Learning and Teaching Investment Fund 2011

Final Project Report

Submission date: 17 February 2012

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

Strategic objective(s) addressed:

• to be global in reach and impact
• to be work-relevant and industry-partnered

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1. Executive summary (up to half a page)

- Provide a summary that describes the project and what was achieved. This will appear on the RMIT website and the full final report will be linked to the summary.

The adoption of virtual 3D simulated learning is a new innovating learning and teaching strategy for the School of Health Sciences and School of Medical Sciences. In 2011, medical imaging, nursing, chiropractic and mental health professionals came together to create a virtual learning experience in Second Life for the four disciplines.

The study aimed to:
1) investigate the use of a 3D simulated environment as a learning platform for health science students to develop effective communication skills with patients; and
2) promote interdisciplinary learning and understanding amongst healthcare students.

To achieve the first objective, the module was offered in four separate components, linked together via a single patient journey - the journey of a patient who was experiencing difficulties in breast feeding her baby. The patient was first seen by the Lactation Consultant, who then referred the patient to the Chiropractic and Mental Health clinics and the Medical Imaging department. Students from each discipline role-played the interactions that occurred between the healthcare practitioner and patient.

To promote interdisciplinary understanding and learning, students were required to participate in blog discussions designed to engage them on issues such as professional roles and responsibilities. Students were also required to observe and reflect on the role-plays from other disciplines.

In summary, students reported an improved understanding of the topic as well as enhancement of patient interviewing and history taking skills. Findings from this study also showed that medical imaging students found avatar learning to be highly effective in assisting them to develop empathy for patients. Furthermore, our results highlighted the increased interdisciplinary understanding students have obtained from participating in blog discussions, with medical imaging students showing the greatest difference in terms of improved understanding. While medical imaging students reported virtual world learning to be fun, interactive and stimulating, a majority identified technological problems they encountered to be extremely frustrating, preventing them from engaging in deeper learning. These findings were consistent with the case studies reported by Bloustien and Wood (2011).

The 2011 study will be presented at two forthcoming international conferences: 2012 INTED Conference and the 2012 ISRRT World Congress. We are currently in the process of writing two papers for peer reviewed publications. Based on the 2011 LTIF project, we are now continuing and extending the virtual learning to include five more disciplines across SEH and DSC in our 2012 LTIF project. As part of engaged dissemination, the 2012 project team will form a virtual learning community to support academics who may be interested in exploring the use of virtual simulated learning.
2. **A list of outcomes**

   - Provide a brief overview of the project’s outcomes and impact.
   - List any scholarly output in the form of conference presentations or journal papers.
   - This will appear on the RMIT website.

**Key Project learning outcomes**

In terms of student learning, the adoption of the virtual simulated learning has resulted in the following reported outcomes:

   - increased understanding of the content covered;
   - further enhancement 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 understanding amongst students of participating disciplines.

**Key Project impact**

The 2011 LTIF project has contributed to our understanding of how 3D simulated learning such as Second Life can serve as an effective learning strategy for health sciences students. We are now building on this working knowledge to expand the project to include five more disciplines in our 2012 LTIF project.

**Scholarly Dissemination**

To date, the 2011 LTIF project has resulted in the following presentations:

   - 2011 RMIT dissemination:
     - 2011 workshop dissemination: *Incorporating 3D simulation environment in student learning activities: sharing our initial journey*, 8 July
     - 2011 SEH Learning and Teaching Forum December: *Spaces and Beyond, Tech Teasers*, 25th December (Appendix 2.1)
   - 2012 ISRRT World Congress: *17th World Congress of the International Society of Radiographers and Radiological Technologists (ISRRT) and the 70th Annual General Conference of the Canadian Association of Medical Radiation Technologists (CAMRT)*, Toronto, Canada, 7th – 10th June.

As our 2011 LTIF project encountered several major unforeseen technical issues, there was considerable delay in completion of student activities. Most student activities were completed well after Week 12 in Semester Two 2011. Consequently, we were only able to process and analyse the data starting in early December. As such, no paper has been published as yet. However, we have already started the process of paper writing, with one paper in the process of being written and another in the initial first stage of draft.
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.*

A total of 321 students were enrolled in the four courses of the Medical Imaging, Mental Health, Midwifery and Chiropractic programs. The Second Life activities were embedded into each of the four courses and constituted 40% of the total course assessment. Participation in the Second life activities was mandatory for the Chiropractic students and midwifery but voluntary for the other two programs. Consequently, there were approximately 127 students who participated in the Second Life study.

