

***SECOND LIFE* EDUCATION IN NEW ZEALAND: EVALUATION RESEARCH FINAL REPORT**

MILESTONE 2 REPORT

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EXECUTIVE SUMMARY

This report evaluates the *Second Life* in Education in New Zealand (SLENZ) project. This project was funded by the Tertiary Education Commission, and was a pilot to use the *Second Life* virtual world environment in tertiary institutions in New Zealand. The project team developed and trialled two builds in *Second Life* – one supported the pre-clinical training of Midwives, and the other was in Foundation Studies.

The following research questions guided the evaluation:

- How and to what extent do MUVES such as *Second Life* offer enhanced learning for NZ tertiary students?
- What could have been done better during the design, development and delivery of the two pilot learning activities in *Second Life*?
- What worked well during the design, development and delivery of the two pilot learning activities in *Second Life*?
- What good practice can be identified that may help others design, develop and deliver learning experiences in MUVES?

In addition, this evaluation considered the engagement of learners, the opportunity a virtual world affords for learning experiences not available in 'real life', the learning of virtual world skills and collaborative and cross-cultural learning in *Second Life*.

The creation and effective employment of the two builds is a great success of the SLENZ team. In the process, the project team established a valuable corpus of experience in developing and using resources for tertiary education.

The project team decided to adopt *Second Life* as the platform of choice, because it was seen as the most stable and versatile virtual world software available. At the beginning of the SLENZ project, a number of proposals were received for learning areas to be involved. Midwifery Training and Foundation Studies were chosen as sub-projects.

The project team members had a wide range of backgrounds and expertises, from software developers through to practitioners in Midwifery and Foundation Education. Additionally, the members of the team, and participating institutions were widely spread geographically. This represented a challenge, both from the point of view of project management and of effective communication. At an early stage, it was decided to have two project leaders – one whose focus was on the real life aspects of the project, whilst the other concentrated on leadership within *Second Life*. This sharing of leadership was found to work very well.

In a dispersed project of this nature, communication amongst project members is key. The team developed a number of modes of communication, including a project blog, the use of Google Docs, and regular meetings, both face-to-face and within the *Second Life* environment. In general, these modes of communication worked well – there was an appropriate number of modes, and they were well used.

The decision was made early on to complete the sub-projects in three stages. This ensured that tangible outcomes were achieved at the end of each stage, even though in the event only two of the three stages of each sub-project were completed.

The great majority of the work on the builds was carried out by one Developer. This and a degree of lack of understanding by Lead Educators and the Developer about each other's needs, resulted in significant levels of stress as deadlines for the builds approached. It was thought that dividing the stages into smaller 'chunks', and adopting a software development 'sprint' approach to the builds would have made the process less stressful. Another improvement could be to have a larger development team.

Both sub-projects encountered technical challenges. The most significant occurred when accessing the builds from institutions, and appeared in part to relate to issues associated with firewalls; and also to computer specifications. There was also an issue of excessive broadband usage for those learners accessing the Midwifery build from home. Participant experience pointed

to the need to involve institutions' IT departments very early on in such a project. The promotion of similar projects by powerful champions within ITPs was seen as very important.

Learners in the project had the opportunity to receive training to orient themselves to *Second Life*. It appears that there was a greater uptake of this training by Foundation students, who used their build in their institutions, than by Midwifery students who worked from home and experienced more difficulty navigating the world.

The project team have begun to consider ongoing sustainability of the outcomes of SLENZ. Sustainability has two major components – the maintenance and upgrading of the two builds, and capitalizing on the corpus of expertise that has been established. Preliminary steps are in progress to establish an Association to promote the use of MUVES in education in New Zealand.

The two completed stages of the Midwifery build represent a significant success of the project. The first stage was a 3D representation of research findings around the nature of an ideal birthing environment, and was the context for stage two, the normal birthing scenario.

Midwifery students and tutors experienced some challenges in using *Second Life*. For use at the institutions, there were technical challenges due to bandwidth and firewall issues, and computer specifications. Fewer challenges were experienced when participants accessed the build from their own home, but the application tended to be bandwidth hungry, and used up large amounts of students' broadband allocation.

Difficulties with navigating around and using the functions of the application were experienced by both students and tutors. It is likely that a longer and more careful period of orientation might help participants overcome these difficulties.

There was a degree of resistance to using the builds from some students. Factors that contributed to this included the reputation of *Second Life*, negative attitudes to enjoyment as a part of the educational experience, and poor marketing of the concept to learners.

Those students that accessed the build, and who were confident with the environment, reported a high degree of engagement and enjoyment of the experience, especially in working through the scenario with a buddy. They found this experience removed some of the stress, compared with face-to-face role-play. They found the experience of exploring the birthing suite less engaging.

The Foundation build provided a rich environment for learners to develop their job-hunting skills, despite criticism of its external appearance. It provided the opportunity for students to review material they had learned in face-to-face sessions, and to practice dressing appropriately for, and taking part in, interviews.

For many Foundation participants, the experience was marred by technical difficulties, which highlighted the need for careful planning and good collaboration with the IT department before introducing virtual world learning into on-site programmes. These difficulties appeared to be more significant for native English speaking participants than for ESOL learners, who may have been more prepared to persevere with the environment.

Some learners and staff expressed resistance to the use of *Second Life* in their programmes. Key factors were the amount of time it took to master the environment, and negative perceptions of *Second Life*. However, others saw the value of the build, and the potential for future developments.

The build offered opportunities for collaborative and cross-cultural learning, although the impact of this may have been reduced by students working adjacent to each other in the same room, and by being restricted to text chat. In some cases, authenticity of the experience was increased by the use of interviewers from outside the institution.

Institutions' staff were generally keen to be involved in future work with virtual worlds, but emphasized the need to resolve technical issues.

Recommendations

The following recommendations for future projects exploring the use of virtual worlds in education arise out of the findings and discussion:

- Establish a larger development team, and adopt a 'sprint'-based development process
- Ensure that developers and educators spend time together to familiarise themselves with the requirements of each others' disciplines
- Establish close collaboration with institutions' IT departments to ensure that learners can have fully functional access to builds within institutions
- Establish champions of the project at a senior level in each participating institution
- Communicate with students regarding ICT requirements and expected broadband usage to run the builds at home, and expectations in terms of participation and learning outcomes
- Provide a thorough, compulsory, orientation to the virtual world
- Ensure that each stage of each build incorporates highly interactive and engaging activities for learners

INTRODUCTION

The SLENZ Project

The present pilot was a groundbreaking attempt to use a multi-user virtual environment (virtual world) to deliver learning activities to groups of year 1 and 2 Midwifery, and Foundation Studies students from tertiary institutions throughout the country. The original proposal for the project was developed by NMIT (as lead institution) in collaboration with Wellington Institute of Technology (WelTec), Otago Polytechnic and the Open Polytechnic, although students from WelTec and the Open Polytechnic did not take part in the pilot. However, a staff member from WelTec was involved in the development effort, and staff from the Open Polytechnic kept a 'watching brief' on the builds.

Early in the project, the SLENZ team produced a review that summarised the literature on the use of virtual worlds in education (Salt et al, 2008). Because of the rapidly changing nature of the field, the review included a number of anecdotal reports of the use of MUVES in education. The review suggests the use of behaviourist approaches to help learners master the virtual world environment; and constructivist approaches to guide the development of pilot activities.

Despite perceived drawbacks to using *Second Life*, this environment was chosen for the pilot, because it was considered more stable, and offered more features, than other virtual world environments such as *Open Sim* and *Croquet*.

The pilot was divided into three subprojects:

Orientation activities for staff and students.

Foundation build. The aim of this build was to support Foundation and other students in developing job seeking and interview skills.

Midwifery build. There were intended to be three stages to this build. The first was to use research carried out at the University of Technology at Sydney to create an ideal birthing suite, whilst the second was to create a role-play in *Second Life* of a simulated normal birth. The third, which was not completed, would have been to simulate problematic birthing scenarios.

The orientation activities were designed to give staff and students the skills to enable them to teach and learn effectively within *Second Life*. Staff and students involved in both the Foundation and Midwifery courses took part in activities designed to achieve this end. The literature review (Salt et al *op cit*) recommended that learners should complete points 1 and 2 of the *Second Life* Core Competency Framework.

It was hoped that students from NorthTec, Manukau Institute of Technology (MIT), Nelson-Marlborough Institute of Technology (NMIT) and Otago Polytechnic would be involved in the SLENZ Foundation pilot. In the event, only NorthTec and MIT took part. The Foundation courses were held on-campus. During the courses, learners had access to learning activities via the virtual world in computer suites and/or classrooms on campus.

The Midwifery students were enrolled in midwife training programmes at Otago Polytechnic and at Christchurch Polytechnic Institute of Technology (CPIT). The Midwifery students spent blocks of time on campus, but much of their study was carried out by online distance learning using *Moodle* and *Illuminate*. It was expected that they would be able to access the virtual world both during the on-campus blocks, and when they were off-campus.

Tutors at the participating institutions were involved in using *Second Life* with their students. Thus for the Midwifery build, two tutors were involved in Christchurch and one in Dunedin as well as the Lead Educator.

In both NorthTec and MIT, the Foundation build was used by other groups as well as by Foundation students. Thus at NorthTec, a group of migrant students used it in their ESOL classes and at MIT, students from the Business Studies faculty practised interviewing skills.

The Evaluation Research

The aims of the evaluation were to help the project team to:

- Understand what could have been done better during the design, development and delivery of the two pilot learning activities in *Second Life*
- Understand what worked well during the design, development and delivery of the two pilot learning activities in *Second Life*
- Identify good practice that may help others design, develop and deliver learning experiences in MUVES

These aims served as the basis of research questions to guide the evaluation.

The project blog indicated anecdotal strengths that were considered to distinguish virtual world learning environments from other online environments, including *'the increased engagement of learners with a familiar game-like environment where learning may intentionally be a product of serious 'play'; the ability to create experiential learning situations not available in "real life"; the opportunity to learn the skills necessary to operate socially, technically and ethically in an online global virtual world; and also the opportunity to experience and practice collaborative, cross-cultural problem solving in social networking environments.'*

Since my understanding was that the project team would be interested in learning how and to what extent these strengths might be features of the present pilot, I endeavoured to keep them in mind during the data analysis.

The Evaluator's Role

I was approached in February 2009, and asked to evaluate the SLENZ project, after the person who was originally assigned this role, and who was involved in writing the literature survey, withdrew from the project a few months after the start.

METHODOLOGY

The project was suited to a case study approach. We treated the Midwifery and the Foundation study instances as separate, but linked case studies from which to draw overall conclusions and recommendations to guide future design and development of virtual world based learning opportunities. Information pointing to the orientation sub-project was collected from participants in both proposed case studies. However, the orientation sub-project was seen as being of peripheral importance to the evaluation.

Ethical procedures

CORE Education has its own ethics procedures, which are based on the New Zealand Association for Research in Education (NZARE) and the Aotearoa New Zealand Evaluation Association (ANZEA) guidelines for the ethical conduct of research. The evaluation research was submitted to this procedure in the first instance. Research projects are reviewed by a member of CORE research staff not involved in the project, and also by an external member of the CORE ethics group, which is drawn from academics involved in educational research. In the present case the project proposal, which includes a description of the research methodology, was submitted to the ethics process, accompanied by copies of informed consent documentation. One minor change to this documentation was suggested by the external referee, and was incorporated into the final version.

Once the project had received approval from the CORE group, it was submitted to the ethics committees of the participating institutions, as well as that of NMIT. The latter institution did not have students participating in either sub-project; but was included as the parent institution administering the SLENZ project. All the institutions approved the ethical basis of the evaluation.

Information about the project was posted online for participants to access, together with a response form that could be completed and submitted online to indicate willingness to be involved in the research. Slightly differing versions of the project information were produced for students and for project team members and tutors. Appendix 1 includes the text of the online participant information.

The online response form was designed using *Zoho* online software, and online responses were automatically added to a *Zoho* database. Although tutors were e-mailed and asked to request their students to complete and submit forms online, less than half of the consents were received online. Some tutors chose to print out the evaluation information and forms for students to complete manually, and in some cases the evaluator took hard copies of the material for students to complete immediately before interview. Details of participants completing forms manually were added to the *Zoho* database by the evaluator.

The research questions

As mentioned above, our proposed research questions were based on the aims of the evaluation. These questions were:

- How and to what extent do MUVE's such as *Second Life* offer enhanced learning for NZ tertiary students?
- What could have been done better during the design, development and delivery of the two pilot learning activities in *Second Life*?
- What worked well during the design, development and delivery of the two pilot learning activities in *Second Life*?
- What good practice can be identified that may help others design, develop and deliver learning experiences in MUVES?

These research questions, together with the anecdotal strengths listed in the *Evaluation Research* section of the Introduction, were used as the basis for developing interview questions and indicators for analysing evaluation data.

Sources of data

Key stakeholder groups for the project include:

Project Team members: responsible for designing, building and administering the *Second Life* facility. The project team members were taken to include the real life and *Second Life* Project Leaders, lead educators, e-learning designer, and software and server side developers. The UTS Associate Professor involved as a consultant in the research into ideal birthing suites was also included in this group.

Educators: responsible for delivering the learning programmes to the students

Students: the end users or beneficiaries of the learning activities

Data was principally collected by semi-structured interviews of members of the above groups. In the case of project team members and educators, interviews were carried out either face-to-face or via *Skype* VoIP calls. Most student interviews were carried out in groups of 3-8 participants; although one interview was carried out with a single student who had strongly negative views on the use of *Second Life*, and who was thought likely by the tutor to dominate a group interview. Notes were taken during all interviews, and face-to-face interviews were also recorded using a digital recorder or *PowerGrama*, a free VoIP recording application.

Data was also collected by attendance at one in world, and one face-to-face group meeting. In addition, some SLENZ blog posts and online documentation were examined.

Interview questions

Separate sets of interview focus questions were developed for each of the main stakeholder groups: Project Team Members, Midwifery Tutors, Midwifery Students, Foundation Tutors and Foundation Students. These sets of questions were designed to be guides to keep the interviews on track.

These sets of questions can be found in Appendix 2.

Data analysis

Recordings of interviews were converted where necessary into a format that could be used with the free transcribing program *ExpressScribe*. In most cases, the recordings were played back through a USB headset, and immediately spoken back into the speech recognition software *Dragon Naturally Speaking*. The resulting texts were then saved as text files. In a few cases, transcriptions of recordings were carried out manually. These transcripts were then coded and analysed using *HyperRESEARCH* qualitative research software. Data from interviews of Project Team members and from Midwifery and Foundation participants were treated as separate cases in the analysis. Lead Educator interviews were included with their specific sub-projects. Coding categories were devised to highlight a number of themes and are listed in Appendix 3:

FINDINGS

Operation of the SLENZ Project Team

Choice of Second Life

In 2007-8, a number of educators were interested in the potential of virtual worlds in education and became aware of the fact that there was funding available from the TEC Encouraging Innovation Fund. A meeting was held in Wellington under the auspices of IBM Ltd to sort out the scope of a potential project, and subsequently the two Project Leaders sorted out the details.

A number of MUVES have been developed and used for educational purposes including *Open Sim* and *Open Croquet*, as well as *Second Life*. *Second Life* itself is a commercially owned environment operated by Linden Labs. Its original purpose was not educational -- it was built as a social networking environment, and has a very large number of users including private individuals, commercial organisations and government institutions as well as educationists. *Second Life* is thus a microcosm of real life. It is often seen as merely a computer game, and there are questionable activities that occur in *Second Life*, resulting in a perceived "sleaze factor". This has affected educators' and students' attitudes to the use of *Second Life* as a medium for education. Thus the Lead Midwifery educator commented:

The other big barrier that I haven't mentioned before is educators' attitudes to Second Life, and also student's attitudes to Second Life ... the perception of Second Life is that it is a game that only geeky boys play. That the virtual world is populated by sexual perverts. You can laugh and I am probably being a tad vicious, but that is what is being said in so many words. The perception is that people go in there and build their avatars to be young, sexy, big bosomed, blonde women... those perceptions need to be overcome, and educators' perception about its being a game -- that it is not of any value to serious Midwifery education. (Midwifery Lead Educator interview)

According to the educational designer:

The first issue was why were we selecting Second Life as a platform? I took the original project to be referring to virtual worlds in general... if we did choose to focus on Second Life, why would we? Second Life was chosen for various reasons. It might not be entirely appropriate for public education, which Open Sim might be, or even Open Croquet given that Open Croquet has been heavily invested in by other organisations ... the conversation wasn't there. (Educational Designer interview)

Subsequently, the project director pointed out that the decision to adopt *Second Life* was taken before the educational designer joined the team.

In the opinion of both Project Leaders, alternative MUVES were less stable than, and did not offer the same opportunities for building resources as did *Second Life*:

In my opinion, unless you have got a very large budget, at the moment it (Second Life) is the only place to do that kind of educational build. If you can afford to go out there and buy your own servers and set up your own virtual world maybe you can, but without that I don't think that there is an alternative to Second Life. It is by far the most sophisticated in terms of what it allows you to do and build. (Project Leader SL interview)

The Project Leader SL added that:

Open Sim, which is the open source version of Second Life, is nowhere near stable enough. It is just still in alpha really ... you could not rely on it ... I don't believe that any of the other virtual worlds that are out there ... offer anything like the potential freedom that Second Life does for building whatever you would like to build.

