VirtualPREX: Innovative assessment using a 3D virtual world with pre-service teachers

Final Report 2013

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List of acronyms and glossary of terms

Acronyms

ACU       Australian Catholic University
AISTL     Australian Institute for Teaching and School Leadership
ALTC      Australian Learning and Teaching Council Ltd
CSU       Charles Sturt University
Curtin    Curtin University
KL        key learning area
OLT       Australian Government Office for Learning and Teaching
RMIT      RMIT University
UNE       University of New England
VirtualPREX virtual professional experience

Glossary of terms

artificial intelligence is the embodiment of intelligence in machines
avatar a 3D representation of a self in a virtual world (the alter ego which
is a graphical representation of themself in the virtual world)
avatar inventory a place for storing objects in Second Life that have been collected
by the avatar or that they have access to
bot non-player character which is controlled by a computer and not by
a human controller (bot is short for robot)
inworld in Second Life – in the virtual world/space/environment
LibOpenMV a library that implements core functionality such as protocols,
networking and programming interfaces for clients to interact with
in virtual worlds
machinima inworld video. This is obtained by videoing inworld activities and
creating video
non-player character is an avatar being controlled by the computer
participants encompasses all students who participated in the role-play
activities
pre-service teacher a university student who is in an initial teacher education award. In
the VirtualPREX project, this constitutes mostly first year pre-
service teachers (i.e., in their first year of enrolment)
primary school student refers to primary school student avatars used in the VirtualPREX
project
professional experience practicum, work integrated learning, work placement (where pre-
service teachers are placed in a school to observe and practise their
teaching skills)
role-play role-play activities (where pre-service teachers have a role that
they are to act out)
role-play scenario description of the roles provided to participants in the role-play
activities
Second Life one of over 200 3D virtual worlds
student refers to both later year pre-service teachers and higher degree
students who undertook role-play activities
virtual world 3D immersive electronic presence that imitates real life in the form
of a personal presence through someone’s avatar
Executive summary

The higher education community has embraced the use of virtual worlds for teaching and learning. There have been many publications produced over recent years on the efficacy of virtual worlds as a teaching and learning tool. However, even though there has been increased usage, there has not been comprehensive research on using a virtual world to practise teaching in a way that is simple to use and provides a variety of scenarios for use by educators in a risk-free environment. VirtualPREX, the term coined for this project, provides this. The VirtualPREX project, part of an Office for Learning and Teaching (OLT) two year project grant, explored the validity of pre-service teachers using a virtual world to practise teaching skills prior to undertaking professional experience. Second Life was the virtual world chosen for this research as it is a tested environment and three of the participating institutions jointly owned land that could house the VirtualPREX classrooms. Additionally, a number of the project team were familiar with the Second Life environment. A classroom and playground theme had already been created, making it an ideal platform for the creation of more VirtualPREX classrooms.

Four virtual classrooms, each containing ten pre-service primary school student avatars (five female and five male) and two teachers (one female and one male), were created so that pre-service teachers could practise and enhance their teaching skills and experiment with new teaching strategies through role-plays. A further classroom was created to house primary school student bots (non-player characters) to enable asynchronous practice. These have all been created on the Second Life island of “Australis 4 Learning”. The VirtualPREX classroom environment was tested with various cohorts of students and academics from UNE, ACU and CSU, who participated in teaching role-play scenarios, over the two years of the project. In particular, on-campus and off-campus cohorts of students from UNE undertook role-play activities during 2011 and 2012, on-campus students and academic staff from ACU undertook role-play activities in 2012, and academic staff from CSU participated in a role-play demonstration in 2012. Students participating in role-plays completed questionnaires including demographic questions, questions relating to their ICT and virtual worlds experience, perceptions of their preparedness for their professional experience placement and questions about their experience of the role-play activity. The results indicated that, although there are a number of aspects of the design of the role-play activities, and the environment itself, that could be further refined, VirtualPREX is promising as a space for pre-service teachers to practise their skills and build their confidence before going out on professional experience placement.