Students were aware that the adoption of Second Life was a new learning and teaching initiative. All feedback relating to the Second Life aspects of the course was voluntary and participating students were required to give explicit consent to having their feedback and each of their learning activities included as part of the evaluation data for this study.

The list below shows the number of participating students from the four disciplines:

- Pre and post interdisciplinary survey: 126
- Inter-disciplinary discussion blogs: 127
- Inter-disciplinary student reflections: 82
- Intra-disciplinary student reflections: 66
- Final reflection: 46
- Final module evaluation survey: 52

52 of the participating 127 students (41%) completed the final module evaluation survey at the end of the semester (Appendix 3.1). 60% of the respondents were female, with 19 to 24 (42%) and 25 to 34 (40%) as the two predominant age groups. Nearly half of the respondents were Chiropractic students (44.2%), with Medical Imaging, Midwifery and Mental health students distributed proportionately, 19.2%, 19.2% and 17.3% respectively. One major reason for the dwindling student numbers was due to the technical difficulties students encountered resulting in a gradual drop in student participation.

Expected outcomes listed in the 2011 study proposal:

- To enhance student learning in the context of communication and patient care;
- To assist student in their transition from university learning to clinical workplace;
- To promote interdisciplinary learning, understanding and collaboration amongst health sciences students across four disciplines: Chiropractic, Medical Imaging, Nursing and midwifery and Mental health;
- To contribute to our understanding of 3D simulated environments as learning, teaching and assessment tools for health sciences students in the context of patient care communication
- To enhance staff development in the use of 3D simulated environments as experiential forms of learning.

**Enhance communication skills and transition to clinical workplace**

Learning outcomes reported by students included a deeper understanding of the topic and enhancement of their patient history taking skills. The adoption of virtual role play assisted them in their problem solving and communication skills. Learning is therefore active, contextual and more authentic (Conradi et al. 2009). These findings are consistent with those reported in the literature (Clark & Maher, 2003; Macedo & Morgado, 2009; Robbins, Roby & Johnson, 2007). In addition, the sharing of the virtual role play clips enabled students to learn from one another.
The Second Life activity gave us an opportunity to do a proper history of a pediatric case in a practical way. It is so different to reading it on paper and provides a new way of finding out on what you can improve on. [CS13]

All in all the Second Life exercise has been a valuable experience, via listening to ourselves conduct a history and by listening to other conduct history on the same patient has allowed for me to identify key area mistakes in which I have made and to see how others do the same thing and pick up on areas in which I can improve and to give and get reflection on the task is invaluable. [CS15]

One rationale of adopting 3D virtual simulation was to prepare students for clinical settings that they had yet to experience. For Medical Imaging, clinical experience in mammography is limited in the undergraduate education. In this instance, Second Life was an effective learning tool in assisting Medical Imaging students in their transition from university learning to clinical workplace, thereby providing a more structured approach to student training than the ad-hoc clinical experiences experienced by many students (HWA, 2010).

This activity [Second Life] enhanced my learning and understanding of the topic immensely. Mammography was a subject that we had not really been exposed to, apart from the 1 day of lectures by a guest lecturer. This task enabled me to gain a greater understanding of mammography and the challenges involved with this imaging modality and how an anxious patient might feel. [MIS3]

Another major benefit that emerged from the role play participation via Second Life was the development of greater empathy for patients. The development of empathy has been identified by Medical Imaging students as the most important and valued learning outcome (Sim et al., 2011). Students identified that this form of virtual learning was the only learning opportunity in their undergraduate education where they have to assume the role of a patient and adopt their perspectives.

This learning activity definitely enhanced my learning and understanding of the anxiety patients experience when having a mammogram. I believe I can empathise more with patients since undertaking this activity. [MIS10]

Unlike Medical Imaging students, none of the other three streams indicated empathy as a learning outcome. One possible reason for this may be the Medical Imaging clinical scenario required Medical Imaging students to develop strategies specifically to allay patient anxiety and concerns. In contrast, the other three disciplines were focused primarily on practitioner’s history taking and patient interviewing skills.

Of the four disciplines, Medical Imaging was the only student group who viewed Second Life as an effective learning strategy which helped them to think more deeply about the course content and assisted them in their learning. This is reflected in the final module evaluation survey with 90% of Medical Imaging students disagreed/strongly disagreed with the statement that Second Life did not help student learning in class, while between 60 to 90% of the other three healthcare disciplines agreed. The majority of the rest of participating student groups indicated that the extent of technology issues had deterred them from wanting to engage more in Second Life learning. This finding of technology problems as a hindrance to learning is consistent with the 2011 findings reported by Bloustien and Wood in their ALTC (Australian Learning and Teaching Council) report.