Second Life was selected for the project because these kinds of advantages were considered to outweigh the drawbacks. It appeared that as the project became established attitudes about using *Second Life* for education began to change:

The first time that I talked about Second Life, it was two years ago and most people thought it was highly amusing that we could even contemplate using it for education. We had all the

familiar questions: “what about the sex?” And the other usual stuff. But when we were at e-Fest in 2008 people had to take us a little bit more seriously because the Government had given us \$500,000. There were people who were keeping a watching brief on what we were doing. The feeling that we had at e-Fest in 2009 was that we were able to generate some real excitement ... (Project Leader SL interview)

Selection of sub-projects

At the start of the project, the team asked for proposals from a number of ITPs. The literature review (Salt et al, 2008) was used as a basis for suggesting types of learning activities that might be suitable for the *Second Life* environment. It was also used to create criteria for project selection. Three of the proposals were considered to have considerable merit, but funds were limited:

The two proposals that were adopted were:

Foundation Studies; A build to support Foundation students in learning job hunting and interview skills. It consisted of the “Stairway of Learning” that incorporated pop-ups to remind students of essential skills and knowledge. There was also a clothing store where learners could select and get feedback on the suitability of clothing to wear at interview; and practice interview rooms. Participating institutions were Manukau Institute of Technology and NorthTec.

Midwifery: The *Second Life* Midwifery suite was based on research carried out by Dr Deborah Davies at the University of Technology in Sydney on defining an ideal birthing unit. The suite itself was furnished with equipment that midwives use in their work. The intention was that Year 1 Midwifery students would familiarise themselves with the suite and supporting resources, whilst Year 2 students would use practice birthing role play scenarios to develop their clinical and administrative skills. In the event, only one, normal birthing, scenario was completed by the end of the project. Students from CPIT and Otago Polytechnic used this build.

The Project Leader, RL commented:

One thing that was hard was that we really wanted to choose three (projects) from the applications, but we only had resources for two. The project team managers who were choosing them said let's go with three. I'm sure that we can make it work ... whereas the project steering group ... insisted that we only chose two. I have been so glad. I just think that if we had tried to do three...

Management of the project

The project team consisted of the following members:

- “Real Life” Project Leader (contracted, Wellington) (Terry Neal)
- “*Second Life*” Project Leader (NMIT) (Clare Atkins)
- Developer (contracted, Northland) (Aaron Griffiths)
- eLearning Designer (Otago Polytechnic) (Leigh Blackall)
- Lead Educator Midwifery (Otago Polytechnic) (Sarah Stewart)
- Midwifery Consultant (University of Technology Sydney) (Deborah Davies)
- Lead Educator Foundation (MIT) (Merle Lemon)
- Server Side and Secondary Developer (WelTec) (Todd Cochrane)
- Blogger (John Waugh)

At the start of the project, the challenge was to combine this disparate and geographically dispersed group of people into a team. Initially it was necessary to sort out who would be Project Leader:

Once we got the funding I rang everybody that had been put forward as being in the team about their skills, and what their role should be. When I talked to (the future Project Leader SL), we realised that we both thought that we were Project Leader; so then we had to think about what that really meant. (She) came up with a suggestion that worked really well -- that she should be Project Leader Second Life, which recognised her experience in Second Life and in development (she is from an IT background and that is her real passion). Whereas (I should be) Project Leader real life (which) recognises my experience and ... my passion for budgets and milestones and keeping things on track. We did not realise at the time that we both care about the people side of things and processes for enabling teams to work well together. (Project Leader RL interview)

The Project Leader RL recalled some of the challenges that she faced:

Most of us did not know one another. I personally have never worked with any of them before. We have a number of strong characters in the team. I imagine you get that in innovation projects more than in other projects. Whatever makes you an early adopter makes you a bit opinionated. So we had to form as a team...

Because the team was breaking new ground, it was difficult to define the roles of members of the team:

I think a lot of success or failure of working in a team is around people understanding their roles. There was a challenge because we didn't actually know what we were doing. None of us had ever done it before ... and there was a bit of storming, and then we normed ... I think that in the end we got there. (Project Leader RL interview)

For her, managing the project was:

A massive learning curve in terms of not being strongly from an educational background ... in a way I think that was good because I did not think that I knew all about teaching and learning, so I actually listened to everybody ... (Project Leader RL interview)

Being a project manager can be a lonely and challenging task. The Project Leader RL recorded her appreciation of working with her *Second Life* counterpart:

I can see that there are some real benefits in having someone who cares about the same things as you in that you can talk really honestly ... particularly during the storming phase, it has been really nice to have (Project Leader SL) to talk things through with ... she and I are similar in a lot of ways in how we work. I think it could have been diabolical with the wrong person because we would spend the whole time doing territorial things between the two of us whereas that was not true because of who we both are as individuals. (Project Leader RL interview)

A significant part of the project manager's task was to recognise and capitalise on particular strengths of team members, and to keep them on track:

Commitment to working together and working through issues, even when it was difficult, willingness to make compromises, commitment to completing things on time ... (Project Leader RL interview)

Communication

Another challenge was maintaining communication between the team members dispersed across the country. This required the development of a range of procedures for communicating within the team.

The fact that none of us have done it before (meant that) we had to design processes. I spent quite a lot of time at the beginning thinking about processes, and then we needed to design processes to capture our thinking. We had to use them and to refine them as we went. I think we did quite well at designing the processes for capturing our thinking ... we had Google Docs which was our formal "this is what we have agreed". The plan was that we

would modify Google Docs as we went but I don't think that we did it very well partly ... because we were just so busy doing it. (Project Leader RL interview)

The Project Leader SL commented:

I think that the other thing that was done very well was team communication, even though we had our problems ... until we got it sorted. The ability of all the team members to be able to communicate with each other and with (the Project Leader RL). (She) played a huge role in making that work. I think that was terribly important.

She also noted that:

The first thing that was done very well was the whole idea of having a blog and having somebody responsible for doing the blog and nothing else. Blogging so well about it over a sustained period. This was absolutely important, absolutely fundamental. It has been very important in terms of us getting international recognition for what we are doing as well as national. (Project Leader SL interview)

There seemed to be some differences of opinion about the role of the project blog:

The blog has been an important aspect of this project. It was set up by an experienced journalist to integrate and to document the progress of the project ... we got a good blog, but (I think) he did not document the project progress as much as I think he should have. It would have been better to document the progress more. (eLearning Designer interview)

He also criticised the way that *Second Life* was used for project meetings:

Every month there is a project meeting in Second Life. We meet in a place called Koru and conduct a meeting, just using voice. We could switch off the screen and not need to be in Second Life. Just listening to the voices as though we are on Skype. This reflects that even the experts are not using Second Life in the way that they talk about.

For the developer:

Although I have a lot of time for virtual worlds, I think that there were times when a day of face-to-face would have made a huge difference in the designing and building stage ... I think (we could have had) more face-to-face especially in designing the actual structures. I think we talked to death a lot of things at times. It was interesting that in some of our face-to-face meetings we would decide in 10 minutes what we were going to do, and then talk about it for four hours, and then conclude that what we have said in the first 10 minutes was the correct thing to do. (Project Developer interview)

Communicating about the project to the outside world overlapped with issues of accessibility to the project builds. Notwithstanding his comments recorded above about the project blog, the eLearning Designer was committed to making the project widely accessible:

(He) was really hot on this. One thing that he came up with was if people could not access the builds and do the immersive stuff, then they could at least benefit from the fact that we had constructed these things in the world, through videos. (Like the) video of the unit ... that said, there are some researchers talking, you can see this build -- that was some of the thinking behind it. (Project Leader RL interview)

Videos of the Foundation build may be accessed from:

<http://www.youtube.com/watch?v=6tlufh6x5Fc> and

<http://www.youtube.com/watch?v=0sfDtvIKFKA>, while the Midwifery build can be seen at:

<http://www.youtube.com/watch?v=w6fRxfDEoRU>.

Philosophy on intellectual property

For some members of the project, it was important that project builds and documentation should be freely available. For the eLearning Designer, who had played a significant role in the adoption by Otago Polytechnic of a Creative Commons approach to intellectual property:

At the outset my condition to be involved in the project was that the content in the project would be licensed Creative Commons Attribution ... we do not want people profiting from public expenditure, and we want maximum transparency.

The Project Leader, RL commented that:

We have been committed to Creative Commons from the beginning. I think different people have different reasons for that. I think some are very strongly pro-Creative Commons in every circumstance ... For me personally I am open to different models at different times but when I think that there is a project like this that the New Zealand government is funding out of a special fund, it should be available for New Zealanders; and so Creative Commons was a way of doing that.

She added:

Of course open (source) stuff theoretically works well. It is a bit like communism. Communism is wonderful except that it does not really work. Apart from that it is perfect. And it does not work because of what makes people tick ... (Project Leader RL interview)

The Project Leader SL took the view that:

The whole issue of it being freely available attributed as Creative Commons is absolutely fundamental to the success of education in virtual worlds. What is the point in having every Polytech in New Zealand and every TAFE in Australia building their own little emergency departments? Crazy. Absolutely crazy.

The eLearning Designer observed that:

Many institutions don't have such an intellectual property approach. Participating institutions had to be approached to say that this project will be Creative Commons (and told that) your contribution will be different from your normal IP policy. Do you have an issue with that?

He felt that different project team members had different understandings of the implications of Creative Commons. Thus:

The developer introduced content that he had built for somewhere else and that did not have the license ... it is important to me and open education that what you see is what you can take ... It became a heated issue. The whole non-restrictive intellectual property issue I don't think has been fully understood, but this has been a first step. (Learning Designer interview)

However, from the developer's point of view:

Early on we set up in terms of Creative Commons that whatever we built would be openly available. That has been absolutely fine. The way that the contract has been set up and the way to commission work within Second Life, I have ownership of everything that I have created; and transferred them over to the NMIT avatar. It has not been a problem for me. (Project Developer interview)

The designing and building process

Details of the designing and building process for each of the two builds will be discussed further in the relevant sections below. At this stage I shall discuss issues that are common to both builds.

The Project Leader SL had been involved in "conventional" e-learning during her work at Massey University:

I had some experience with Blackboard and have been using the Moodle at NMIT but I was not a great lover of those learning management systems . I saw it as a barrier between me and the students rather than as a help. So I had not been very positive adopter of e-learning, or online teaching and learning.

She continued:

I realise that this (Second Life) was beyond the barrier. That this was something which actually provided the nearest thing to a face-to-face experience. (More so) than you could

have using any of the flat (web based applications) ... I also came to appreciate over the last three years how much game style activities could be used for learning at a very high level of education. (Project Leader SL interview)

Division into stages

From the beginning the project team recognised that SLENZ was an ambitious project with significant outcomes. Furthermore:

nobody knew at the beginning how to do these things, and I mean nobody globally. There was no literature, no guidelines we found. We were starting from scratch. (Project Leader SL interview)

Despite this lack of clear guidelines in the literature, the literature review (Salt et al, 2008) was drawn upon in creating a provisional framework for designing and implementing the SLENZ build.

The Project leader SL commented that:

At the very first face-to-face meeting ... we knew that what we knew we could build and what we wanted to build for each of the two projects for the Foundation and for the Midwifery were a long way apart and we had no idea of how to estimate how long it was going to take us to do some of those things. We did not know what problems we were going to hit; only that we knew that we would. So what we decided to do was to pick three points... For example, if I use the Midwifery as an example, the first milestone would be a completed Midwifery unit, a virtual birthing unit with all its information and the web resources that went with it and all that kind of stuff. That would be at the end of stage one and so even if we could go no further and even if that took us 12 months we would have something useful at the end of stage one. If we were successful with stage one, and we had time to do stage two, stage two would be the development of a normal birthing scenario and all the related activities. And once we had got done on all of that, that would be the end of stage two. In stage three would be the development or the extension of the normal birth scenario into one which required medical intervention and so the midwife would have to make decisions about when to call an emergency assistance and that kind of stuff. Those were our three stages. As it turned out, stage one took longer than we thought it would, stage two took longer than we thought it would and we never got on to stage three.

The rationale for adopting the staged approach was to ensure that the project team would have something concrete to show at the end of the project. As the eLearning Designer commented:

One thing that we agreed on was that we would take a staged approach. We would approach the project in three stages. Such that at the end of each stage we had a finished product ... It was important to finish the stages because ... if we had not finished stage one we would be left with nothing. Similarly with stage two and stage three.

It appeared that one of the consequences of adopting the three stage approach was that it resulted in a time squeeze towards the end of each stage. This especially impacted on the Developer:

I think I could have started the work a couple of months earlier if people had come to the table (a bit more promptly). And so towards the end it was very, very rushed; for the last four months of the project I was seven days a week and very long hours. There was very little time for thorough testing at some stages because students were in on Monday and we had to have something for them. It did become critical at times. For the Midwifery project we were considering pulling the plug because we did not have it done. We did get it done in the end but it was not the ideal way to do it. In terms of corners cut and things not being where I would like them, probably in such things as optimisation of code, but in terms of what the students experienced we got to the point where we wanted to get to. We got to that point absolutely exhausted. Not the ideal way of working

Given the fact that the project team was developing its own guidelines and procedures on-the-fly, it achieved its outcomes remarkably successfully. Thus the Project Leader SL commented:

I think we have to recognise that it was an innovation project. I think that we have done phenomenally ... Looking back retrospectively I don't think that we could have done anything better but we learned a lot of lessons...

One of the lessons learned was that in future projects it may be appropriate to divide the development process into smaller, more manageable stages:

...It would be breaking down the activities that we were doing into smaller chunks. And managing each one of those as a unit. One of the software methodologies talks about doing 'sprints', so you have a sprint of 30 hours to build a specific thing or a specific part and the end of that you are able to look for bugs. And you are able to work through it with the users and give them the opportunity for them to experience it and that kind of thing. Although we broke the overall development down into three stages, I think that if I was doing it again I would break each stage down into smaller more manageable units, and ensure that within each of those units the developers were very clear about what roles they had within that small unit.

Understanding of developer requirements

In a complex project like SLENZ, a key challenge is to ensure that the skills and knowledge of the team members are accessed and shared in an appropriate and timely manner. The educators have the contextual and content knowledge related to their particular fields, and these need to be communicated to the developers in order that the virtual worlds they build meets the educators' purposes. Furthermore, the relevant information needs to be communicated to the development team in a timely manner, and the educators need to be available to give feedback on draft builds.

The Developer reflected that this did not always happen:

There were lots of things coming from the educators, more especially in the Midwifery department, that were coming to me very late in the piece. They sometimes did not seem to grasp how essential it was to have the information to make the builds proceed.

Moreover:

It was often very difficult to liaise with the lead educators especially on the Midwifery project because they often were just not available or were travelling around the town (Project Developer interview)

The Developer commented that in some cases a lack of information created significant challenges for him:

It has been quite a lonely task, because I was really (involved) in terms of the build. For the birthing unit we had a floor plan and that was it. No specs on it other than the dimensions, where a door would be or where a window would be, so a lot of that part of the task was left to me because I was available all the time...It seems that a significant part of the problem was that the educators had no real grasp of the building process... They are not understanding the process of building anything in Second Life. If there had been a real understanding of the sort of photographs that one would need to create an object in Second Life, that would have made my job a lot easier. I was not getting photographs of plans, elevations, etc which is what I needed. The only thing I got that for was a box of sterile gloves. I could make a perfect box of sterile gloves. For things like a blood pressure cuff I had a photograph of it. I only knew what it looked like, but what I really needed was a good square on evenly lit photograph of the labelling, of the dial, to make it easy for me to transfer onto the object in Second Life to make a good re-creation. (Project Developer interview)

The Project Leader SL also commented:

For example one of the developers would say I need to know what a pinnard is. So the midwife educator would send a link to a whole page of a whole lot of pinnards. That is not actually a great deal of help. We needed more detail. How big, what did you want it to do, what should it look like? Here we have got 100 different variations on the theme, we just need you to choose one and that is what we will build. So it took longer than we expected.

From the Midwifery Lead Educator's point of view:

Some of the members of the team knew each other well already, but others were strangers to each other. So this was an incredibly intense project to be working on with complete strangers over physical geographical distance. We had a range of skills and experiences, I was obviously the Midwifery expert, but I didn't know anything about Second Life. Aaron was the designer and expert on Second Life, but he didn't know anything about Midwifery so consequently at times we didn't communicate with each very well and we made assumptions about each other's understanding and knowledge that were wrong assumptions and I think sometimes we needed to step back and take things very basically and build on them and we didn't do that.