This report draws on research conducted by project team members from UNE, CSU, Curtin, RMIT and ACU over the two years from 2011 to 2012. Data was collected from surveys, observations and discussions. The research sought to examine the virtual world space created for the VirtualPREX project for pre-service teachers to undertake practice teaching and assessable tasks. The aim was to develop the space, the role-play scenarios and bots for teaching in an authentic setting to be used worldwide upon completion. The study set out to provide the higher education community with guidelines and recommendations to encourage the use of the virtual world classrooms and assessable tasks with pre-service teachers.

The project consisted of four phases through three stages (pilot testing, refined role-plays and bot development):

- Phase 1 – Investigation and pre-formative assessment survey
- Phase 2 – Development and validating of bots, virtual classroom and machinima
- Phase 3 – Pilot implementation of VirtualPREX with pre-service teachers, and post-formative assessment survey
- Phase 4 – Analysis, reporting and final evaluation
The primary outcome of this project was the development and implementation of VirtualPREX: a 3D, interactive, virtual space designed as a classroom with structured learning experiences for formative assessment, in which pre-service teachers could practise teaching skills prior to practicum placements. Students are able to use the space both synchronously and asynchronously, by themselves or interacting with other students, academics and/or bots (non-player characters which enable pre-service teachers to practise their teaching skills without the need of peers). The bots are continuously being updated and are a work-in-progress. Students are able to interact with classroom simulations so that they can reflect, practise and apply skills learnt. VirtualPREX is accessible to academic users of Second Life worldwide for use with their pre-service teachers and can be found in Second Life at maps.secondlife.com/secondlife/Australis%204%20Learning/94/212/21.

The project culminated in the production of the following outcomes and deliverables:

- Documentation of principles and guidelines for developing and implementing formative assessment in a 3D virtual world based on application of social constructivist pedagogy for learning activities.
- A broader evaluation of the usefulness of Second Life in meeting the project aims for pre-service education students across the five institutions.
- The creation of prototype primary school student bots and an automated classroom where pre-service teachers can practise teaching skills by themselves, with other students and/or their academic teacher.
- A space to create and use machinima for self, peer, formative and summative assessment.
- Guidelines for using machinima as a resource for assessment tasks and discussion of standards.
- Assessable tasks for individuals or groups for use by higher educational institutions worldwide.
- Guidelines for encouraging effective teaching strategies through role-play.
- An agreed protocol for sharing future use and development of VirtualPREX.

These outcomes and deliverables can be found at “Australis 4 Learning”, a space in Second Life, and on the VirtualPREX website, virtualprex.com. The space in Second Life has all classrooms set up to be used. The website has a multitude of resources containing instructions on how to undertake role-plays on “Australis 4 Learning” and links to YouTube machinima for assessment and how to undertake these tasks. Many “how to” instructions are also available on the website. In this report there are many more links to resources available to enable use of VirtualPREX, either as role-plays, machinima viewing, assessable tasks and general information.

For users of the VirtualPREX resources, it is recommended that educators become familiar with the virtual world of Second Life prior to embarking on the role-play activities. This way, they will be able to overcome any technical difficulties they encounter. It is recommended that users visit http://virtualprex.com/silhowto.html to assist in their learning to become educators of VirtualPREX and ensure that all users have the best possible experience available. It is also recommended that educators make comprehensive use of the YouTube machinima and instructions on how to use the machinima for assessable tasks. That way, educators who are not familiar with using Second Life are still able to use the resources with their pre-service teachers. The sizeable time that could be required to invest in VirtualPREX has been overcome if the educator uses the resources available. It takes considerable time and effort to create a space such as VirtualPREX. Because of the VirtualPREX project, the potential now exists for educators to utilise these resources in the preparation of their pre-service teachers for their professional experience.
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Chapter 1 – About the VirtualPREX project

Introduction

The primary aim of the VirtualPREX project was to support deeper professional learning experiences for pre-service teachers by providing expanded opportunities for quality professional practice sessions using formative assessment activities in a highly interactive, 3D virtual world (Second Life). Documented principles and guidelines for implementing teaching role-plays and formative assessment activities (especially self-review) were to be integral in achieving this. A key objective was to transfer emphasis to peer- and self-led learning, with less reliance on supervisors, as well as providing greater flexibility and access to off-campus students. Our investigation of automated bots (non-player characters) as an alternative to human-controlled avatars supported this aim.

