start of the online module in Semester Two. These strategies included:

- the use of Camtasia (a commercial software) to capture digital role plays
- using a software patch to prevent automatic upgrade of Second Life
- all computers were checked by IT to ensure they had the minimum specifications for Second Life
- creating an introductory tutorial to assist students in the use of Second Life
- compulsory introductory tutorials conducted in the first and second week of semester

As a result of the above strategies, students did not experience any of the 2011 technical problems.

Just two weeks prior to the start of Semester Two, IT announced the roll out of Windows 7. The new window platform rendered our Second Life patch obsolete. Together with the IT Team, our Second Life designer raced to install a new Second Life patch across the computing laboratories in readiness for Week One of Semester Two.

3.3.2 2012 LTIF: Problem in accessing Second Life

However, throughout the semester, students regularly reported inability to access Second Life at RMIT, with avatars appearing as ‘white clouds’ and buildings not rendering. Students spent considerable time just trying to log into Second Life, often with no success. Our repeated SOS calls to IT to investigate the problems did not result in any solutions. Consequently, we had to resort to advising students to complete their Second Life activities from home. For those who were unable to access Second Life from home, we advised students to complete their role play recording by audio.

We were exasperated by the extent of poor Second Life performance. The inability to access Second Life was not encountered in our 2011 project. Despite the best of effort by our Second Life designer and the IT Team, we were unable to rectify the problem of Second Life access throughout the semester. The inability to even log onto Second Life had severely impacted on student learning experiences in this project. Student frustration was evidenced and this accounted for the low participation rate of students consenting to have their data included in this study.
We had assumed all along that the technical difficulties were due to the implementation of Windows 7. However, it was not until the beginning of this year that our Second Life designer found the reason for the inability to access Second Life at RMIT. Apparently, there exist within RMIT an IT team whose function is to limit and degrade network performance on applications that were deemed ‘undesirable’. And as Second Life has been identified by the team as a ‘game’, the internet speed for Second Life was intentionally throttled to 512kbps university wide (see Appendix 3.1: Report on technical issues). This was the main reason why students and staff were unable to access Second Life on campus, with avatars not materialising and virtual clinic not rendering. It is unfortunate indeed that prior to their action of degrading the internet speed, the IT Team did not seek verification as to whether Second Life has been used at RMIT as an educational tool. Once the internet speed was restored, the issues of non-appearing avatars and buildings failure to render ceased immediately.

This Second Life project was funded by RMIT as part of LTIF and had the support and approval of IT Senior Managers from both SEH and DSC (SEH IT Senior Manager: John Zylinski and DSC IT Senior Manager: Laurie Davis). RMIT owns a couple of Second Life Islands for learning and teaching purposes and these islands were used by staff from Engineering, DSC and the Lead Investigator. None of us, including IT Service desk, was aware of the existence of this team, and hence the possibility that the internet speed in this instance had been kerbed. Had we known of the existence of this IT Team, we would have informed them that Second Life is a legitimate learning activity. In this instance, the lack of communication between IT teams and the relevant University sections had negatively impacted on student learning in this LTIF project.

Consequently, the inability to access Second Life affected student ability to complete the required learning activities within the specified time frame. This resulted in poor student learning experiences, poor engagement, which in turn impacted upon their learning. Despite the fact that more students participated in Second Life module this year, the number of students who gave consent to have their data included was understandably, relatively low. Thus, while students acknowledged the benefits of Second Life, many indicated that the technological difficulties encountered had discouraged them from wanting to use Second Life again.

### 3.4 Disciplinary and interdisciplinary linkages

*Describe any disciplinary and interdisciplinary linkages that have emerged as a result of the project.*

The 2011 and 2012 LTIF projects brought together academic staff from SEH and DSC, including School of Medical Sciences, School of Health Sciences and School of Global Studies, Social Science and Planning. The 2012 study also expanded to include the engagement of Geelong Hospital and Austin Health. Using 2012 as a launching pad, RMIT currently leads a state wide oncology stimulated project.
4 Dissemination strategies and outputs

List materials or outcomes that will be made available to the university or groups of stakeholders within the university or sector and provide information about where any project material is available

Outputs

4.1 RMIT Second Life Polyclinic

The virtual learning spaces for the seven disciplines are located on RMIT Second Life Polyclinic:


See Appendix 4.1 for snapshots of the virtual RMIT clinic

4.2 Second Life tutorial materials

In respond to 2011, a step-by-step written instruction and web based tutorial were created to assist students in the familiarisation and adoption of Second Life (see Appendix 4.2: Second Life introductory tutorials).

https://sites.google.com/site/virtualclinicproject/home

A virtual tutorial tunnel was also created on the Second Life island to provide a more interactive learning experience for students.

4.3 Dissemination

Dissemination amongst RMIT academics to encourage simulated learning: completed

- RMIT Learning & Teaching Expo, August 2012
- School of Medical Sciences Brown Bag Lunch Series, 16 May 2012

Dissemination amongst industry partners and professional communities: ongoing

- Two peer reviewed publications of 2011 and 2012 LTIF studies
- Five conference presentations (international and national)

For details of dissemination amongst RMIT academics and the wider professional community, please refer to Section 2: Outcomes (pp.4-5).

- As we had just completed our data analysis in February, the LTIF team will now proceed to publish our latest findings and present at international and national conferences and workshops this year.
- As part of the 2013 LTIF study, the Team will be creating a web based resource on simulated learning, integrating our findings and resources and sharing our experiences and expertise with the RMIT academic community
5 Evaluation of project outcomes

Provide evaluation outcomes including evidence of the impact of the project and the value it will bring to the university and/or the sector.

The project was evaluated via quantitative (using SPSS) and qualitative approaches (thematic analysis). Evaluation was via multiple approaches including pre and post interdisciplinary survey, role plays, student reflections, focus group discussions and a final module survey.

Impact of 2012 study

The 2012 LTIF project demonstrated the benefits of Second Life in university setting. The Project Leader is now establishing the efficacy of this form of virtual learning in clinical workplace. Consequently, RMIT is now engaging with major Victoria oncology centres including Peter MacCallum, Geelong Hospital, Alfred, Austin, Radiation Oncology Centre and Epworth Oncology, on the effectiveness of simulated learning in clinical setting. Based on the preliminary findings of the HWA project, the Lead Investigator is now aiming to prepare for a national funding on simulated learning in oncology setting.

To ensure continuity and sustainability, the Second Life Team will continue in 2013 to build a web based resource for simulated learning. The Team will focus on developing a web based resource on simulated learning, integrating our findings and resources and sharing our experiences and expertise with the RMIT academic community.

6 Budget report

What was the amount of funds approved?

- The amount of fund allocated was $55,000

What was the final amount of funds acquitted? Please attach a financial statement.

- The final amount remaining was +$1,115
References


List of Appendices

3.1 Report: Technical issues encountered in 2012 LTIF study

4.1 Snapshots of RMIT Second Life clinic

4.2 Second Life introductory tutorials