She added that:

I've actually felt as the designer of learning activities in Second Life that this has been a disadvantage. I think in hindsight what it would have been useful for me to have done was to have spent time in Second Life at the beginning doing some role play and getting my head around how to build, so that I had a much better understanding of what you can achieve and how you can achieve it in Second Life, not only from a technical point of view but also from a design point of view. (Midwifery Lead Educator interview)

And the Midwifery Consultant commented:

Even in the build, trying to communicate to (the Developer) what we wanted. I think he had some frustrations because we weren't being clear because we didn't understand what he wanted or what he needed from us, so trying to communicate how we wanted the building to look and what needed to be in it and what it needed to communicate to people and all that sort of thing. It doesn't even sound like it should be hard now, but it was really difficult because we didn't understand what he needed ...

On the other hand, the developer thought that:

In the Foundation build it was more that the person had too much faith in me in some ways. The design was some rough scribbles and some writing on a sheet of paper that was given to me and we discussed that on the first day. And then it was a matter of trying to elicit what exactly (did she want?). The response was "Well you're good at what you do, you decide." Sometimes that works and sometimes it doesn't. Sometimes I just needed an answer.

In order to lighten the load, and to alleviate the "loneliness of the long-distance developer", he felt that:

Personally I would have enjoyed having a graphics person on my side. There was a lot of basic graphics that we had to put together, and just having a young graphic designer working alongside me would have helped.

He also commented that it may have helped both the developers and the educators to understand their mutual needs, educators could have been "*involved in the actual building process in some shape or form*".

Whilst the Developer focused on building the environment and incorporating content material, the Secondary Developer, worked on the heads up displays (HUDs) for use in the simulations. The Developer commented that:

I found it hard to work with him because he had quite different hours when he was working ... because we were both building bits of code that had to work together, I found it very difficult at times when he was not available or I couldn't match the times when he could be in (Second Life). Better organisation around these sorts of things (would help), and maybe discussing more (of) what we were doing.

However, the Secondary Developer thought that the issue resulted from:

The Lead Developer having too much to do, and... a low understanding of the progress being made...

Understanding of educator and student requirements

The two builds were designed for different groups of students to use in different situations. The Midwifery students, who only visited their institutions occasionally for face-to-face sessions, most frequently accessed their build from home, whereas the Foundation students generally used the Hyperdome with their tutors in their institutions.

The Project Leader RL emphasized the importance of:

Making sure that what we developed was relevant and would fit in with existing learning programmes rather than being something that is way out.

The Learning Designer mentioned the different needs of students and educators:

...it is no good creating something engaging for the students if it is not engaging for teachers. Teachers have different pressures, which prevent them engaging in Second Life – for example time, and cynicism about the Internet.

The Project Leader RL elaborated on this theme:

We still have to learn all about how to motivate them. That was really obvious in the distance one (the Midwifery build). In the Foundation (build) it is not an issue because they just do what they are told. They just sit in the lab and do it...so I guess that you have to motivate the educators, and to think about the design that would work with them...for distance or where they have some choice, it is about the learners. I don't know how you deal with that because to me the... 'would you like to learn this way?' question is a bit like whether I like Antarctica because I have never been there. I do not know and you can't imagine it unless you have been there.

For the Learning Designer:

We cannot assume that the students are already in Second Life. We need to come from the perspective that they have never even heard of Second Life. How do we design and serve their needs every step of the way?

In the design of the Midwifery build, the Lead Educator would have liked to involve students in discussion of the design and testing of the build from the start. From the perspective of the Midwifery Consultant:

We did our best, I think, to ...try and help the students understand how this might be relevant... and useful... the scenarios weren't developed when we were orientating the students...I think they might have needed us to show them a scenario so they could make a link in their mind even if the (Second Life) skills weren't there yet: 'aha, that's where I'm going, that's where I'm going to be able to use that...' I think that not having that ready when we were orientating might have made it a bit more difficult to get them interested, to get the (idea of it) being something more than a game.

It appears that the team's perception of the needs of the Midwifery students was not as clear as it might have been. The first stage in the build, the birthing suite itself and the accompanying 'clickable' resources, was designed for first year students. However, the novelty soon wore off for these learners, and some reported that they found doing this activity became "boring". A number of them went on to try out the normal birthing scenario:

*The original idea was the construction of the birthing unit with the information about: 'click on this and it will tell you why nutrition is important'...that was what was designed for the first year students. The normal birth scenario was designed for the second year students who had already had the theory of childbirth. But in practice, the first year students got really, really excited about being able to play the midwife because they are the ones who have just signed up to do a degree in Midwifery and it's going to be 18 months before they get anywhere near a pregnant woman. They are doing it all without any of the theory...just trying things out and making hundreds of mistakes. It doesn't matter. I found that fascinating.
(Project Leader SL interview)*

For students and educators to be able to use *Second Life* easily, they need to have good, reliable access, and to be oriented to the virtual world environments. We shall see below that the contexts within which the Midwifery and Foundation builds were accessed and used were considerably different, and that each had its own challenges in terms of access -- both in terms of the technology and in terms of the IT administration in the different tertiary institutions.

An orientation experience was developed to help users get used to the environment. This included selecting an avatar, navigating, interacting in *Second Life*, and selecting appropriate clothing for one's avatar. There were also some "fun" activities such as dancing and dodgem cars.

There appeared to be considerable differences in the ease with which different users managed to master the environment. Surprisingly some of the ESOL learners from NorthTec adapted very quickly to working in *Second Life*, whilst some Midwifery students reported significant difficulties, one having been "*trapped in a bubble*" from which she found it difficult to escape. A number of learners mentioned the amount of time it took to master the environment; time that they thought could have been better spent studying the content material, which the builds were designed to deliver. Thus one student commented:

I just think that we pay a lot of money for our course and it is not what we wanted to be doing... all we did was just play on the computers and try to figure it out and then it crashed
(MIT Foundation Studies Student interview)

Technical and IT issues

The Foundation Studies and the Midwifery builds were accessed in different ways, reflecting the way in which the programmes were delivered. The Foundation Studies students were engaged in a predominantly face-to-face programme, whilst the Midwifery students were studying a large proportion of their course online from their homes. As a result of this, the technical challenges faced by each group of learners and educators differed.

At both NorthTec and MIT, the Foundation Studies students accessed *Second Life* in on-site computer suites. Students and tutors at both institutions reported access problems. At MIT, there were problems with regard to computer and network capacity, and bandwidth availability. The lead educator reported that they had access to a maximum of eight computers for 18 students. Students of this institution experienced frequent computer freezes and crashes. Part of the problem appeared to be access to high enough specification computers. The computer suite in the Foundation Studies building was equipped with old computers that were due for replacement, and were not up to the task of running *Second Life* effectively.

A member of the Information Technology support team at MIT had significant reservations about the use of *Second Life* in education. His experience was that:

With no changes from our end, the service fluctuates between what can be classed as abysmal and tolerable.

He also commented on issues such as problems with multiple machines attempting to access *Second Life* through the institution's firewall. It proved very difficult to sort out the problems, partly as a result of there being few people in the institution with sufficient skills to carry out an effective test of *Second Life* in the MIT environment.

The Foundation Lead Educator felt that at MIT the project did not have the wholehearted support of the IT administration department:

IT have got to allow it to happen by giving us the bandwidth, by giving us priority on the system, which they won't do...

She commented further that it was:

Red tape. Bureaucratic crap. (Foundation Lead Educator interview)

At NorthTec, efforts were made early on to ensure that the *Second Life* application was installed on a network of over 20 laptops. The NorthTec Flexible Learning Advisor commented that

the biggest success was that we managed to get a commitment from our IT team to allow access... not many institutions would take that risk

However in practice, despite this IT support, a significant barrier was being unable to use voice chat. Thus one student commented:

The talk function was absolute rubbish. Only one person could talk at once. It took four lessons to realise that you couldn't really use it. (NorthTec Foundation Student interview)

The Flexible Learning Advisor thought that the problem with the talk function might be due to the firewall crashing as a result of a high bandwidth demand when *Second Life* is used with a number of networked machines.

Most student access to the Midwifery build was by learners from their home locations. However there was also access from the institutions, notably by second year students at CPIT. For the students, access was a significant issue. One of the educators stated that:

We assumed that there would be IT support for it and there isn't ... it has been very much up to the generosity of people at the grassroots ... we give them chocolate. And (the ICT manager) has been very supportive. He has tried very hard to get easy access for the students (CPIT Midwifery Educator interview)

She continued by saying that there were problems with firewalls, memory capacity, and lack of appropriate soundcards to enable the use of voice chat. She also pointed out the need for an IT business case to be prepared to ensure adequate support of future projects within CPIT.

At Otago, a last-minute meeting with the IT department ensured that *Second Life* would be accessible in time for a workshop attended by people from out of town. At this point:

They got serious and really tried and pulled out all the stops ... we got there in the end (Midwifery Consultant interview)

Several of the tutors commented that access was far easier for them as individuals working from home. This was noted by tutors from the both the Foundation Studies pilot and the Midwifery programme. Thus the lead Foundation Educator believed that:

We lost a lot of student interest because a lot of the computers were going slowly. If I had been able to give them the sort of experience that I have on my home computer they would have been totally captured. (Foundation Lead Educator interview)

For one of the Midwifery tutors, technical issues meant that in order to take a full part in the SLENZ educators' meetings, she would need to drive home to be able to use voice chat. For her this involved a two-hour round trip.

The technical challenges facing Midwifery students accessing the *Second Life* build from home are dealt with in the Midwifery section below.

It is very clear from the above data that there are considerable technical challenges that need to be overcome to access *Second Life* from networks of computers within educational institutions. Challenges that were highlighted by interviewees included firewall issues, broadband usage, and computer specifications including installation of appropriate soundcards. In future projects of this nature, it will be advisable to involve the institutions' IT departments from an early stage, and in some cases to prepare a business case to ensure the necessary support.

Summary of project outcomes

Tangible outcomes

The most obvious tangible outcomes of the project were the two builds themselves. These were visually and functionally very different. The Foundation Studies build had a very futuristic appearance, centred on the skills mastery Hyperdome. Outside the Hyperdome were the Steps to Learning, each of which had pop-up material to remind learners of essential content. Within the Hyperdome itself was a clothing store where learners could select appropriate dress for job interviews, a catwalk where they could obtain feedback on the suitability of their attire, and a

number of interview rooms in which learners could practice job interview skills. These interview rooms were designed with the support of businesses such as 3M and Pizza Hut. The main educational outcome in this build was to enable learners to acquire "soft" skills to help them gain employment.

By contrast, the external appearance of the Midwifery build was that of a conventional medium sized New Zealand house. Within the building there was a waiting room, birthing suite, clinical area, and an upstairs meeting room. The whole building was designed to embody research findings about the design of an ideal birthing unit. Within the birthing unit there were items of equipment used by midwives, as well as a birthing pool, resuscitation equipment etc. A glass door led out to a garden area. The build was designed so that first year students could look around it, and become familiar with some of the facilities. The second stage of the build was to produce an interactive normal birthing scenario in which students could role-play being a midwife and a pregnant mother. During the role-play they could practice skills such as interviewing the mother, interpreting clinical data, and making and submitting clinical notes. Thus the main aim of this build was to help students gain professional Midwifery skills.

The production of these two builds by the SLENZ group represented a very significant achievement. According to the Project Developer, a major success was:

Getting the thing finished ... getting the project to the stage that we did and the quality that we did was a bloody big success. We have really put New Zealand out there in terms of virtual world development.

This success has been recognised by national and international recognition of the project, including the award of third place in the international 2009 Edublog Awards for the Best Educational Use of a Virtual World.

Intangible outcomes

At the beginning of the project, few of the project team members had experience of using virtual worlds in an educational context. Both of the Project Leaders commented that there were no guidelines to go by, and that in many ways the team were *"flying by the seat of their pants"*. As mentioned above, the project team consisted of members from very different backgrounds and with very different motivations for their involvement. Notwithstanding this, the group melded together into an effective, productive unit. Some of the significant learnings of this experience have been:

- How to work effectively as a team dispersed over a wide area, and made up of a range of disparate individuals
- Pointers towards increasing the efficiency and decreasing the stress involved in developing educational materials in virtual worlds
- Learning how to use virtual world environments most appropriately for educational purposes

Thoughts on project sustainability

The legacy of this project included the two virtual world builds. These represented the culmination of months of work by the team. Project team members regarded it as important that the builds continued to be used after the end of the project. This would require periodic injection of funding to secure the virtual world space on which the builds have been created, and updating the builds to ensure that they do not become obsolete. The project team also discussed and worked on making the builds transportable to other virtual world environments such as *Open Sim*.

The project team recognised that they had developed a valuable corpus of skills and experience which was unique in New Zealand, and probably in the world. This recognition of the value of the Midwifery and the Foundation Studies builds led the team to discuss the sustainability of virtual world educational research in New Zealand at the ASCILITE conference in December 2009. This led to the proposal for a virtual world education Association in New Zealand. Part of the function of this Association will be to maintain and build upon the experience of the project team, to promote virtual world learning, and to seek funding for future projects.

Another concern of the project team was to identify suitable learning areas for future development of virtual world content. Members of the project team have been involved in presentations and discussions with groups involved in nursing education, trades training and other learning areas.

Summary of findings on operation of the team

The creation and effective employment of the two builds is a great success of the team. In the process, the project team established a valuable corpus of experience in developing and using virtual world resources for tertiary education.

The project team decided to adopt *Second Life* as the platform of choice, because it was seen as the most stable and versatile virtual world software available. At the beginning of the SLENZ project, a number of proposals were received for learning areas to be involved. Midwifery training and Foundation Studies were chosen as sub-projects.

The project team members had a wide range of backgrounds and expertises, from software development through to practitioners in Midwifery and Foundation Education. Additionally, the members of the team, and participating institutions were widely spread geographically. This represented a challenge, both from the point of view of project management and effective communication. At an early stage, it was decided to have two project leaders – one whose focus was on the real life aspects of the project, whilst the other concentrated on leadership within *Second Life*. This sharing of leadership was found to work very well.

In a dispersed project of this nature, communication amongst project members is key. The team developed a number of modes of communication, including a project blog, the use of Google Docs and regular meetings, both face-to-face and within the *Second Life* environment. In general, these modes of communication worked well – there were an appropriate number of modes, and they were well used.

The decision was made early on to complete the sub-projects in three stages. This ensured that there were tangible outcomes, even though in the event only two of the three stages of each sub-project were attained.

The great majority of the work on the builds was carried out by one Developer. This and a degree of lack of understanding by Lead Educators and the Developer about each other's needs resulted in significant levels of stress as deadlines for the builds approached. It was thought that dividing the stages into smaller 'chunks' adopting a software development 'sprint' approach to the builds would have made the process less stressful. Another improvement could be to have a larger development team.

Both sub-projects encountered technical challenges. The most significant occurred when accessing the builds from institutions, and appeared in part to relate to issues associated with firewalls; and also to computer specifications. There was also an issue of excessive broadband usage for those learners accessing the Midwifery build from home. Participant experience pointed to the need to involve institutions' IT departments very early on in such a project. The promotion of similar projects by powerful champions within ITPs was seen as very important.

Learners in the project had the opportunity to receive training to orient themselves to *Second Life*. It appears that there was a greater uptake of this training by Foundation students, who used their build in their institutions, than by Midwifery students who experienced more difficulty navigating the world.

The project team have begun to consider ongoing sustainability of the outcomes of SLENZ. Sustainability has two major components – the maintenance and upgrading of the two builds, and capitalizing on the corpus of expertise that has been established. Preliminary steps are in progress to establish an association for the use of MUVES in education in New Zealand.

Midwifery Project

The Midwifery build was created to complement other online materials used to train Midwifery students enrolled at Otago Polytechnic and at CPIT. As mentioned above, project implementation was planned to occur in three stages. In the event, only two of these three stages were completed:

The construction of an ideal birthing environment. This build was based on research into birthing environments carried out by Dr Deborah Davies at the University of Technology in Sydney. It consisted of a building containing a reception area, birthing suite, and equipment and resources used in Midwifery practice. French doors led out onto an attractive patio area. There is also an upstairs room for meetings and conferences. This stage of the build was designed for Year 1 students to get a feeling for what an ideal birthing environment would be like, and to enable them to become acquainted with the sorts of equipment used by midwives.

The build is shown in the following figures. Figures 1 and 2 show the building from the outside. Figure 3 shows the birthing room, and Figure 4 a clinical area. The birthing room contains a birthing pool (Figure 5). Note that this and subsequent figures contain a superimposed bar with items that are part of the midwives stock in trade. Figure 6 is a frame showing the mother lying in the bed in the birthing room. There is equipment to hand in the cupboard by the head of the bed. Figure 7 is an area that contains resuscitation and suction equipment. (Illustrations taken from the YouTube video <http://www.youtube.com/watch?v=w6fRxfDEoRU>)

The development of a normal virtual birthing scenario. This scenario was aimed at second year students and was created to reinforce their understanding of the birthing process. It was designed for students to use in pairs, as a role-play experience, with one student acting as the midwife and the other acting as the birthing mother. The scenario followed the whole process from the initial phone call from the mother, through labour, the actual birth, to one hour after birth. The student acting as midwife was expected to make clinical notes on the process, and was able to submit these online for evaluation by the tutor. This process is shown in Figures 8 and 9.

It was intended that problematic birthing scenarios would be created as a third stage. However, time and resource constraints did not allow this to happen.