Second Life has offered more than what text books or lecture notes could ever achieve... Learning the emotions and concerns of a patient after experiencing their feelings during the role play is certainly a benefit within this 3D simulation. How students could approach such matter, how they can deal and construct effective communication channel towards patients, how to be involving, yet stay professional in a sensitive situation is very important in real life, yet I believe Second Life role play identified that for students already. Therefore it's certainly a MUST for students to learn these skills before placements. [MIS13]

Our final module evaluation indicate that the majority of the participating students have relatively minimal or no experience in simulated learning. Of the four disciplines, Medical Imaging students are more technical savvy,
as their clinical roles require a considerable level of computer interactions. This may explain why, as a whole, Medical Imaging students are generally more inclined towards Second Life learning.

**Promote interdisciplinary learning**

Pre and post interdisciplinary surveys were conducted prior to the commencement and upon completion of the module respectively (Appendix 3.2 & Appendix 3.3). The pre-interdisciplinary survey was conducted at the beginning of the semester, prior to the commencement of the study while the post interdisciplinary survey was conducted upon student completion of the study. The survey consisted of 14 interdisciplinary attributes that have been identified as critical in the context of interdisciplinary healthcare (Braithwaite and Travaglia, 2005; Health Workforce advisory committee in New Zealand, 2003). These attributes ranged from practitioner’s ability to work with one another, learn from and learn about each other to practitioners’ ability to share disciplinary knowledge and tolerate disciplinary differences. Students were required to rank the importance of each attribute from not important to important. The aim of the pre and post surveys was to determine if student attitude towards interdisciplinary attributes changed upon completion of the Second Life module.

Of the total of 127 students participating in the study, 87 students consented to their pre and post interdisciplinary surveys being included as part of evaluation data for this study. Interdisciplinary learning was identified by participating students as one of the major learning outcomes of this study. The sharing of a single patient journey through the four disciplines assisted students to better understand how each discipline contributed towards the overall management of the patient. Having a better understanding of the professional roles of each discipline has resulted in an increased confidence of patient referral for both midwifery and chiropractic students.

*Using Second Life has allowed me to view disciplines other than nursing/midwifery, in which I have gained more insight into. Being able to interact with students from other disciplines has also allowed me to ask questions about their specific discipline which I was previously unsure about.* [MWS2]

*Besides experiencing a virtual world, I have learned about other disciplines such as what kinds of services or skills they have, how do they manage their patients etc. It helped me to think about the importance of building good interdisciplinary relationships that would lead to better patient outcomes.* [CS8]

*The interdisciplinary component is great as without this program/assignment, I doubt none of this observation would be possible within RMIT.* [CS3]

The differences between the average pre- and post-survey scores were broken down by discipline. The statistical analysis shows that of all the four disciplines, Medical Imaging students is the cohort that has benefitted most from the interdisciplinary interactions. These results show that prior to the study, Medical Imaging students had lower attitudes towards interdisciplinary attributes than students from Mental Health and Chiropractic. After taking part in the study, the attitudes of the Medical Imaging students improved to the point where they were the same as the students from the other three disciplines.

The extent in which Medical imaging students benefitted from the Second Life interdisciplinary activities were evidenced from the students’ final reflections on their learning:

*The Second Life assignment allowed me to understand more of other disciplines and their general working roles. This has also demonstrated how these disciplines are likely to interact with each other in the working environment.* [CMIS4]

*This learning activity…enhanced my knowledge on the multiple disciplines available and accessible within the health industry that I was unaware of.* [CMIS10]

Unlike nursing and other allied health professions who work alongside with multiple healthcare practitioners in patient management, Medical Imaging practitioners operate primarily in silo in a diagnostic capacity. The
findings show the need to embed more opportunities for interdisciplinary learning understanding in the pre-registration education of Medical Imaging students.

**Contributing to our understanding of 3D simulated environments and staff development**

Prior to the commencement of 2011 study, we were aware of the importance of technical matters and its potential of disrupting student learning and hindering deeper student engagement. While we were of the view prior to the commencement of 2011 project that we had all technical issues under control, there were many other technical problems that surfaced which we did not anticipate. What we have learned from this study is the practical aspects of implementing virtual simulated learning within the constraints of RMIT IT infrastructure.