In the medium to longer term, this project aimed to provide a comprehensive, immersive, 3D virtual environment with classroom spaces and resources designed to facilitate authentic teaching practice and formative assessment activities, and embed them in Australia’s national pre-service teacher curriculum in a consistent way. The national curriculum was under review when this project began, making it timely in that it included many academics from different Australian states.

The VirtualPREX project aimed to test the role-play activities, bots and virtual classroom in order to develop a proof of concept which could be implemented in a later study.

Project plan

To achieve the overall aims of the project the research was segmented into four phases:

Phase 1 – Investigation and pre-formative assessment survey

- The partners and evaluator met to decide on a cohesive communications protocol and to further refine and finalise the key evaluation questions.
- The investigation phase focused on developing consensus amongst the partners on the pedagogical and assessment principles that guided the technical design and development of VirtualPREX.
- The focus was on developing a model of an effective, repeatable approach to using and evaluating a virtual space for teaching and learning.
- Broad requirements for the role-plays were established and role-play scenarios created based on key issues impacting on pedagogy and classroom management that are experienced by teachers in school and classroom environments as identified by focus groups of experienced practicing teachers.
- A model for the design of 3D virtual worlds was developed based on situated learning and social constructivist theories.
- VirtualPREX classrooms were built and primary school student and teacher avatars were created.
- Key skills and knowledge to support pre-service teachers in the virtual world and professional development and support mechanisms required by teacher educators were identified.
- A pre-formative assessment survey of pre-service teacher experiences and supervising teachers was to be conducted after their professional experience observation. Instead, this was conducted after VirtualPREX role-play activities.
Phase 2 – Development and validating

- Bot primary school students were created, based on the results of the Phase 1 focus groups.
- To realise the model arising out of Phase 1 for developing activities to enable meaningful interactions within the virtual world, a combination of role-play, both planned and spontaneous, scenarios and case studies, and formation and support of a virtual community of pre-service students were created.
- The virtual classroom and machinima were tested and validated by pre-service students from the partner universities.
- Development of the virtual world was to be undertaken iteratively with cycles of formative and summative evaluation involving members of the project team, as well as pre-service teachers, feeding back into successive versions of the bot programming, machinima and resource design.
- Pre- and post VirtualPREX role-play activity surveys were conducted with pre-service teachers and analysed to ascertain their experiences with the VirtualPREX classroom, bot and machinima to feedback into further development.

Phase 3 – Pilot implementation and post-formative assessment survey

- Implementation of the 3D virtual world and the agreed model with cohorts of students from the partner universities.
- A post-formative assessment survey of pre-service teacher experiences was conducted after their two-week professional experience placement.

Phase 4 – Analysis, reporting and final evaluation

- Both quantitative and qualitative analysis of the survey results were undertaken.
- Dissemination through conference and journal presentation of results and workshops, both face-to-face and in Second Life.
- Evaluation of the machinima used for self, peer, summative and formative assessment were undertaken and updated, as required.

Project team and roles

The inspiration for the VirtualPREX project began in 2007. Discussions ensued over the next three years between interested parties from a variety of education and technological backgrounds to formulate the team that we have today. In 2009 three institutions collaborated in the purchase of an island in Second Life, called “Australis 4 Learning”. It was here that it was decided to develop the VirtualPREX environment.

VirtualPREX team members:

- Sue Gregory (University of New England) - project leader – brought knowledge of virtual worlds and virtual world education, access to teacher educators, pre-service teachers and later year students.
- Dr Yvonne Masters (University of New England) – brought professional experience expertise to the project and knowledge of virtual world education.
- Associate Professor Barney Dalgarno (Charles Sturt University) – brought background expertise in education and access to teacher educators and pre-service teachers.
- Professor Geoff Crisp (RMIT University) – brought background expertise and knowledge of assessment in virtual worlds and access to teacher educators.
- Dr Torsten Reiners (Curtin University, originally from University of Hamburg,
Germany in 2011) – brought technical knowledge of computer programming in virtual worlds.