The learning context

The students enrolled in the Midwifery programmes at CPIT and Otago carried out most of their studies remotely, only occasionally travelling into the institutions for face-to-face sessions with their educators. One of the purposes of these sessions was to introduce and to orientate the students to using the *Second Life* Midwifery suite. Most of the students' use of this facility was carried out in their own homes, via their private broadband connections. The format of the Midwifery course at CPIT was in the process of changing from a classroom-based model to a distance model during the course of the project. Thus the second year students received a significant proportion of their tuition face-to-face, whereas the first year students were the first cohort of a new programme that focuses much more on blended and distance learning. One of the tutor's commented:

These new students are more open to exploring new learning activities than the ones who come into the college every day. Year one students come into a face-to-face situation one morning a week and the rest of their theoretical courses are delivered online. So they spend a lot of their lives on computers. (CPIT Midwifery Tutor interview).

Educator involvement

The Lead Educator was first introduced to the use of *Second Life* in education by one of her colleagues at Otago Polytechnic, during a course on online facilitation. She became interested in how *Second Life* could be used to develop a virtual birthing unit to educate Midwifery students. She was also interested in using *Second Life* as a collaborative tool with the wider international Midwifery community. She and the Midwifery Consultant took the chance to make this a reality by responding to the SLENZ call for proposals.

The Consultant commented that:

(The Lead Educator) was telling me what she was doing, and I was talking about what I had been doing, and we kind of had this idea, you know, that it might be possible to build a birthing unit using these principles in Second Life ... and one thing led to another (Midwifery Consultant interview)

The Lead Educator's previous experience of games and virtual worlds was "virtually zilch". For her, major challenges included:

My lack of familiarity with Second Life, both in terms of the technology and what you can do with it ... someone told me ... that the Midwifery project had been chosen partly because I was renowned for scepticism for Second Life. Despite the fact that I had this idea about Second Life ... and I was keen to explore it I've also been quite sceptical about it. For me Second Life is a difficult platform to come to terms with. You need to spend a lot of time in it to get used to how it works and to build up your skills to use it ... (Lead Midwifery Educator interview)

For the Consultant:

I was introduced to the idea (of Second Life) by the Lead Educator. I had never even heard of it before. I didn't have any idea what it was, nor done any gaming. I didn't know what a VLE was... (Midwifery Consultant interview)

The Lead Educator reflected a certain amount of ambivalence towards *Second Life*:

You think it sounds a great idea, and I'm sure it's got great potential but the reality is not so easy. I have always been sceptical about it and I have been very resistant to having to spend lots of time on it ... Second Life is a lot more difficult, a lot more challenging. So I have been sceptical about it at the same time as wanting to explore it further. I have resisted people (who have said) that you have to really immerse yourself ... because I've always taken the view "why should I need to spend so much time?" Consequently I haven't spent a lot of time in Second Life over the past year and ... I've actually felt ... (this) has been a disadvantage. I think in hindsight it would have been useful for me to have spent time in Second Life at the beginning ...

She also commented:

the other big barrier ... is educators' attitudes to Second Life ... the perception of Second Life as a game that only geeky boys play. That it is a virtual world that is populated by sexual perverts ... that is what is being said in so many words. The perception is that people go in there and build their avatar is which have to be young, sexy, big bosomed, blonde women. As feminist midwives that's not a perception that we want ... this whole business of being young and slim and big boobed is a bit of an affront to the feminist midwives. (Midwifery Lead Educator interview)

The Lead Educator also commented that there were other work commitments that made it difficult both for her to devote time to the project, and also at times to access *Second Life*. These reservations and barriers lead other members of the team to question her passion for the project:

Initially there was reticence from the lead of Midwifery; not having enthusiasm for it ... there needs to be that excitement ... that needs to be carried through the project. If educators start losing faith there needs to be support for them to bring them back into the fold. (Project Developer interview)

And:

With the Midwifery educator, she never really believed it, I don't believe, until she first saw both the students role-playing (Project Leader SL interview).



Figure 1 Midwifery Suite Exterior



Figure 2 Midwifery Suite Entrance



Figure 3 Birthing Room



Figure 4 Clinical Area



Figure 5 Birthing Pool - Note Range of Options in Bar

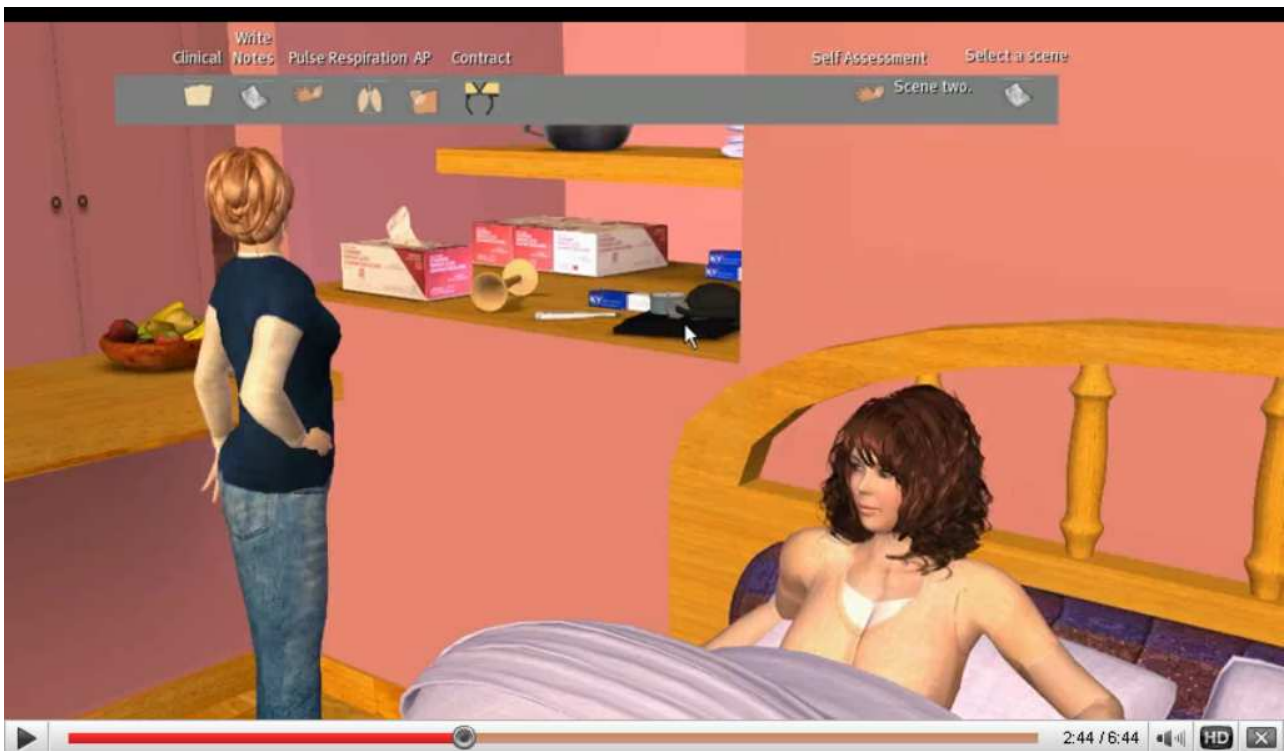


Figure 6 Mother in Bed - Note Equipment in Cupboard



Figure 7 Resuscitation Area

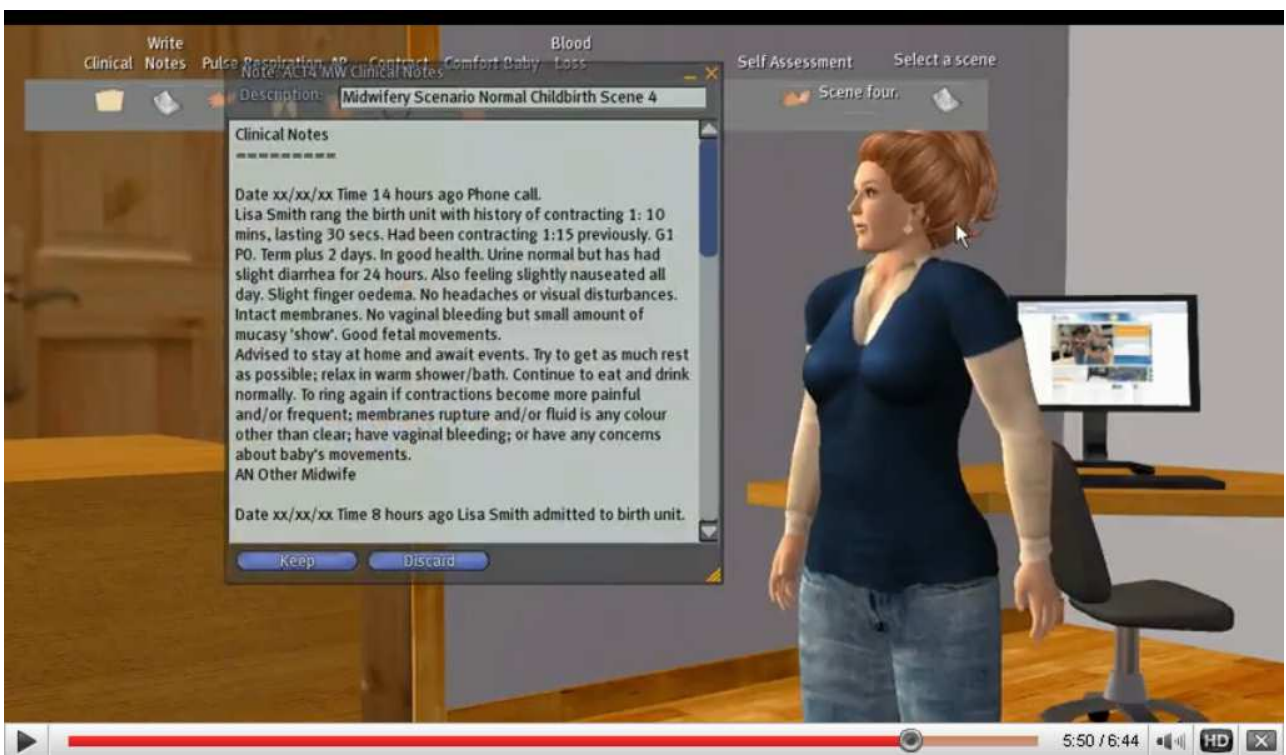


Figure 8 Recording Clinical Notes

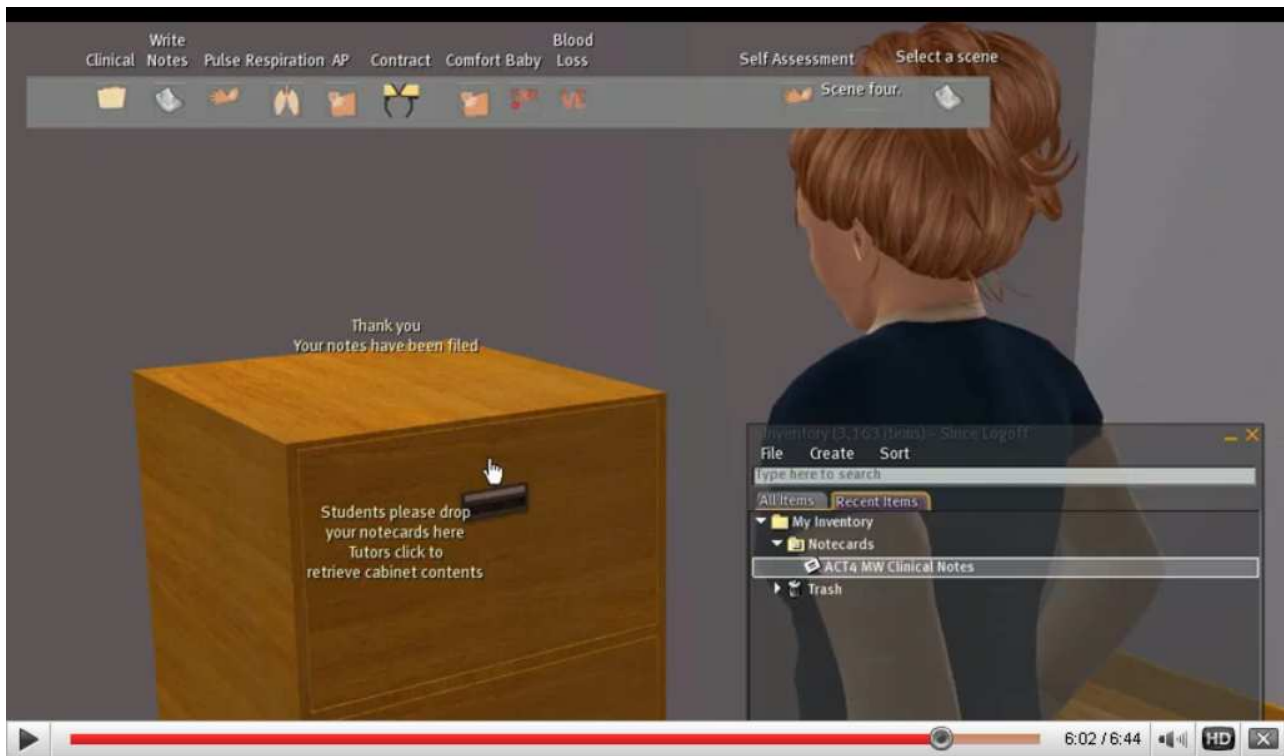


Figure 9 Submitting Notes to Tutor

From the Lead Educator's point of view:

The problem was where I was living and working. I did not have very good Internet access, and it wasn't good enough to support Second Life particularly when we were designing and really getting the birth unit up and running. I think that (the Developer) would have appreciated it if I could have just popped in and out of Second Life to check with him how what he was doing was right and I wasn't able to do that and so I think that held him up. I certainly found it frustrating ...

One of the CPIT Midwifery tutors commented that although she used *Elluminate* with her distance students, she:

might actually prefer to run tutorials on Second Life ... it is just fantastic to meet people... The human bit, even though they look like avatars ... there is something about it. I felt that I was getting across the message to the students in a much more meaningful way.

Student access to the Midwifery build

During the course of data collection, group interviews were held separately with Year 1 and Year 2 students at both CPIT and Otago Polytechnic. Individuals in both groups had access to the Midwifery build both within their polytechnics and from home. As with the Foundation build, learners initially had to create their avatars, and learn how to navigate and operate within the *Second Life* environment. This included choosing the clothes in which to dress their avatars. These clothes were obtained from the clothing store in the Skills Mastery Hyperdome of the Foundation build. On one occasion Midwifery students bumped into Foundation learners in the Hyperdome:

I had my class, and some of the Midwifery students turned up, and (my class) had a chat with the Midwifery students ... because we have the free clothes in our building (Foundation Lead Educator interview)

Midwifery students highlighted a number of barriers and technical issues which made it difficult to access and use the build, even allowing for one learner who:

Tried (to use dial-up) last year -- that was a problem! (Otago Year 2 Midwifery Student interview)

Technical problems for students trying to access the builds from home related both to broadband speed and to computer hardware and software issues such as computers crashing:

Question: you have mentioned a technical issue in that your machine crashed. Has anybody else had any technical problems?

Answer: it seemed to wipe all my other software one day and I don't know why. (CPIT Year 1 Midwifery Student interview)

One of the tutors elaborated on this problem:

We had some challenges in that two students did not have enough memory space and it crashed their computers and 50% of their work was lost. So they had to redo the work that they had done for some assignments... (one student said that) this has so seriously crashed my hardware and a whole lot of software has been lost and I have had to reload it and I have lost all my work and it was not recoverable. (CPIT Midwifery Tutor interview)

In other cases, the software froze, and avatars unexpectedly changed their appearance:

Student A: You are trying to move forward and nothing is happening. And the next thing you know is that you have lost your hair and you have lost your clothes. You had not touched the buttons to say that you wanted to do that. They just disappear ... I was on with (student B) and suddenly I lost all of my clothes and I was standing there in my underwear. Then I put clothes on and they could not see my clothes. They could only see me in my underwear!

Student C: I don't know if I believe you! I think it was on purpose. I think she is an exhibitionist! (Otago Year 1 Midwifery Student interview)

Students also reported issues with voice communication, which appeared to result from limited broadband speeds:

We had one experience (when we did the phone call in the simulation). This was quite hard because of the broadband speed. We had to end up typing in what we had to say because you could not hear it ... (Otago Year 1 Midwifery Student interview)

The Lead Educator acknowledged the technical obstacles that students faced, even within the institutions:

You've got all the other barriers to Second Life. You've got access to the technology, even at Otago Polytechnic. They (IT support) have been extremely supportive of us using this. They set up computers with Second Life. (However) it (was) still very difficult to use ... I had terrible problems with it and if you are thinking of using it with rural students in Queenstown, I am sure that they will have lots of problems with the Internet access ... you think it sounds a great idea and I'm sure it's got great potential but the reality is not so easy.

Another barrier noticed by some students appeared to be the rate at which using *Second Life* used up their broadband allocation:

Question: so you are chewing through your allocation?

Answer: I never thought it could be Second Life, but now that you mention that I have noticed that I have been using much more lately.