Despite the technical problems, the findings show the value of this Second Life study and the corresponding impact the increased interdisciplinary understanding on student confidence in patient referral and patient management. One major challenge we encountered is the fact that students are on clinical placement throughout the semester, making interdisciplinary exchanges more difficult. While Second Life does provide flexibility in terms of learning, in reality, students are generally less inclined to be doing RMIT activities while on clinical placement. They prefer to be focusing their attention on their work integrated learning. The LTIF Team will continue to fine tune the design of interdisciplinary learning activities in our 2012 LTIF project with the aim of promoting interdisciplinary learning across a wider range of disciplines across RMIT.

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

  We encountered several major technical issues in our 2011 study. The table below lists the technical difficulties encountered by students, with the corresponding strategies we will be implementing in our 2012 study.

**Table 1: Technical difficulties encountered in 2011 and corresponding strategies for 2012**

<table>
<thead>
<tr>
<th>Technical difficulties encountered in 2011</th>
<th>Strategies to be adopted in 2012</th>
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<tr>
<td>Students encountered difficulties in</td>
<td>Aside from the existing 2011 instructions, we will be:</td>
</tr>
<tr>
<td>• registering for Second Life</td>
<td>• creating a video clip to show step-by-step procedure</td>
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<tr>
<td>• entering our RMIT Second Life Polyclinic</td>
<td>• conducting a compulsory face-to-face orientation induction at the beginning of Semester Two 2012</td>
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<tr>
<td>This has resulted in a delayed start for many students.</td>
<td>to ensure all participating students are ready for the start of the semester.</td>
</tr>
<tr>
<td>Second Life is a web based program that requires regular software updates. This followed that students were unable to log onto Second Life if an update is required.</td>
<td>Our Second Life designer will be working alongside with IT to install a patch that will bypass the update requirement.</td>
</tr>
<tr>
<td>Some of the computer specifications in the computing laboratory were inadequate to meet the Second Life requirements.</td>
<td>We have already arranged with IT SEH to ensure all identified computer laboratories will have the minimum specifications to run Second Life.</td>
</tr>
<tr>
<td>Video capture of student role play</td>
<td>For 2012, we have purchased Camtasia (with concurrent license), a commercial software for video capture. It is anticipated that this will solve both the headsets and video recording issues reported in 2011.</td>
</tr>
<tr>
<td>• headsets seemingly not functioning</td>
<td>IT SEH and DSC will assist in installing Camtasia in the nominated computers in both City and Bundoora campuses.</td>
</tr>
<tr>
<td>unable to video record role play using free software</td>
<td></td>
</tr>
<tr>
<td>We used free software video capture for this study. Free software has its quirks and for students who are not technical savvy, they were unable to overcome/ circumnavigate the technical idiosyncrasy.</td>
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</table>
Based on student feedback, the outcomes listed in our proposal were achieved. However, the impact of the above technical difficulties resulted in considerable student frustration and has certainly resulted in drop in student participation and prevented remaining students from engaging in deeper learning. While students acknowledged that the virtual role plays have assisted in enhancing their communication and history taking skills, the extent of technical difficulties they encountered has caused many students to question the value of Second Life as a learning strategy. It was felt that the amount of time spent in trying to resolve the technical issues has prevented them from exploring the content deeper.

The 2011 LTIF Team is confident that with the above 2012 strategies, we will have addressed the technical problems encountered in 2011.

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

As a result of our 2011 project, we have expanded our disciplinary linkages to include five more disciplines in our 2012 LTIF study:

- Pharmacy (SEH: School of Medical Sciences)
- Radiation therapy (SEH: School of Medical Sciences, Medical Radiations)
- Exercise Science (SEH: School of Medical Sciences)
- Chinese Medicine (SEH: School of Health Sciences)
- Social work (DSC: Global Studies, Social Science & Planning)

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

**Creation of RMIT Second Life Polyclinic**

RMIT Second Life Polyclinic:

Joe Bird, our Second Life designer from IT DSC, has created a virtual RMIT Polyclinic consisting of four consulting rooms: midwifery, chiropractic, mental health and medical imaging. This Polyclinic also has a resource area consisting of interdisciplinary materials for student reference. Simulation platforms, such as Second Life, also have the advantage of being reusable (University of Portsmouth, 2008). Hence, for our 2012 LTIF project, the Polyclinic infrastructure and learning objects will be re-used and further expanded to include five more disciplines at RMIT.

**Blackboard presence**

The 2011 LITF Team has created a program shell in Learning Hub to facilitate interdisciplinary learning and exchanges. Students are required to log onto this shell to participate in blog discussions. This shell also consists of the same learning resources that can be found in RMIT Second Life Polyclinic.