- Professor Heinz Dreher (Curtin University) – brought background expertise in assessment and knowledge of assessment in virtual worlds.
- Matthew Campbell (Australian Catholic University 2011 only - moved to Griffith University and was unable to continue with the project) – brought background expertise and knowledge of virtual worlds in education to the project and access to teacher educators and pre-service teachers.
- Vicki Knox (University of New England) - project officer – brought expertise in project management and research skills.

The VirtualPREX project team was dispersed widely across Australia and initially Germany. At the beginning of the project, four team members were at universities in New South Wales, one in Victoria and one in Western Australian and one in Germany. Due to a number of movements among the project team, this changed to three in New South Wales, one in Victoria and two in Western Australia. Communication through virtual means was a feature of this project.

The term VirtualPREX – “virtual professional experience” – was coined for this project. The project was to fill a gap for pre-service teachers who were unable, for various reasons, to gain access to the amount of professional experience that they desired. VirtualPREX created a classroom environment in Second Life on “Australis 4 Learning” so that pre-service teachers could prepare for their professional experience by undertaking role-play activities either synchronously with their peers or asynchronously with bots (non-player characters) through authentic simulations. These experiences were not to replace professional experience in school settings, but rather to supplement them and to provide the opportunity for further practice of teaching skills and strategies. The virtual classroom allowed the pre-service teachers to gain confidence in their teaching ability in a low-risk environment where there would be no consequences for real school children. VirtualPREX has created an authentic classroom environment where the various teaching strategies pre-service teachers have learned can be trialled and tested enabling them to deal with the many different situations they will encounter in their teaching careers.

The VirtualPREX stakeholders are the OLT, teacher educators, pre-service teachers, teachers, professional experience organisers, curriculum developers and the general public.

Background and literature review

The centrality of professional experience (otherwise known as practicum or work placement) to teacher education is recognised in the literature on teacher education (Darling-Hammond, 2006; Hastings & Page, 2006; Keogh, Dole, & Hudson, 2006; Smith & Lev-Ari, 2005). However, there is also a growing corpus of literature that raises a number of concerns about professional experience, the placements available and the preparation that pre-service teachers receive for both professional experience and their eventual careers as teachers (Abbott-Chapman, 2011; Barbousas & Nicholson, 2009; Ferry, Kervin, Cambourne, Turbill, & Puglisi, 2004). The problematic nature of placements has become so immediate that it has been one focus in both government and media reports (House of Representatives Standing Committee on Education and Vocational Training, 2007; O’Keeffe, 2011a, 2011b; Productivity Commission, 2012). These concerns are undoubtedly linked to reports of pre-service teacher attrition when facing professional experience difficulties (Sim, 2006) and beginning teacher attrition (Ingersoll, 2001). The VirtualPREX project, which can be used for preparation of professional experience, has the capacity to alleviate many of these reported concerns.
VirtualPREX has been designed to build on the expertise and Second Life resources held by the project partners, through the development of the original online classroom space into a sophisticated, virtual, professional experience environment. As such, it uses the full range of audio-visual interactivity of 3D simulations and expands on previous work on the use of network-based systems for realistic classroom simulations (Ferry et al., 2006; Gregory & Masters, 2010).

The VirtualPREX project has provided pre-service teachers with authentic learning experiences, drawing on constructivist theories of learning, to develop and increase their teaching skills through an action research methodology. It has been postulated that authentic learning supports the development of expert thinking, complex communication, reflective judgement and problem-solving skills in a risk-free environment (Herrington & Oliver, 2000; Herrington, Reeves, & Oliver, 2010). The teaching simulations and role-plays that are integral to VirtualPREX have been specifically designed to promote authentic learning with the intention that pre-service teachers will undertake “tasks that are identical or similar to those that [they] will eventually encounter in the outside world” (Ormrod, 2004, p. 396). Authentic learning is “learning by doing” (Lombardi, 2007, p. 1).

Project scope

The project proposal outlined the following impact/deliverables.

Assessment

- Documentation of principles and guidelines for developing and implementing formative assessment in a 3D virtual world based on application of social constructivist pedagogy for learning activities.
- Assessable tasks for individuals or groups for use by higher educational institutions worldwide.
- Guidelines for encouraging effective teaching strategies through role-play.