Question: So how much more do you think that you are using?

Answer: normally I would use 1 1/2 to 2 GB and it has been up to almost 3. (CPIT Year 1 Midwifery Student interview)

Another student noted:

Our Internet use used to be under 10 gigs for the whole household. Last month it was 21 gigs. I am not sure whether it was because of me. We can't figure it out, whether it has got something to do with Second Life. (CPIT Year 1 Midwifery Student interview)

A third student observed:

I have noticed an increase of about one gig. (CPIT Year 1 Midwifery Student interview)

This issue was not confined to CPIT students:

One of our students from Central Otago said that the only time that she had ever used up the entire Internet bandwidth for the month was when she was exploring Second Life... (Otago Midwifery Tutor interview)

What are the students studying with Second Life?

In creating the Midwifery build, the original intention was that Stage One of the build, the physical environment and related resources, would be used by Year 1 students; and that the birthing scenario created as Stage Two was aimed at year two learners.

The first year students have no Midwifery clinical knowledge. The first year of the Midwifery programme is very theoretical. It is setting the Foundation. We get them to look at sociology, anthropology; we get them to do basic physiology and anatomy. We don't do any Midwifery skills with them so we weren't designing this complex Midwifery clinical thing for them because they wouldn't know how to use it, because they didn't have any experience. That was our assumption. When they went in, the first years were very interested; they went in and had a look around but then there was no interactivity. They were just walking around the unit clicking on a few things. A couple of bits of information popped up and to them it wasn't very exciting. There was minimal interaction ... they didn't engage with it at all. What they wanted to do was to go into the birth unit and do things. The way that we set it up at the time, they weren't able to do that. They went, in they saw the birth unit they had a look around it and that's it. "It's very boring, I don't want to do anything more with it." So they thought it was all very boring and by the time we got the second stage up and running, the word had got around that it was boring ... I think that what we should have done (was to have) released the whole thing to people all in one go so that they would have gone in and they would have interacted with the birth scenario right from the start. Even if the first-year students didn't have the clinical knowledge to fully engage with it, I think they would be able to get something out of it and they would have been excited by it. They would have found it sexy and so it would have helped to spread the word of this very interactive resource. (Midwifery Lead Educator interview)

Student comments about the use of Second Life in their learning

A number of Midwifery students reported difficulties with getting oriented to using *Second Life*. These difficulties included:

The basics of getting in and out and getting to the place that you want to be. Creating the avatar and moving your avatar, so that so much time is not taken up with learning that stuff. Being a little bit clearer about what they want you to do in there, what they want you to learn ... (Otago Year 1 Midwifery Student interview).

As mentioned above, some of the Midwifery students had difficulty with navigating, ending up in strange places such as "in an underwater bubble", on the ceiling, or stuck behind a door. For another student:

I think that the intro (orientation) could have gone on longer and been more in depth because just being introduced to it and being shown how to put on your clothes wasn't enough for me ... I am computer illiterate. I need more instructions. (Otago Year 2 Midwifery Student interview)

Attitudes to Second Life

Some students had negative opinions of *Second Life*. These appeared in part to relate to social perceptions of *Second Life* – several students mentioned a 20/20 documentary about online adulterous affairs. Other negative opinions seemed to be based on a view that play is incompatible

with learning, the time investment, the virtual nature of the experience, and a feeling of being intimidated by the environment. Thus the Midwifery Consultant said:

I had some students in particular who were really anti-. One was really cross. How dare I expose students to this environment and, as a feminist, what was I thinking about ... that really challenged me and was quite a shock. I think it comes with the reputation (of Second Life) and we've got to get over that. Not just the reputation of it being potentially a sleazy place, but the game aspect. People think that it is a game and why are we trying to do something serious in this game place?

Student comments included:

I don't want to waste my time. I don't want to fiddle with the avatar, and get myself off the floor. I'm not interested in getting hair on and getting dressed and things. We haven't got time. (Otago Year 1 Midwifery Student interview)

And:

It is just that in practice we are going more online, and I think that that is ridiculous, even though I appreciate that this is a good accessory to learning, but it is not it. (Otago Year 2 Midwifery Student interview)

Another student added:

I find it intimidating to come into because I don't have a good computer background. (Otago Year 2 Midwifery Student interview)

On the other hand, some students' attitudes changed as a result of using the build:

I was a bit dubious about how useful it would be, but once I had breached through that, even though we had some hiccups, I could see that it could be a really good learning tool (Otago Year 1 Midwifery Student interview)

And:

Student: I was going into it pretty sceptical, and my whole opinion of it actually changed. I thought it was going to be a bit of a waste of time, and I came out of it thinking 'OK I have to actually practice the skills...

Question: So it pointed out things that maybe you had to think about a bit more?

Student: Yes. It was actually somewhat useful. I was actually surprised...It was good. (Otago Year 2 Midwifery Student interview)

Engagement

One of the key attributes of MUVES is that users become identified with their avatars, and have the experience of actually being present in the virtual environment. The Lead Educator described this experience:

In Second Life ... you are actually in the house, you are making the phone call and I've noticed very quickly that you ... forget that you are on your computer in your bedroom. You are actually there in the birth unit dealing with a pregnant woman, once you get past the giggles, once you get used to it. You do very quickly become the character

Through using MUVES, learners can take part in virtual experiences that might be inaccessible to them in real life:

(It is) that immersive experience. Supplying them with an experience that they couldn't otherwise have had (Midwifery Consultant interview)

For students, the engagement factor was a powerful selling point. One student felt that this could have been used to greater advantage with first year students:

I think being shown the scenarios in our first introductory talk would have made me think 'wow this is amazing, because they show us in the textbook this sort of stuff'. ... it would have

been like well we can actually do this kind of thing from home. And it would have a greater impact. (CPIT Year 1 Midwifery Student interview)

Other students reported getting 'sucked in' to the build, and indicated advantages of *Second Life* over other interactive software that they had experienced in their programme:

Student A: I actually thought it was an incredible time waster but I did check it out ... and then I thought yes I can see it now

Question: and you found it quite engaging?

Student A: yes once you got in...

Student B: and that is why I say it is better than our Elluminate sessions, because our Elluminate sessions can fail to be as engaging as Second Life (CPIT Year 1 Midwifery Student interview)

Another learner commented on the game like aspects of the build:

It is quite exciting if it works properly. It is just like a game. And you think "we can do this". It needs to work properly, so you don't get stuck in the doors! (Otago year two Midwifery interview)

In summary, both learners and educators recognized the powerfully engaging aspect of *Second Life*. However, this immersiveness and engagement is not something that can be described – it must be experienced. Thus there is a need to 'sell' the build more effectively to educators and learners, to ensure that they are quickly and thoroughly orientated to the environment, that the technical barriers are minimized, and that the build is used in a truly engaging manner for all learner levels.

Collaborative learning

There were a number of ways in which Midwifery students and educators engaged in collaborative learning. They were able to meet in world and discuss aspects of the birthing environment, to have tutorial sessions, and, most engagingly, to work in pairs to role play the birthing scenario. One first year student commented on the importance of collaborative work in exploring the birthing unit:

It is only really good if there is somebody else in there with you. Otherwise you're just sort of walking around. ((Otago Year 1 Midwifery Student interview)

Another student underlined the effectiveness of meeting in world:

One (meeting) was focused around different birthing environments. It was quite interesting taking a look around the Kowhai and actually discussing it. I think it needed that discussion, it needed the personal element whether we discuss it with our fellow students or if it gets facilitated by a tutor ... it works to your benefit rather more than just reflecting on it (CPIT Year 1 Midwifery Student interview)

Some participants reported working with the Midwifery Consultant in world, and also meeting qualified midwives from other parts of New Zealand and from overseas. One recognised the potential that *Second Life* afforded for learning from the experiences of midwives practicing in other contexts:

If we could connect with different people from all over the net in doing these things, that would be a fantastic tool. To have a community of midwives ... in their interacting with students. Because we could hear all their experiences. (CPIT year one Midwifery interview)

Students worked together when they role-played the birthing scenario:

They have to work as pairs because you've got the pregnant woman and the midwife and it set up so that you have got the two HUDs, which control everything. And one can't work without the other, so at the very minimum they have to work as a pair. (Midwifery Lead Educator interview)

Although the scenario was intended for second year students, several of them indicated that it was of limited value to them, because they had already learned about normal birthing in their other course work. However, first year students engaged with the role play, and found it useful:

We both got in there, and (B) took on the role of midwife and I was a pregnant woman. I had to ring her and say that I was having mild pains. I had been going to the toilet. Everything else was on the wee script that I had to read aloud, but we ended up typing it out because of the sound issue. And then (B) had to document it and come up with a plan to go to the next step, which is where we finished the session. (Otago Year 1 Midwifery Student interview)

Meeting other users in world also helped students overcome problems with navigating the environment. The Developer mentioned helping learners dress their avatars, and a Year 1 student reported:

(My tutor) actually teleported me, otherwise I think I would still be sitting there in the bubble. Because I had no idea how to get help. Every time I pressed the help button, the feed was so slow that it took ages and ages for anything to actually happen ... (Otago Year 1 Midwifery Student interview)

The opportunities to collaborate in world also had its lighter moments:

Question: How effective did you find the opportunity to interact with others in Second Life?

Student A: It was great.

Student B: It was absolutely hilarious. It was an absolute scream. It was so funny. (Otago Year 1 Midwifery Student interview)

Cross-cultural learning

The potential for collaborating with people from other cultures has been mentioned in the previous section. This was also commented on by Midwifery educators. Thus:

That is one positive aspect. I just love that when you are in Second Life (there is) the opportunity of meeting other educators from around the world. I met one from Zimbabwe; talking to her about how they are working at the (Midwifery) schools and so on and another (student) met a student from Canada... And that is a wonderful spin-off... which was not necessarily scheduled in the learning (CPIT Midwifery Tutor interview)

Emotional factors

A very valuable aspect of using *Second Life* to carry out role-play exercises was the reduction of emotional pressure experienced by learners. This was emphasized by a number of interviewees. Thus students commented:

I think it is quite beneficial as a professional tool for students, the people who are quite shy and find it hard to role play in the real life situation. A lot of people are not public speakers and they get themselves stressed out and (think that) they cannot do what they would do in the real life situation. I think that it's good in teaching in that it gives them the confidence to do that in their own space and in their own time. They can portray it in a facilitated practice scenario. (Otago Year 1 Midwifery Student interview)

And:

When you get into the character of the person you are playing, it does take away the emotional pressure on you ... whereas if you are doing a role-play face-to-face there are all the other emotional cues which you get from the other students and which can interfere with the learning. But with (Second Life) that does not play a role. (CPIT Year 1 Midwifery Student interview)

One of her peers added:

The big advantage in Second Life is that if you have an avatar it makes it less emotional... (CPIT Year 1 Midwifery Student interview)

And a second year student added her perspective based on her experience:

And also you do not have the emotional connection. You do not have the energy in the room. You don't have people waiting outside a hospital room. You don't have a partner there was breaking down or being really amazing. (Otago Year 2 Midwifery Student interview)

The Lead Educator recognized this important aspect to learning in the virtual world:

Someone said what is the difference between role-playing this in the classroom and role-playing in Second Life? Will the difference is in the classroom you've got people watching you, you feel very ... it is inhibiting because you got people watching you and laughing at you ...

Authenticity

The project team made great efforts to ensure that the experience that learners have when using the build was as authentic as possible. The Lead Educator recounted the following story, which illustrates the authenticity of the scenario material:

*There was a couple of weeks when I was working at Lumsden as a locum midwife. The beauty of Lumsden maternity unit is that they've got an excellent Internet service, so in the evenings I was working on Second Life. I was working with (the Developer and Project Leader SL) developing the scenarios. The first stage of the scenario is what we call the phone call; and that's when the pregnant woman rings up midwife and says "I think I'm in early labour", and the midwife deals with the phone call. That very evening ... the phone went and I said (to the others) "you'll have to excuse me a minute I will have to answer the phone." And it was **the** phone call! And I asked exactly the questions and I gave exactly the advice that we had worked on in Second Life. So it was absolutely 100% what you do as a midwife. So it is authentic.*

Another aspect of the authenticity of using *Second Life* stems from the nature of the interactions that learners may have in world. This was highlighted by one of the Tutors at CPIT:

When we had the conference with (the Midwifery Consultant) when 10 students from CPIT were present (logged in) from home,... suddenly a light went on and they could see, wow, yes, it is like real life. You can actually talk, feedback, reflect, discuss, constructively and critically analyse with a very prestigious speaker who has written a book about the birthing environment and can answer questions. That was fantastic. I would definitely suggest that if we are looking at incorporating it into our programme for the students there needs to be that interaction. You cannot just let them go in on their little merry way. Suddenly Second Life comes alive because it is a bit clumsy, if you are used to a fast computer that does instructions bang bang bang bang bang Second Life is slow and clumsy and yet when you have the interaction it does not matter so much anymore. Suddenly because the human element is there. (Midwifery Tutor interview CPIT)

Other comments – potentials and improvements

There were a number of comments made by tutors that illustrated a different perspective from that of the students. These can be roughly classified as: 'getting into' *Second Life*, *Second Life* as a learning environment, benefits of the build, and future potential.

One of the tutors spoke eloquently of her growing appreciation of *Second Life* as a collaborative learning environment:

I am not a games person. Normally I can't stand all the virtual stuff. To me it is a bit like escapism, so I came in with reasonably negative attitudes to Second Life, but recognising that I thought that we need to be part of this project because I would love to find out whether this is a learning tool or teaching tool for the students and is it a good place to meet face-to-

face with students? I was curious. I was not closed to it but the graphics and stuff, initially, all the slim women, and all that really put me off. And the clumsiness of the way that they are moving. However when I got over all of that, I just grew to like it. Very much. I can see a big potential if you constantly meet in it but it would just be a small part... It is a really good tool for communication between the pregnant woman and a midwife. Excellent. (CPIT Midwifery tutor interview)

This tutor also commented on the opportunity afforded by the environment for learners to add comments in a way that is impossible in real life. She also spoke of the possibility that the visual nature of the environment might make it a favourable venue for holding tutorials:

One of the things that is interesting about Elluminate as well as Second Life is the ability to make comments as well, that you cannot do in classroom. You have to raise your hand and speak to everyone. You can't just post your comments into the air for everyone to see. (You have to) wait for the lecturer to take a breath and to come back to you. That is a new thing, and it is interesting... Although we use Elluminate, I think that I might actually prefer to run tutorials on Second Life. You never see people (in Elluminate) . We don't see them in any meaningful way. It's just voices and texts... (CPIT Midwifery Tutor interview)

For her:

it is just fantastic in 3-D to meet people. That human bit, even though they look like avatars, and they're not even human, there is something about it and really, for me, personally I felt that I was getting across the message to the students in a much more meaningful way. I was also surprised when you are using it regularly how quickly you get used to who different people's avatars are. (CPIT Midwifery tutor interview)

This perspective was echoed by a student who said that:

Something I think that is a possibility or potential for Second Life is doing our Elluminate meetings, like our lectures and tutorials in that space because they have those big screens that they can do PowerPoint etc on, so we could all come and sit there and do our Elluminate sessions in there, which I think would be really cool. I think it would be really valuable because it means that we have one less program that we have to keep working with all the time, one less thing that we have to learn how to do ... I think that is going to take a bit more development before it would be ready to send students into ... but I think it would be more valuable than our current Elluminate sessions. (CPIT Year 1 Midwifery Student interview)

Tutors and students in both locations were concerned about privacy and safety issues. One of the Otago tutors, was in favour of having the birthing unit openly accessible, but would like to be able to exclude strangers when appropriate:

We were looking around (the birthing suite) and this woman walks in from the garden into the birthing room. I thought that when we were in there other people could not just wander in; we could have been in the middle of the birthing scenario... I don't have any objection to the birthing unit being an open unit; I quite like the idea. But you should be able to lock the door... (Otago Midwifery Tutor interview)

She thought that the existence of the Midwifery suite in *Second Life* was an important benefit of the project, that had implications beyond the pre-clinical training of midwives:

Having that birthing unit, that lovely normal birthing unit is a huge plus, because in Otago and Southland's main centres there is no birthing unit that resembles that...(staff of) existing primary birthing units which are less than optimal have the opportunity to see a more ideal environment and reflect on their own environment and how they could potentially improve it...(Otago Midwifery Tutor interview)

Tutors in both centres commented on the potential that *Second Life* offered Midwifery tutors and students. However, the way that it was expected that first year students were to use the build was seen as a limitation of the potential:

It has got huge potential but it is not being tapped. The way it is set up at the moment. (CPIT Midwifery Tutor interview)

One of the Otago tutors saw a limitation of the potential of the build to be: *just getting past the difficulties of...learning how to engage with Second Life*. However, she was excited about how the environment could be used for problematic birthing scenarios:

There are a lot of clinical situations that are not in the Second Life project yet. It is very much a normal birth. But there are a lot of situations and factors that you would only meet rarely in practice, but need to be able to act effectively. And you are not going to be able to come across it in practice to be able to practise and practise it in practice. But you could in Second Life...you could go in and do it every day if you wanted to. So you feel that 'I have nailed it – I know exactly what to do'... (Otago Midwifery Tutor interview)

This point of view was echoed by several Year 2 students:

If they developed it more so that you have more scenarios where you have abnormal findings. That would be better for the second year. But it was just very basic. I think that they are just starting out with the scenarios. (Otago Year 2 Midwifery Student interview)

Another thought that an improvement would be for the mother in the scenario to actually have the baby rather than:

Just pop there is the baby ... because you are missing out lots of stages from A to Z. You have the equipment. You have the sterile stuff to do the cord clamping and all that, but you do not actually use it. If they had the process of actually birthing the baby then you could use the equipment that you have there. (Otago Year 2 Midwifery Student interview)

However, one of the Educators does not agree that a virtual birth would add value:

...virtual birthing doesn't matter. We don't need to do that...it is not that beneficial (CPIT Midwifery Tutor interview)

Finally, one of the second year students had a blue sky idea:

If you had an actual simulated lifelike mannequin that you could do internal (examinations) on, that you could catheterise, that you can do all these hands on skills with...(Otago Year 2 Midwifery Student interview)

Midwifery summary

The two completed stages of the Midwifery build represent a significant success of the project. The first stage was a 3D representation of research findings around the nature of an ideal birthing environment, and was the context for stage two, the normal birthing scenario.