**Name of Program shell:** 3DSLIHD 3D Simulated Learning in Healthcare Disciplines
Describe the ways in which the project’s outcomes have been or will be shared across the university, the sector and/or nationally and internationally. For guidance refer to the ALTC Dissemination Framework (url: http://www.altc.edu.au/print/resource%2Ddissemination%2Dframework%2Daltc%2D2008)

As per our 2011 LTIF proposal, the RMIT Team has successfully completed the information dissemination engaged dissemination strategies identified in our proposal.

Dissemination amongst RMIT academics to promote participation: completed

- Learning and Teaching Forum November 2010
- RMIT workshop July 8 2011
- Learning and Teaching Forum November 2011

Dissemination amongst industry partners and professional communities: ongoing

- International conferences
  2012 INTED (Appendix 4.1) and 2012 ISRRRT World Congress (Appendix 4.2) as listed in Section 2 of this report (p. 4).
- Peer-reviewed publications:
  Currently in progress as explained in Section 2 of this report (p. 4)
- Engagement with professional community:
  The 2011 LITF project was shared with the Victorian Radiation Therapy Clinical Educators group on 23 October 2011. The aim of the presentation was to invite all Victoria Radiation Therapy clinical centres to participate in a proposed Health Workforce of Australia simulated learning funding.
  The Radiation Therapy Clinical Educators Group indicated their interest in participating in a Second Life project for Radiation therapy. Consequently, a HWA funding designed for radiation therapy was submitted, with RMIT and Andrew Love Cancer Centre (Geelong) as co-investigators.

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. For guidance refer to the ALTC Evaluation Framework (url: http://www.altc.edu.au/extras/altc-gsep/index.html)

The project was evaluated via both quantitative (using SPSS) and qualitative approaches (thematic analysis). Evaluation of the study was via pre and post interdisciplinary survey, blog discussions, focus group discussions and a final module survey. Student video clips and student reflective work also formed part of this study evaluation data. Evaluation findings are reported in previous sections.

Impact of 2011 LTIF study

- 2012 LTIF project
  The 2012 LTIF project is a direct consequence of the 2011 LTIF study. The 2012 study will include five more new disciplines, thereby bringing together nine disciplines in total for both intra-disciplinary and inter-disciplinary learning.
• **RMIT Virtual Simulated Learning Community.**
  It is the intention of the 2012 LITF Team to form a learning community to serve as a resource and catalyst for other similar like-minded RMIT academics who may be interested in incorporating virtual learning into their curriculum.

• **Submission of HWA 3D simulated learning proposal**
  As a direct consequence of the 2011 LTIF project, I have submitted a Victoria state wide proposal seeking $250,242 funding for a Second Life project to be implemented in oncology setting. This proposed project will be in alignment with RMIT strategy of engaging with industry partners on education and research. As of first week of February 2012, we have been advised our proposal has successfully reached the final selection stage (see Appendix 5.1). At this time of report writing, we are waiting on HWA final verdict.

6. **Budget report**

   All financial claims related to your project must be processed against your internal order number **before the end of 2011.** Claims cannot be accepted in the New Year 2012. Unexpended funds will be retained by the university and unclaimed costs will be borne by your School/College.

   A financial statement (in PDF), signed by the team leader and relevant Finance Manager of acquittal of funds must be attached to the report. It should include a statement of income and expenditure against the budget categories specified in the approved project proposal. Please consult your Finance Manager for further information.

• **What was the amount of funds approved?**
  The amount of fund allocated for this 2011 funding was $57,000.

• **What was the final amount of funds acquitted? Please attach a financial statement.**
  The final amount was -$333 (Appendix 6.1)
References


Health Workforce Australia (2010). Use of Simulated Learning Environments (SLE) in Professional Entry Level Curricula of Selected Professions in Australia. Adelaide: Health Workforce Australia.


7. **Appendices**

- Include any material that may support your claims of outcomes and impact.
- Attach pictures, presentation material, website links and so on that may be important. In particular, please provide an image that can be used for publications, such as a poster.

**List of Appendices**

2.1 2011 SEH Learning and Teaching Forum:
   Second Life poster displayed at workshop

3.1 Final module evaluation survey

3.2 Pre interdisciplinary survey

3.3 Post interdisciplinary survey

4.1 2012 INTED Conference: acceptance letter

4.2 2012 ISRRT Conference: acceptance email

5.1 HWA proposal: responses from HWA

6.1 2011 Financial statement