Assessment tasks have been created for the pre-service teacher educators and for the pre-service teachers themselves using machinima as a base. The assessment tasks are provided on the VirtualPREX website at: <virtualprex.com/assessment.html>. There is also further information later in this report on VirtualPREX assessment in Chapter 3.

Second Life

- A broader evaluation of the usefulness of Second Life in meeting the project aims for pre-service teachers across the five institutions.

Originally it was hoped to test the usefulness of Second Life at UNE, ACU, RMIT, CSU and Curtin. However, it was only possible to test Second Life at UNE and ACU due to technological and logistical issues experienced at other institutions (including computer hardware, bandwidth and scheduling).

Bots and virtual classrooms

- The creation of a prototype primary school student bot and an automated classroom where pre-service teachers can practise teaching skills by themselves, with other pre-service teachers and/or their academic teacher.

Various bots (non-player characters) have been created for the VirtualPREX project. Bots were created to duplicate the types of primary school student avatars created for the role-play activities, i.e., creating the avatars as children and dressing in them in traditional Australian school uniforms. See Chapter 4 for more information on bots.
Five prototype classrooms have been created for the VirtualPREX project. Four classrooms colour coded for synchronous role-play activities with large groups of pre-service teachers and one classroom to house the bots.

Forty primary school student avatars and eight teacher avatars were created to enable synchronous role-play activities by pre-service teachers.

Machinima

- A space to create and use machinima for self, peer, formative and summative assessment.
- Guidelines for using machinima as a resource for assessment tasks and discussion of standards.

Machinima, inworld videos, were created by videoing VirtualPREX role-play activities. These are available on the VirtualPREX website at: <virtualprex.com/machinima.html>. These machinima were created for analysis to gain ideas on how to use the VirtualPREX Second Life classrooms, to be used as a resource for critical reflection by teacher educators and pre-service teachers, and for teacher educators to use for assessment activities. They have been categorised into different key learning areas (KLA) to provide a framework for formative and summative assessment tasks (see Assessment above). Exemplar role-play machimina were also produced and uploaded to the website, as a demonstration of exemplary teaching and also for assessable tasks. There are over 100 machinima to view. See Chapter 3 for more information.

VirtualPREX sharing

- An agreed protocol for sharing future use and development of VirtualPREX.

VirtualPREX will be shared through CreativeCommons.

VirtualPREX resources

A VirtualPREX public website and a private wiki were set up for communication between team members.

Website

A website to disseminate information of the project was created – <virtualprex.com>. This website is used to provide information about the project in general, dissemination of the team’s publications and presentations and useful information for anyone to view the progress of the project. However, most importantly, the website is a repository of resources provided for teacher educators who wish to undertake virtual professional experience with their own pre-service teachers. Information is provided on how to use the VirtualPREX role-plays synchronously with peers. The VirtualPREX website is a work-in-progress and will be continuously updated to ensure that steps are up to date. “How to” information, role-play machinima, exemplar role-play scripts, and machinima and assessment tasks are all available on the website. The guide that was provided to activity participants on using Second Life and VirtualPREX resources is in Appendix 9 of this report. This has also been replicated on the website for ease of access: <virtualprex.com/slhowto.html>
Role-play scenarios and activities

The VirtualPREX classroom environment was tested with teaching role-play scenarios which were conducted with various cohorts of students and academics over the two years of the project. UNE conducted role-play activities with first year pre-service teachers in both 2011 and 2012. In 2011, on-campus pre-service teachers undertook the Stage 1 Pilot testing role-playing either the teacher or primary school students. Later in 2011, UNE off-campus pre-service teachers also undertook these activities. After analysing the feedback, role-play scenarios and introduction were updated. The appearance of the classroom and primary school avatars were also updated. This was done to provide a more authentic teaching scenario in the classroom and provide the pre-service teachers with more information on the Second Life environment. In 2012, on-campus UNE pre-service teachers undertook the Stage 2 refined role-play activities, followed later by the UNE off-campus students. ACU students also undertook these role-play activities. ACU students were later year students enrolled in either a Diploma in Education or Masters of Education. In late 2012, the VirtualPREX classroom environment and role-play scenarios were also demonstrated to teaching staff at CSU.
Chapter 2 – Testing the VirtualPREX role-play activities