Students and tutors experienced some challenges in using *Second Life*. For use at the institutions, there were technical challenges due to bandwidth and firewall issues, and computer specifications. Fewer challenges were experienced when participants accessed the build from their own home, but the application tended to be bandwidth hungry, and used up large amounts of students' broadband allocation.

Difficulties with navigating round and using the functions of the application were experienced by both students and tutors. It is likely that a longer and more careful period of orientation might help participants overcome these difficulties.

There was a degree of resistance to using the build from some students. Factors that contributed to this included the reputation of *Second Life*, negative attitudes to enjoyment as a part of the educational experience, and poor marketing of the concept to learners.

Those students that accessed the build, and who were confident with the environment, reported a high degree of engagement and enjoyment of the experience, especially in working through the scenario with a buddy. They found this experience removed some of the stress, compared with face-to-face role-play. They found the experience of exploring the birthing suite less engaging.

Foundation Studies

The Foundation Studies build was created to support teaching and learning of job search skills. The focal point of the build is the Skill Mastery Hyperdome. (Figure 10) Within the Hyperdome there is a clothing store where learners can select appropriate clothing for being interviewed (Figure 12), a catwalk where they can receive feedback from their peers on the suitability of the clothing that they have selected (Figure 13), and interview rooms (Figure 14). They were also able to use their avatars to examine and practice appropriate body language. Outside the Hyperdome there is a series of steps to learning, each of which provides reinforcement on vital job seeking skills (Figure 11). The skills to be learned included finding job opportunities, creating a curriculum vitae, writing letters of application, dressing appropriately for interview, and participating in interviews. The images of the Foundation Build are taken from the YouTube video (<http://www.youtube.com/watch?v=6tlufh6x5Fc>). The external design of the Hyperdome is very futuristic and distinctive, and was criticized by one interviewee as being “like something from Planet Pluto”.

In contrast to the Midwifery build, which was designed for distance learners to use from their own homes, remote from their learning institutions, the Foundation Studies build was created to be used in the institutions in the presence of a tutor. As with the Midwifery project, the build was created in stages. The first stage involved "the stairway of learning" and centred on the creation of a generic interview situation. The developer commented:

The Foundation build was very much facilitated, whereas in the Midwifery they are very much left to their own devices, here you have a facilitator involved all the time. What we have tried to put in there is more of the gaming aspect, so that when you go up the steps you have the steps of learning with things popping up based on you colliding with them. (Project Developer interview)

The second stage involved creating specific job interview scenarios, whilst the third covered the complete process of obtaining a job, from seeking opportunities to final interview for a real job. These practice interviews could involve learners working in pairs, or being interviewed by external interviewers.

The Foundation Studies build was used by tutors and learners at both NorthTec and at Manukau Institute of Technology.

The learning context

The lead educator for the Foundation Studies project is a tutor at Manukau Institute of Technology. She is an avid enthusiast for *Second Life*, having taught herself how to operate in the environment using the book "*Second Life for Dummies*". She commented on the professional development opportunities afforded by *Second Life*:

There is a mentor program in Second Life. It is lecturers, educationalists, helping other lecturers. and educationalists. And even with me, I belong to a group of communications lecturers in Second Life, we have regular meetings, we share things, we were talking about how ... students in Arizona ... could mentor my students, my students can mentor her students. The sharing is unbelievable. (Foundation Lead Educator interview)

The Lead Educator and a colleague both used the *Second Life* build with their Foundation Studies classes. These classes contain students of a range of ethnicities and ages. The Foundation build is also used by a class in the business studies department at MIT.

At NorthTec, the Foundation Studies students, who are mostly New Zealand nationals, have used the build. At this institution, it is also used with a class of ESOL students, which includes students with Muslim, Asian, and South American backgrounds.



Figure 10 The Skill Mastery Hyperdome

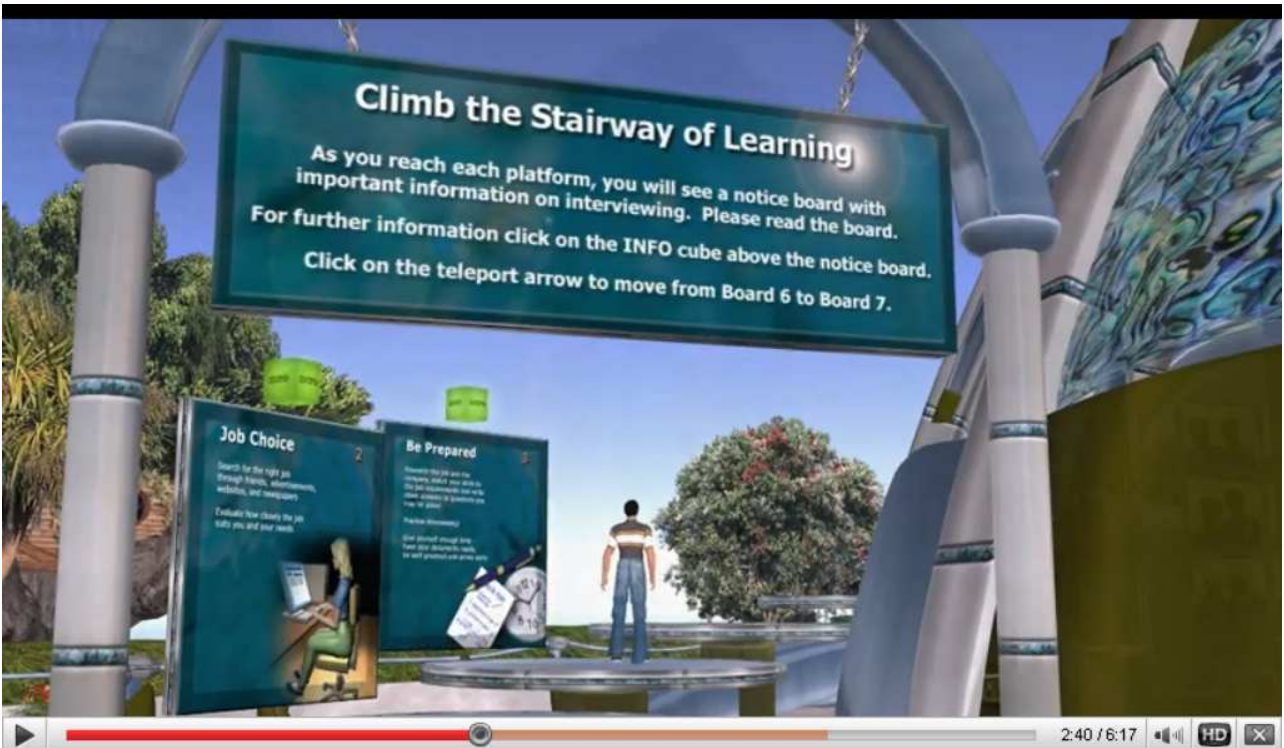


Figure 11 The Stairway of Learning



Figure 12 The Clothing Store



Figure 13 The Catwalk



Figure 14 A *Second Life* Job Interview

Access to *Second Life*

In contrast to the Midwifery build, the predominant usage of the Foundation Studies area was by students in face-to-face classes at their institutions. This meant that student access was significantly affected by the technical issues that accompanied multiple access in computer labs. These issues have been described above.

As in the case of the Midwifery project, participants accessing the build from home had fewer issues associated with bandwidth and firewall limitations. Thus a number of staff interviewed in both centres spoke of the quality of their experience accessing the build via their home broadband connection. However, access is likely to be more difficult in remote areas. Thus the e-Learning Advisor at NorthTec commented that:

If we want to continue to use it with our students, we would like them to be able to connect from home. That would be one of the significant barriers. Even if they go to one of our regional campuses, the connections are not great; and unfortunately Second Life is a bandwidth hungry application (NorthTec e-Learning Advisor interview)

What were the students studying with *Second Life*?

Students had up to eight sessions working on *Second Life* with their tutors. Initially they were oriented to *Second Life*, logging in, and creating and customising avatars. There were a number of fun activities that helped students to master moving around and navigating the environment, including dodgem cars, and dancing. The Lead Educator and her colleagues at MIT spent considerable time orienting learners to *Second Life* through in world games and practice. This emphasis helped learners master virtual world skills:

The first two sessions that we took them into was orientation. We were building up their skills, teaching them to walk, run, jump, communicate, get themselves dressed, change their avatars' appearance, navigate ... all those basic skills. (Foundation Studies Lead Educator interview)

This emphasis on orientation and learning virtual world skills may have been responsible for the apparent ease with which the Foundation Studies students, although not necessarily being

computer literate or native English speakers, mastered the environment. This contrasted with some Midwifery learners who reported significant difficulties in navigating and using the virtual world:

I was surprised how quickly everybody picked it up. (NorthTec ESOL Tutor interview)

Furthermore, the Foundation educators at MIT believed that there needed to be compulsory orientation, and that if students did not take part, they should not have the opportunity to use *Second Life* in their studies.

Once the students had completed their orientation to *Second Life*, they used the build to practice their job seeking and interview skills. They went up the stairway to learning and reviewed basic skills at each step. After they had selected appropriate dress for interview, and received feedback from their peers as to its suitability, they could set up interviews with each other, or with their tutors in the virtual interview rooms. Thus for example, ESOL students at NorthTec used *Second Life* to work with Foundation students to practise interviewing. The ESOL students and the Foundation students were in separate computer rooms. The experience was limited by the fact that students were unable to use voice chat facilities. This meant that the interviews had to be carried out using text. The Foundation students found this extremely frustrating, and felt:

It was a waste of time ... because of the lack of the talk function, they could not do their speeches online. (Foundation Studies Tutor, NorthTec, interview)

On the other hand one of the ESOL students thought that the experience of using the text chat:

Helped me to improve my English vocabulary ... and my grammar. (ESOL student, NorthTec, interview).

Her ESOL tutor supported her comment:

I think it has remarkably improved their language ... (they) learn some new language, they improve their computer skills, and they get exposed to a different vocabulary.

The tutor also noted that:

My students were willing. They would not be defeated by one thing that did not work. They enjoyed typing because it gave them time to think. It did not really worry them. (ESOL tutor NorthTec, interview)

The lead educator at MIT, who regarded herself as a *Second Life* "resident" was extremely enthusiastic about the potential of *Second Life* in Foundation Studies. She believed that as well as improvements in job seeking skills and confidence in interviews, other spin-offs included students acquiring and developing computer skills. Tutors commented on the advantages of students working through their avatars in *Second Life*:

They were taking on a different personality with their avatars than they had in real life. Some of them who were quite shy became quite out there and open ... a lot more than they did one-on-one. (MIT Foundation Tutor interview)

This ability to take on a new personality was dramatically demonstrated by a Muslim woman in the ESOL classes at NorthTec. This woman, who appeared to be in her mid 40s, was dressed in traditional Muslim clothing. She was using the data projector to demonstrate some aspects of the *Second Life* build to the rest of the class. I found the appearance of her avatar very interesting. She had chosen to dress the avatar as a fully fledged punk! When I asked her about her choice of avatar, she commented that she had dressed the avatar as a punk because she "*wanted the freedom.*"

In a number of cases students and tutors spoke of gains in learning and confidence through the use of *Second Life*. Thus a Foundation Studies student at MIT mentioned that he was not aware that there were specific skills involved in being interviewed before he practised in *Second Life*. In another case:

*I had a student who was worried sick about having to do ... a real-life interview. She came to me and asked if I would do an interview with her in *Second Life*. So we went in and practised. Afterwards she was all smiles. She said: "I'm not scared any more. I know I can do it. This thing is so real ... (Foundation Lead Educator interview)*

In a number of cases the lead educator at MIT arranged for students to be interviewed by guest interviewers from external organisations. She commented on the positive nature of the feedback from these guest interviewers. She also mentioned anecdotal positive feedback about the performance of the students who had used *Second Life* when compared with other classes who had only studied in face-to-face situations.

Collaborative and cross-cultural learning

There was a number of ways in which students using the Foundation build worked collaboratively. The Lead Educator spoke of starting with groups of three, and then moving to groups of two because some of the people who had been assigned the role of observer were becoming bored.

There were also a number of instances of cross-cultural interaction and learning in the Foundation Studies project. As well as the cross-cultural collaboration between ESOL students and Foundation students at NorthTec, the Lead Educator spoke of interactions in world between students of different cultures, which spilled over into the real life situation:

Lead Educator: (Tutor B) has got some international Chinese boys and there is the... Samoan lady. And this is two groups that really don't interact ever. In Second Life they did. And the Chinese boys were chasing the Samoan ladies about the place, and that was wonderful!

Tutor B: they were laughing, and they were giggling, and ...

Lead Educator: Even that intervention makes it worth it just on its own.

Interviewer: Did that spill over into real life?

Lead Educator: I have noticed that they talk to each other

Tutor B: They are friendlier definitely.

Interviewer: That is very interesting.

Tutor B: They have actually broken the ice with each other. (MIT Tutor interview)

As *Second Life* is an open environment, learners had the opportunity to interact with people who are not themselves involved in the project. Thus one Asian woman commented that:

I have had a chance to talk to people in Second Life that I did not know, to share about life. (NorthTec ESOL Student Interview)

In another example, some Midwifery students turned up during one of the Lead Educator's classes and "had a chat with" the Foundation students.

The Lead Educator also spoke of her experience of taking some of her Maori communication students into a native North American sim to compare Maori and native North American culture. She commented that: "*they absolutely loved it ... what they gained from it is huge*" Although this is not directly related to the present project, it does illustrate the potential of *Second Life* in cross-cultural learning.

Authenticity

The inability to use voice chat, and thus the necessity to use text chat, limited the authenticity of the experience for learners. However, the opportunity to be interviewed in world by guest interviewers added a significant degree of authenticity to the *Second Life* experience. The Lead Educator spoke of a similar level of authenticity in an interview that she conducted with a learner:

I had a funny experience today. (Student Z) missed out on his Second Life interview with the guest interviewer...so I agreed to interview him. I wanted to make it a bit different so I came in as one of my alts – and he had never seen this avatar before. But of course it is my voice. He reacted really differently... He wanted a job at Pizza Hut, so we went into the Pizza Hut interview room, and we did the interview...He answered everything beautifully. Afterwards I

thanked him and he said “Oh Miss, do I get the job?” I said “Why?” And he said “Man, I want you for a boss – you are hot!” I had a good laugh about that! (Foundation Lead Educator interview)

Attitudes to the use of Second Life

There was a wide range of attitudes of participants in the project to the use of *Second Life* in their learning, ranging from complete commitment and enthusiasm, as shown by the Lead Educator, to outright opposition such as manifested by one of the MIT students. During interview, it was apparent that students from non-English speaking backgrounds appeared to be generally more positive about *Second Life* than native English speakers. For the former group, many of whom had few computer skills, the opportunity to work in a virtual world environment may have made them more willing to persevere despite technical or other barriers. English-speaking students seemed to be more aware of publicity concerning the negative aspects of *Second Life*: This range of attitudes was also reflected in the attitudes of institutional staff. Thus the Technical Manager at MIT questioned whether *Second Life* was an appropriate environment for educational institutions not only because of security issues, but because of some of the dubious activities which take place on *Second Life*. On the other hand, however, other staff members saw these issues with *Second Life* to be similar to those around educational use of the Internet, and to reflect the situation in real life. Thus the Flexible Learning Advisor at NorthTec commented:

Setting up communities that are locked down with passwords so that (students) are not exposed ... is not realistic. We are not preparing for the real world. This is a similar discussion to the one that schools now have about cyber safety and citizenship. So rather than putting up walls and protecting... Second Life is no different from first life. (NorthTec Flexible Learning Advisor interview).