Consistent with the ten design elements for authentic learning (Lombardi, 2007) an action research methodology (Kemmis & McTaggart 1988) was adopted to guide the VirtualPREX project through the cycles of action, analysis, reflection and re-action. Both qualitative and quantitative data were collected ensuring accuracy and alternate explanations (Stake, 1995). Triangulation of data through multiple sources was carried out to confirm the validity of the analysis of the data (Tellis, 1997; Yin, 1994). To achieve the overall aims of the project the research was segmented into three stages so the VirtualPREX classroom environment, its resources and validity could be tested:

Stage 1 – 2011:

In order to identify the aspects of teaching practice to be included in the VirtualPREX role-play scenarios, experienced teachers formed a focus group. A pilot study of on-campus first year pre-service teachers and off-campus later year students role-play activities, using the initial version of the VirtualPREX environment, was undertaken.

Stage 2 – 2012:

The VirtualPREX environment was refined and role-play activities were again trialled with additional cohorts of pre-service teachers, later year students and extended to other institutions.

Stage 3 – 2011–2012:

Development of bots for asynchronous role-plays within the VirtualPREX environment (see Chapter 3).

Methodology

Please note the terminology in this section regarding participants in the role-play activities are as follows:

- **participants** encompasses all students who participated in the role-play activities
- **pre-service teacher** a university student who is enrolled in an initial teacher education award. In the VirtualPREX project, this constitutes mostly first year pre-service teachers (i.e., in their first year of enrolment)
- **primary school student** refers to primary school student avatars used in the VirtualPREX project
- **student** refers to both later year pre-service teachers and higher degree students who undertook role-play activities

Focus group and role-play scenario development

Eight experienced teachers accepted the invitation to be members of a focus group formed to gather practitioner experiences of key pedagogical issues and classroom management problems encountered during their professional career. The focus group sessions were recorded. The focus group meeting was to facilitate the creation of the virtual world role-play scenarios.
The key outcome of the focus group was the identification of a series of common primary school student behaviours occurring in a typical classroom. These behaviours were grouped and the group types informed the design of the initial pilot role-plays, in which pre-service teachers were asked to play the role of either a “good student” or a “naughty student” (later renamed “on task” and “off task”).

The Stage 2 role-play scenarios were updated after feedback from the pilot role-play activities and further analysis of the literature on classroom behaviour and management techniques. In all, 12 role-play scenarios were created and these are available on the VirtualPREX website: <virtualprex.com/roleplayinfo.html>

The VirtualPREX classroom environment

The University of New England, Australian Catholic University and Curtin University owned a joint island called “Australis 4 Learning”. This was chosen as the platform for the development of the VirtualPREX classroom environment. Four new virtual classrooms were built based on activities undertaken in an earlier virtual classroom by two members of the project team (Gregory & Masters, 2012). Figure 1 displays several images of role-play activities being undertaken in the classrooms.

Figure 1. VirtualPREX role-play activities being undertaken in the VirtualPREX classrooms
Forty primary school student avatars (ten for each of the four classrooms) and eight teacher avatars were created for the role-plays (one male and one female for each of the four classrooms). The naming convention for the avatars was simple – they all had the same surname – “PREX”, and they all had a short first name preceded by the letter “x”. The letter “x” was placed before the first name to keep all the primary school student avatars together in Jass Easterman’s (the project leader’s avatar) list of friends. This enabled Jass to easily set up the primary school student avatars to be used by the pre-service teachers. All primary school student avatars were located in the appropriate classroom ready for use. The primary school student avatars were small, looked younger and were dressed in an Australian school uniform. School uniforms were changed from Stage 1 to Stage 2 to a more authentic Australian formal school uniform, based on feedback provided in Stage 1 surveys and from project team discussions. The Stage 1 and Stage 2 school uniforms are displayed in Figure 1 and Figure 3 (Stage 2 uniforms).