Student engagement

In a number of cases, educators spoke of a high level of engagement of learners in the *Second Life* environment. One educator spoke of students’:

Laughter, and the look of enthrallment in their eyes ... when they got into the interview they were actually taking it seriously ... the rapture on their faces when they could actually put on some (clothes) completely different from what they wear in real life. (MIT Foundation Tutor interview)

The lead educator also spoke of students with behavioural and attendance issues turning up to sessions on *Second Life*; and the ESOL tutor at NorthTec ascribed the level of engagement to:

You put your consciousness in there. Your avatar is you ... after a little while you forget that you are actually sitting outside the computer ... you interact with people more as if that is you in your life. (ESOL tutor, NorthTec interview)

Other comments – potentials and improvements

For a number of participants, important improvements would be those that improve access and the quality of the experience:

Fix up all the glitches. Using it with headphones. Get the talk function working... (NorthTec Foundation Tutor interview)

The e-Learning Advisor was keen to develop the authenticity of the in world interviews:

The next stage is to have real recruiters in there posting real jobs, and students from all the participating institutions competing for the jobs. That is a real simulation for me! Like a virtual job centre. You could get feedback on what you need to improve on. That is the advantage of doing this – otherwise you just replicate the classroom. (NorthTec e-Learning Advisor interview)

She commented that she regarded using *Second Life* to deliver formal lectures was a 'waste of time' for her institution. She saw the real strength of the environment to be:

Discovery learning. Guided discovery. Because you have the opportunity to go and explore and manipulate. And problem solving and experiential learning. And I think in the future for learning by doing and creating. Constructing. But at this stage I would think that very few students and very few teachers have the skills to be able to use the environment in that way. (NorthTec e-Learning Advisor interview)

The type of generic skills taught in this type of Foundation programme are valuable for all students, whatever core programme of study they are taking. The Lead Educator spoke of the place that a programme based on *Second Life* could have:

One of the biggest problems we have with Foundation Studies is that each of the courses (provided at MIT) is individual. They are all going on a slightly different pathway; they all have different needs when you look at study skills, life skills, all the people skill type stuff. Why do you have to have that in a normal timetable? Why can't you have it in parallel that they could access separately in something like Second Life?... (Foundation Lead Educator interview)

The ESOL Tutor would "definitely" get involved in working in virtual worlds in the future if given the chance. He believed that virtual worlds *in some format, in the way e-learning is developing, is likely to become a default method.* He looked forward to future developments *with touch*; However, he felt that a key improvement would be to have *a virtual world that is not Second Life...because it would take the sleaze factor out...*

Foundation studies summary

The Foundation build provided a rich environment for learners to develop their job-hunting skills, despite criticism of its external appearance. It provided the opportunity for students to review material they had learned in face-to-face sessions, and to practice dressing appropriately for, and taking part in, interviews.

For many participants, the experience was marred by technical difficulties, which highlighted the need for careful planning and good collaboration with the IT department before introducing virtual world learning into on-site programmes. These difficulties appeared to be more significant for native English speaking participants than for ESOL learners, who may have been more prepared to persevere with the environment.

Some learners and staff expressed resistance to the use of *Second Life* in their programmes. Key factors were the amount of time it took to master the environment, and negative perceptions of *Second Life*. However, others saw the value of the build, and the potential for future developments.

The build offered opportunities for collaborative and cross-cultural learning, although the impact of this may have been reduced by students working adjacent to each other in the same room, and by being restricted to text chat. In some cases, authenticity of the experience was increased by the use of interviewers from outside the institution.

Institutions' staff were generally keen to be involved in future work with virtual worlds, but emphasized the need to resolve technical issues.

DISCUSSION

The above findings will be discussed in the light of the Research Questions and the anecdotal strengths to be found in the Introduction and the Methodology section of this report.

1. **How and to what extent do MUVES such as *Second Life* offer enhanced learning for New Zealand tertiary students?**

As mentioned previously, the two SLENZ builds were designed to achieve different types of learning outcomes. In the case of the Foundation Studies build, the learning outcomes related to the development of generic job seeking skills. Students used the Foundation build in the classroom environment where they were supported by Foundation tutors. Their interactions through *Second Life* were restricted by technical issues such as lack of voice chat and firewall crashes. On the other hand, Midwifery students generally accessed their build from home, and were able to collaborate online in the Midwifery suite through their avatars. In several cases they reported being able to use voice chat.

In both subprojects, there were some learners who were not engaged in the *Second Life* experience. This may have been due to frustration with technical problems, reluctance to invest significant amounts of time in becoming fluent in the *Second Life* environment, or resistance to the idea that "real learning" could occur in such a game like environment. A number were also influenced by the popular image of *Second Life* as being a somewhat sleazy environment.

Sanchez (2009) identified a number of barriers to learning in *Second Life*. He divided these into technical issues, interface issues, and user expectations and the time consuming nature of *Second Life*. With regard to interface issues, a number of his subjects experienced difficulty controlling their avatars. Sanchez also commented on the processing capacity required to run *Second Life* successfully. Some of his students had similar experiences to SLENZ learners in that their avatars lost their clothes. In this study, students also commented on the amount of time consumed in working in *Second Life*.

Both the Foundation Studies and the Midwifery builds were used to complement face-to-face and/or other online studies. Thus the Midwifery build supplemented the learners' theoretical work, and the Foundation Studies experience was used to build on work in the classroom. In both cases there appeared to be unique and significant characteristics of the *Second Life* experience. In both subprojects, participants commented both on learners' identification with their avatars, and the fact that working through their avatars in role-play situations enabled them to practice skills with a lesser degree of emotional inhibition. Thus students at MIT reported overcoming pre-interview anxiety by carrying out practice interviews in the build, and Midwifery students felt freer to practice scenarios with a peer in world than they would do under the eyes of their colleagues and tutors in the classroom.

In the case of the Midwifery build, students working from their respective homes were able to overcome limitations of distance brought about by their working off-site. This was achieved by meeting in the Midwifery suite and carrying out learning experiences together. The ability to see and work in a "realistic" birthing environment was seen to have great advantages over working from text based materials. Students were also able to meet up with their tutors, and with other experts and professionals in the *Second Life* environment. Thus Midwifery students met the Midwifery Consultant in *Second Life*, and also made contact with a midwife from Tauranga. At MIT, the Foundation students were able to do practice job interviews with their peers, tutors, and also with guest interviewers brought in from outside their programme.

The fact that learners operated in *Second Life* through their avatars appeared to remove some of the prejudices and resistances to cross-cultural engagement that might be experienced in real life. Examples were seen in the collaboration between ESOL students and native Kiwi Foundation students at NorthTec, and in the interactions between students of different cultures in *Second Life* at MIT. This cross-cultural interaction was reported to have spilled over into the classroom. Boulos et al (2009) quotes Thomas (2006), who reported

transference of changed attitudes observed in a virtual world in to the real world, where the student is said to have “blossomed.”

Another advantage of using a virtual world environment in this way is that learners could practice scenarios over and over again. There was the ability to make mistakes that could be catastrophic in the real situation; and to learn from the consequences of these mistakes. As one interviewee commented: *“in Second Life, it doesn't matter if the baby dies.”* This aspect is picked up Boulos et al, who comments on the opportunity for learners to *“make mistakes without repercussions.”*

The original intention with the Midwifery build was that the first-year students would confine their *Second Life* activities to the exploration of the birthing suite and the facilities that it offered. However, it soon became clear that these students became bored with this activity and were keen to practice the birthing scenario. As a result they were gaining experience of what it was like to be a midwife well before they began their clinical experience. The second year midwives could see the potential of *Second Life* to allow them to practice difficult birthing scenarios, which could be rare in real life.

In his study exploring the potential of virtual worlds in education, Twining (2009) quoted work by Canole et al (2004) describing pedagogical tools for learning design. These authors describe pedagogy in terms of three dimensions: pedagogy, theoretical/social and reflective. The extremes of the pedagogical dimension are “learning about” and “learning by becoming”. Twining discusses the potential that virtual worlds offer for “learning by doing”, “learning by role-play” and “learning by becoming”. In the present pilots, students had the opportunity to “learn about” by exploring the birthing suite, and “learn by role-play” in the birthing and interview scenarios. It was clear that students found activities towards the “learning by becoming” end of the continuum engaging and enjoyable, but “learning about” the midwifery suite soon became “boring”.

It appeared to be clear that both first and second year students quickly appreciated the potential of *Second Life* to deliver immersive and realistic experiences. The present evaluator recommends that future projects exploit to the full the potential offered by virtual worlds to create learning scenarios, simulations and role-plays.

2. What could have been done better during the design and development and delivery of the two pilot learning activities in Second Life?

A number of members of the project team have commented that at the outset there were no guidelines in existence for projects of this type. As a result many of the procedures were developed “on the hoof”, and the project team learned many lessons as a result.

As far as the design and development of the builds is concerned, the decision was taken early in the project to break each build down into three separate stages, with each stage being completed before commencement of the next. This has the advantage that there would be something tangible to show for the investment in the project, even if time and resource constraints meant that all three stages of each build were not completed. There were however two disadvantages to this approach. One resulted from the way that the earlier stages fed into the later stages, and the other was the excessive time pressure and stress experienced by the development team as the date approached for builds to be available for use by educators and students. One approach to resolving this latter problem could be to use a “sprint” approach to software development which involves a division of the project into smaller stages which can be completed in short, intensive bursts of about a couple of days.

The Lead Educators had different attitudes to, and expectations of, the use of *Second Life* in education. The Foundation Studies Lead Educator very quickly became a passionate enthusiast for *Second Life*. For her, it appeared that the potential of MUVes in education was almost limitless. On the other hand, both the Midwifery Lead Educator and the Consultant were initially extremely sceptical. They were busy people who had full workloads and did a lot of travelling. The Developer believed that the Educators did not necessarily have sufficient understanding of the need for clear, detailed, design specifications for the objects that he

was creating. This meant that he had to make unilateral design decisions without the benefit of full technical input. This added to his workload.

The Developer also mentioned two further sources of frustration. One was a sense of loneliness engendered by his role - he was one of the two members of the project team employed full-time in the project. The other source of frustration, paradoxically, was the fact that he spent a lot of time in the *Second Life* environment, and offered help to other users who were struggling with the environment. This called him away from the work that he was doing.

The Server Side and Secondary Developer, who was also involved in designing and building the HUDs, expressed some frustration about the software development process. He felt that the development process was insufficiently formal, that it should involve more people, and that there should be a faster turnaround in developing small pieces of work and soliciting feedback from users.

In summary, it appears that the design and development process could be improved by:

- Employing a larger development team
- Employing a graphic designer to help in creating virtual objects
- Having a more formal development process
- Dividing the development stages into smaller "chunks"
- Obtaining rapid feedback from users on each "chunk"
- Developers and educators spending more time together at the beginning of, and during, the project to ensure a thorough understanding of each other's needs and processes

The situation with regard to delivery of the pilot activities was different in each of the two builds. By far the greatest use of the Foundation Studies build occurred within the institutions. Educators at both institutions experienced significant technical difficulties. These included hardware problems, for example, slow computers, inappropriate soundcards, firewall and networking issues. It proved difficult for one IT department to identify problems with running *Second Life*, and to devise a way of testing potential solutions.

Similar challenges were found in attempting to use *Second Life* in the two South Island institutions with the Midwifery build. It appears that some of these technical difficulties may be inherent to trying to use *Second Life* with multiple users behind a firewall. It is very clear from the data, that different institutions had different approaches to the IT challenges presented by this project. It is also clear that educators involved in such a project within institutions need to cultivate a harmonious and effective working relationship with the IT department, so that issues are anticipated and dealt with early in the project. In at least one institution, it would be advisable at the planning stage for a business case to be made for IT support.

Most of the Midwifery students were able to access the build from home. The challenges that they experienced appeared to result from limited broadband speed and connectivity, inappropriate computer specifications and bandwidth hunger, which resulted in some students quickly exhausting their allocations. Here again, it was not always clear what the technical issues were.

The technical challenges involved in using *Second Life* in education are well recognised in the literature. Thus, Sanchez (2009) mentions technical issues as a significant barrier, and Boulos et al (2009) describe the need for high specification computers and graphics cards. Wang and Braman (2009) emphasised the need for a '*stress test of the lab facilities to make sure of proper functioning of systems during class exercises.*'

For some students and educators, using the environment posed problems in terms of selecting and dressing an avatar, navigating in world, and using the functionalities afforded by *Second Life*. It appears that, despite efforts to orientate users to *Second Life*, some

people still found its use problematic. These difficulties were perceived to result in significant wastage of time. This problem could be solved by careful orientation of learners to *Second Life*, including the possibility of pairing up learners with buddies experienced in world. The SLENZ literature review recommended completion of the first two points of the *Second Life* core skills competency framework (Salt *et al*, 2008) Whilst it is likely that some learners, notably those involved in the Foundation Studies pilot at MIT, achieved this level, none of the learners or staff involved in the pilot explicitly referred to this framework (which appears no longer to be accessible online).

In stark contrast to the experience of learners in the present study, Boulos *et al* (2009) claimed that *'moving around in Second Life is...easier...than moving around in a real classroom'*! However, other authors emphasise the need for appropriate orientation to the environment (e.g. Wang and Braman, 2009). Jarmon *et al* (2008) go so far as to make completion of the *Second Life* Orientation Island training a prerequisite for registration on their programme.

In some cases, Midwifery students were unclear as to what they should do when they accessed the build. This was mentioned by some first-year students, who reported being told that accessing the build was not compulsory, but that educators would like feedback. First year students also reported rapidly becoming bored with just exploring the birthing unit and looking at what was available. They, more than the second year students for whom it was 'old hat', appreciated the chance to enter into the role-play the scenario.

Suggestions for improving the delivery of learning experiences to tertiary students through *Second Life* include:

- The Project Team, and Lead Educators at each institution becoming familiar with the IT processes, and striking up an ongoing working relationship with members of the IT team. This could be greatly facilitated by the identification of a senior manager to act as a champion of the project within the institution.
- Clear identification of the hardware and network needs required effectively to run the virtual world on the multiple computers within a particular institution. This would include addressing network security and fire walling issues.
- Clear communication with students who will be using the virtual environment off-site regarding hardware and software requirements to access and make use of all the features of the virtual world.
- An indication to students of the broadband requirements and hardware specifications to run the virtual world effectively on their own home computers, including connection speed, and the likely impact on broadband usage.
- Giving more attention and time to ensuring that users become fully familiar with using *Second Life*. This could involve a more thorough orientation process including working with buddies experienced in *Second Life*.
- Clear indication to students of expectations in terms of their participation and learning outcomes when using the builds.
- Ensuring that each stage of the build actively involves and engages learners, and avoids them spending time "just looking".

3. What worked well during the design, development and delivery of the two pilot learning activities in *Second Life*?

The SLENZ team have achieved a remarkable success in creating and delivering the two builds. The team started from the basis where there was no significant "prior art" to guide the management and execution of such a project. Hence the norms and procedures of the project evolved on an ad hoc basis during its life. The project brought together a wide and disparate range of people with varied backgrounds and experiences, widely spread geographically, most of whom were part-time. The success of the project was in large

measure due to the project management skills of the real life Project Manager. She was responsible for managing the budget, interpersonal communications, and ensuring that timelines were adhered to and deadlines met.

Throughout the lifetime of the project, a project blog was maintained by a professional journalist, which served both as a means of communication within the project and as a medium of publicity, promoting the project to the wider world. The use of Google Docs as a means of sharing and co-editing project documents was also important, as was the holding of regular in world and face-to-face team meetings. Furthermore, the adoption of the Creative Commons approach to intellectual property made the design and development of the project accessible and opened a transparent process.

As far as the design and development of the builds are concerned, the Project Developer almost single-handedly achieved a remarkable success with both builds. He was able to incorporate the differing needs of both the Foundation and Midwifery educators, and in many cases produced aesthetically pleasing and functional designs. The ongoing process of development generally met the required deadlines, although sometimes at some cost in terms of stress.

4. What good practice can be identified that may help others design, develop and deliver learning experiences in MUVES?

Aspects of good practice are covered in the above subsections. In brief they include:

- Strong and effective project management
- Clear communication between members of the project team
- Respect for the particular experiences and skills of team members
- Close ongoing working relationships between the educators and the development team
- A larger development team
- A more formal development process
- Using the 'sprint' approach to divide the project into smaller more manageable chunks
- Obtaining rapid user feedback to guide the ongoing development process
- Establishing senior project champions within each of the participating institutions
- Establishing effective working relations with institutional IT departments at a very early stage
- Completing any intra-institutional procedures necessary to ensure effective IT support
- Ensuring that software and hardware problems are addressed and resolved well before the builds go live for learners
- Paying more attention to user orientation to the virtual environment
- Informing users accessing the environment from remote locations about ICT and broadband usage requirements
- Ensuring that learners are clear about the tasks and learning outcomes that they are expected to achieve
- Ensuring that each stage of the build includes activities that fully engage the learners, in order to ensure that they do not become bored and disillusioned with the use of virtual worlds

The extent to which the project incorporated the anecdotal strengths of virtual world environments compared with other online environments will now be summarised.

The first anecdotal strength was: **"the increased engagement of learners with a familiar game like environment where learning may intentionally be a product of serious play"**. Both builds achieve this to a greater or lesser extent. This appeared to be especially true of the birthing scenario in the Midwifery build. Students were overheard to comment on the fun aspect that they experienced in participating in the scenario. However, where this interactive, game playing aspect was not evident, for example, in the expected exploration of the Midwifery suite by first year Midwifery students, learners rapidly became bored. A number of project team members commented on the potential for including more "game like" activities in future builds, such as the scoring of points and the incorporation of various levels of achievement.

With regard to **"the ability to create experiential learning situations not available in 'real life'"**, both builds were again clearly successful. As far as the Midwifery build is concerned the ideal birthing environment represented by the *Second Life* Midwifery suite is a visual manifestation of a research-based ideal that does not exist in the real world. Moreover, the ability to role-play birthing scenarios, which the builds afforded to first year Midwifery students, was something that was not available to them in real life. The potential exists to create scenarios of difficult birthing situations, which are infrequently encountered by qualified midwives, for learners to practise. With regard to the Foundation Studies build, the opportunity rarely exists for potential job interviewees to try on and obtain feedback on the suitability of different modes of dress for attending interviews. Another opportunity that was provided to several of the Foundation students was that of being interviewed in virtual rooms that had been designed to mimic real-life interviewing environments, in some cases by external interviewers. This is something that is not readily available to students in real life institutions.

"The opportunity to learn the skills necessary to operate socially, technically, and ethically in an online global virtual world" was limited for some participants by technical issues, and due to incomplete familiarity with the virtual world. These limitations resulted in some learners being restricted in their communications to the use of text chat, while others were discouraged by the difficulties they experienced in navigating in the environment. The social constructionist potential of learning in virtual worlds is discussed by Twining (2009) in his adoption of Conole's (2004) dimensions. It is to be hoped that technical issues will be successfully addressed, allowing this potential to be further explored in future MUVE educational projects.

Learners involved in both projects had the opportunity to **"experience and practice collaborative, cross-cultural problem solving in social networking environments"** through their interactions in world. Midwifery learners collaborated together in the role-play afforded by the scenario to work through an authentic birthing experience. In the Foundation build, learners collaborated in a variety of ways, for example, by providing feedback on appropriate dress for interviews, and by carrying out practice interviews with each other. In some cases these collaborative activities involved learners from different cultural backgrounds working together. In addition, some participants interacted with a variety of people in world. These could include the Midwifery Consultant, qualified midwives from other areas of New Zealand and overseas, potential employers, and members of the SLENZ project team. Among other benefits, these opportunities afforded learners geographically remote from each other the chance to co-construct learning together.

Recommendations

The following recommendations for future projects exploring the use of virtual worlds in education arise out of the findings and discussion:

- Establish a larger development team, and adopt a 'sprint'-based development process
- Ensure that developers and educators spend time together to familiarise themselves with the requirements of each others' disciplines

- Establish close collaboration with institutions' IT departments to ensure that learners can have fully functional access to builds within institutions
- Establish champions of the project at a senior level in each participating institution
- Communicate with students regarding ICT requirements and expected broadband usage to run the builds at home, and expectations in terms of participation and learning outcomes
- Provide a thorough, compulsory, orientation to the virtual world
- Ensure that each stage of each build incorporates highly interactive and engaging activities for learners

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GLOSSARY OF TERMS

Alt	An alternative to one's customary avatar
ASCILITE	Australian Society for Computers in Learning in Tertiary Education
Avatar	A computer user's representation of himself/herself or alter ego
<i>Blackboard</i>	A learning management system
Build	A created environment in a virtual world
Creative Commons	An international convention for sharing creative materials
<i>Croquet</i>	An open source virtual world
<i>Dragon Naturally Speaking</i>	A speech recognition software
<i>Illuminate</i>	An online communication and interactive content sharing system
<i>ExpressScribe</i>	A transcription application
Google Docs	A document sharing online system
HUD	Heads-up Display - any transparent display that presents data without requiring the user to look away from his or her usual viewpoint
<i>HyperRESEARCH</i>	Qualitative data analysis software
<i>Moodle</i>	An online learning management system
MUVes	Multi-user Virtual Environments (here regarded as synonymous with Virtual Worlds)
<i>Open Sim</i>	An open source version of <i>Second Life</i>
Pinnard	A device for listening to a baby's heart beat in pregnancy
<i>PowerGrama</i>	An application for making audio recordings from <i>Skype</i>
<i>Second Life</i>	A virtual world established and run by Linden Labs Inc
Sim	Simulation
<i>Skype</i>	A VoIP communication system
SLENZ	<i>Second Life</i> Education in New Zealand – the name of the present project
Sprint	A software development method involving short, intensive bursts of software creation, testing and feedback
TEC	Tertiary Education Commission
UTS	University of Technology at Sydney
Virtual world	A 3-D immersive environment in which users can navigate, create content and interact
<i>VoIP</i>	An online phone protocol
World	The <i>Second Life</i> environment
<i>Zoho</i>	An online survey application

APPENDICES

Appendix 1 – Project Information and Consent Forms

Appendix 2 – Interview Focus Questions

Appendix 3 – Data Analysis Coding Categories

APPENDIX 1 –PROJECT INFORMATION AND CONSENT FORMS

The texts of the online information for interviewees, together with the online consent form are given below. The text of the information material for project team members and course tutors differs in minor ways from that for students involved in the SLENZ Project. The web pages carrying this material can be accessed at : <http://blog.core-ed.net/SLENZevaluation/> and <http://blog.core-ed.net/SLENZevaluationstudents/>

Text 1:

SLENZ Evaluation

Information and Consent Form: Project Team

Tuesday, May 26th, 2009 | Uncategorized

Please read the following and then complete and submit the online form which follows

What is *SLENZ*?

The SLENZ Project is a trial of the use of the *Second Life* virtual world in tertiary education carried out by a consortium of New Zealand ITPs.

About this evaluation

CORE Education is carrying out an evaluation of the SLENZ Project for the Project Team. We will be reporting to the SLENZ Project Team, and may publish our findings. The aims of the evaluation are to:

understand what could have been done better during the design, development and delivery of the two pilot learning activities in *Second Life*

understand what worked well during the design, development and delivery of the two pilot learning activities in *Second Life*

identify good practice that may help others design, develop and deliver learning experiences in virtual worlds.

What we ask you to do

In order to carry out the evaluation, we are collecting data from key stakeholders – project team members, educators and students – involved in the project. I understand that you agreed, as a SLENZ Project Team Member or Educator to take part in an evaluation when you joined the project. However, for ethical reasons, I ask you to finish reading this page, and complete the form below.

Data collection could include:

Online and/or paper based questionnaires

Stakeholder interviews – face-to-face, phone or via VoIP communication (such as *Skype*). Data will be collected by audio recording and written note taking

Observation/interaction within the virtual world

Records of virtual world chats and/or audio recordings

Project documentation e.g. from Google documents

SLENZ blog

Attendance at project face-to-face meetings.

What we will do with the data

All data will be confidential to the CORE Research Team, and will be stored securely on CORE's premises. Data will be destroyed within five years from the end of the evaluation. The resulting

reports may include quotes from interviews etc, but will not identify people who take part in the evaluation.

Ethical matters

This evaluation has been approved by CORE Education's Ethical Group, which includes members of the academic research community as well as members of CORE's research staff who are not involved in this study.

Any Questions?

If you have any questions about the evaluation, please contact me at CORE Education Ltd at the following e-mail address: michael.winter@core-ed.net, or by phone at 03 379 0715. Please forward any concerns or complaints about the evaluation to the SLENZ Director, Terry Neal: terry.neal@blendedsolutions.co.nz, phone: 04 233 2587.

The Form

Thank you for completing and submitting this online consent form. I look forward to working with you.


Replies

Last Name *

First Name *

Role in SLENZ *

I have read, and understand, the information about the SLENZ Evaluation and agree to take part * Yes No

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Text 2:

SLENZ Evaluation Students

Information and Consent Form: Students

Thursday, May 28th, 2009 | Uncategorized | No Comments

Please read the following and then complete and submit the online form which follows

What is *SLENZ*?

The SLENZ Project is a trial of the use of the *Second Life* virtual world in tertiary education carried out by a consortium of New Zealand ITPs.

About this evaluation

CORE Education is carrying out an evaluation of the SLENZ project for the Project Team. We will be reporting to the SLENZ Project Team, and may publish our findings. The aims of the evaluation are to:

understand what could have been done better during the design, development and delivery of the two pilot learning activities in *Second Life*

understand what worked well during the design, development and delivery of the two pilot learning activities in *Second Life*

identify good practice that may help others design, develop and deliver learning experiences in virtual worlds.

What we ask you to do

In order to carry out the evaluation, we are asking key stakeholders project team members, educators and students involved in the project to agree to be involved in the evaluation process. We ask that you agree to relevant data being collected about your involvement in the project. Data collection could include:

Online and/or paper based questionnaires

Individual or group interviews – face-to-face, phone or via VoIP communication (such as *Skype*). Data will be collected by audio recording and written note taking

Observation/interaction within the virtual world

Records of virtual world chats and/or audio recordings

Project documentation e.g. from Google documents

SLENZ blog

Attendance at project face-to-face meetings.

We hope that you will agree to participate in this evaluation, however, should you decide that you wish to withdraw from this study, you may do so at any time by informing me by e-mail. Your withdrawal will be confidential between us, and will not have any consequences to your academic course record.

What we will do with the data

All data will be confidential to the CORE Research Team, and will be stored securely on CORE's premises. Data will be destroyed within five years from the end of the evaluation. The resulting reports may include quotes from interviews etc, but will not identify people who take part in the evaluation.

Ethical matters

This evaluation has been approved by CORE Education's Ethical Group, which includes members of the academic research community as well as members of CORE's research staff who are not involved in this study.

Any Questions?


If you have any questions about the evaluation, please contact me at CORE Education Ltd at the following e-mail address: michael.winter@core-ed.net, or by phone at 03 379 0715. Please forward any concerns or complaints about the evaluation to the SLENZ Director, Terry Neal: terry.neal@blendedsolutions.co.nz, phone: 04 233 2587.

The Form

Thank you for completing and submitting this online consent form. I look forward to working with you.

Replies

Last Name *	<input type="text"/>
First Name *	<input type="text"/>
Role in SLENZ *	<input type="text" value="-Select-"/>
I have read, and understand, the information about the SLENZ Evaluation and agree to take part *	<input type="checkbox"/> Yes <input type="checkbox"/> No

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APPENDIX 2 – INTERVIEW FOCUS QUESTIONS

Second Life Education in New Zealand -- Project Team

Institution _____ Date _____

Interview Questions

Please tell me your name(s).

How did you get involved in this *Second Life* pilot?

What previous experience have you had with online teaching and learning?

What previous experience have you had of online games and virtual worlds?

Please describe your role in the SLENZ project

What have been the most challenging aspects of the work?

What do you regard as your biggest successes?

What barriers are there to using MUVES in tertiary education?

What has been done to overcome them?

How have Intellectual Property issues been addressed?

What are the key factors influencing the design of MUVE educational environments?

How do you develop MUVES to embrace various pedagogical approaches?

What do you think could have been done better in the design and development of the programme(s) in SL?

What do you think was done well?

What do you see as the advantages of using MUVE environments in teaching and learning?

What are the disadvantages?

What advice would you give another group wanting to produce an excellent MUVE educational experience?

Second Life Education in New Zealand -- Midwifery Tutors

Institution _____ Date _____

Interview Questions.

Please tell me your name(s).

How did you get involved in this *Second Life* pilot?

What year level are your Midwifery students?

What previous experience have you had with online teaching and learning?

What previous experience have you had of online games and virtual worlds?

How many times have you visited this SLENZ virtual Midwifery suite?

Where do you access *Second Life*?

What kind of Internet access do you have there?

Please describe any barriers you or your students may have experienced in accessing and using *Second Life* to support teaching and learning.

Please describe your experience of orientation to using *Second Life* to support teaching and learning.

How have you used *Second Life* to support teaching and learning?

How does using *Second Life* in this way compare with conventional face-to-face teaching and learning?

What do you see as the benefits of using *Second Life* in this way?

What do you see as the disadvantages of using *Second Life* in this way?

What improvements do you consider could have been made to the design and delivery of the *Second Life* Midwifery program?

What aspects of its design and delivery worked particularly well for you?

How engaging did you and your students find the experience of using *Second Life*?

How and to what extent do you believe that using *Second Life* has affected your students' confidence in handling real life birthing situations?

What factors do you believe contribute to engaging and effective teaching in a virtual world such as *Second Life*?

How and to what extent do these factors differ from those involved in face to face and 'conventional' online teaching?

How useful did you find the opportunity to interact with the rest of the SLENZ team?

If given the chance, would you get involved in similar virtual world teaching and learning in the future? Why?

Are there any other questions that you think I should have asked or any other things that you would like to say about your *Second Life* experience?

Second Life Education in New Zealand -- Midwifery Students

Institution _____ Date _____

Interview Questions.

Please tell me your names.

What year level are you in your Midwifery studies?

What previous experience have you had of online games and virtual worlds?

How many times have you visited this SLENZ virtual Midwifery suite?

Where do you access *Second Life*?

What kind of Internet access do you have there?

Please describe any technical issues there may have been with accessing *Second Life*.

Please describe your experience of orientation to using *Second Life*.

Describe how you have used *Second Life* in your Midwifery studies.

How does using *Second Life* in this way compare with conventional face-to-face teaching and learning?

What do you see as the benefits of using *Second Life* in this way?

What do you see as the disadvantages of using *Second Life* in this way?

What improvements do you consider could have been made to the design and delivery of the *Second Life* Midwifery program?

What worked particularly well for you in its design and delivery?

How engaging did you find the experience of using *Second Life*?

How and to what extent has using *Second Life* affected your confidence in handling real life birthing situations?

If given the chance, would you get involved in similar virtual world learning in the future? Why?

How effective did you find the opportunity to interact with others in *Second Life* in supporting your learning?

Are there any other questions that you think I should have asked or any other things that you would like to say about your *Second Life* experience?

Second Life Education in New Zealand – Foundation Tutors

Institution _____ Date _____

Interview Questions.

Please tell me your name(s).

How did you get involved in this *Second Life* pilot?

What previous experience have you had with online teaching and learning?

What previous experience have you had of online games and virtual worlds?

How many times have you visited the SLENZ virtual Foundation Studies space?

Where do you access *Second Life*?

What kind of Internet access do you have there?

Please describe any barriers you or your students may have experienced in accessing and using *Second Life* to support teaching and learning.

Please describe your experience of orientation to using *Second Life* to support teaching and learning.

How have you used *Second Life* to support teaching and learning?

How does using *Second Life* in this way compare with conventional face-to-face teaching and learning?

What do you see as the benefits of using *Second Life* in this way?

What do you see as the disadvantages of using *Second Life* in this way?

What improvements do you consider could have been made to the design and delivery of the *Second Life* Foundation program?

What aspects of its design and delivery worked particularly well for you?

How engaging did you and your students find the experience of using *Second Life*?

How and to what extent do you believe that using *Second Life* has affected your students' confidence in handling real life situations such as job interviews etc?

What factors do you believe contribute to engaging and effective teaching in a virtual world such as *Second Life*?

How and to what extent do these factors differ from those involved in face to face and 'conventional' online teaching?

How useful did you find the opportunity to interact with the rest of the SLENZ team?

If given the chance, would you get involved in similar virtual world teaching and learning in the future? Why?

Are there any other questions that you think I should have asked or any other things that you would like to say about your *Second Life* experience?

Second Life Education in New Zealand -- Foundation Students

Institution _____ Date _____

Interview Questions.

Please tell me your names.

What previous experience have you had of online games and virtual worlds?

How many times have you visited this SLENZ virtual Foundation Studies space?

Where do you access *Second Life*?

What kind of Internet access do you have there?

Please describe any technical issues or other there may have been with accessing *Second Life*.

Please describe your experience of orientation to using *Second Life*.

Describe how you have used *Second Life* in your Foundation Studies.

How does using *Second Life* in this way compare with conventional face-to-face teaching and learning?

What do you see as the benefits of using *Second Life* in this way?

What do you see as the disadvantages of using *Second Life* in this way?

What improvements do you consider could have been made to the design and delivery of the *Second Life* Foundation program?

What worked particularly well for you in its design and delivery?

How engaging did you find the experience of using *Second Life*?

How and to what extent has using *Second Life* affected your confidence in handling real life situations, such as job interviews etc?

If given the chance, would you get involved in similar virtual world learning in the future? Why?

How effective did you find the opportunity to interact with others in *Second Life* in supporting your learning?

Are there any other questions that you think I should have asked or any other things that you would like to say about your *Second Life* experience?

APPENDIX 3 – DATA ANALYSIS CODING CATEGORIES

accessibility
attitudes to SL
choice of SL
collaborative learning
communication
confidence
cross cultural learning
curriculum learning outcomes
emotional detachment
engagement
enjoyment
good MUVE educational practice
IP issues
IT Admin issues
learning design
learning experiences not available in RL
learning virtual world skills
lessons
meeting deadlines
play
project Management
relaxed learning
successes
sustainability
technical issues
time issues
understanding developer needs
understanding learner needs
understanding tutor needs