Role-play activity participants

Seventy-two first year on-campus pre-service teachers (85% female, 15% male) and eight off-campus later year students (75% female, 25% male) from UNE participated in the Stage 1 role-play activities. Eighty first year on-campus pre-service teachers (84% female, 16% male) and four off-campus later year students (100% female) from UNE and eight later year students (50% female, 50% male), enrolled in either a Diploma in Education or Masters of Education, from ACU participated in the Stage 2 role-play activities.

In Stage 1, all on-campus participants and one off-campus participant were aged under 26, while the other off-campus participants were 26+ years of age. In Stage 2, 77 on-campus participants were aged under 26 years of age and three were between 26 and 35 years of age. Off-campus participants were all in the 36–45 age group. Four ACU participants were aged under 26, three were in the 26–35 age group, and one was aged between 36 and 45.

For both stages, the majority of on-campus UNE participants came from communities of less than 18,000, while the off-campus and ACU came from a mixture of country towns and cities.

On-campus pre-service teacher UNE activities

In both Stage 1 and Stage 2, the VirtualPREX on-campus role-play activities were conducted in a computer laboratory with between 16 to 24 participants in each session. In each role-play, the activities were conducted in groups of between 6 to 8 participants. The activity was compulsory, but was not an assessable task.

Pre-service teachers undertook teaching role-plays with their peers role-playing primary school students. Typed text was used to communicate via inworld local chat and the teacher role was rendered in upper case so that it was distinguishable from the primary school student chat. Text, machinima and screen shots captured interactions during the role-play (four computers were used to control virtual cameras for this purpose). The data collected were to facilitate analysis of the project, and to be used for the purpose of reflection and evaluation by the pre-service teachers and their lecturers.

A two-hour Second Life orientation session was conducted for on-campus students in Stage 1 four weeks prior to the role-play activity, and for Stage 2, in the week prior to their VirtualPREX role-play activity.

On-campus later year student ACU activities

ACU role-play activities were conducted in the same manner as the UNE on-campus activities. However, due to the circumstance of presenting the ACU activities, orientation to Second Life was conducted immediately prior to the role-play activity.
Off-campus student UNE role-play activity

Eight off-campus later year students in Stage 1 and four students in Stage 2 undertook role-play activities after the completion of their ICT education unit and therefore participated on a voluntary basis. The off-campus role-plays were conducted in Second Life, but with the participants’ located in their own homes, and as a result of feedback from the on-campus activities, the teachers were able to use audio for communication. The pre-service teachers’ role-playing children used typed text.

Surveys

After completion of the role-play activities, pre-service teachers were invited to complete a survey on a voluntary basis. Questions included: demographic questions; Likert scale questions relating to their ICT skills, experience in technology use and virtual worlds and views and beliefs about virtual worlds, perceptions of their preparedness for their professional experience placement; and open ended questions about their experience of the role-play activity and their views about its value. Additionally, upon returning from professional experience placement, UNE on-campus pre-service teachers were asked to voluntarily complete another survey asking whether they thought the role-play activity had helped in preparing them for their professional experience placement. UNE off-campus students and ACU students were not requested to complete the second survey as they did not have specific professional experience allocated times.

Student reference group

Three students from each role-play activity volunteered to provide further feedback that was more specific in relation to the VirtualPREX environments and their perceptions of the activities.

Refinements to the VirtualPREX environment and role-play design

Refinements to the VirtualPREX environment role-play design were undertaken from Stage 1 to Stage 2 as a result of feedback from the participant surveys, stakeholder observers and the project team second face-to-face meeting. In Second Life, the use of local chat is restricted to a 20 metre radius so that only people in that proximity can hear/see the conversation. The classroom locations were moved further apart from Stage 1 to Stage 2 so that messages typed through local chat were not visible to pre-service teachers in other classrooms and to allow access by four groups of pre-service teachers at the same time. The classroom tables and chairs were resized for better proportionality and increased visibility of the primary school student-avatars (see Figure 1 above and Figure 2 images of classrooms from Stage 1 to Stage 2).

The primary school student avatars used in Stage 1 were smaller versions of adults wearing a coloured polo shirt and cargo pants. They had been provided with child avatar skins (the overlay placed on the avatar to define the avatar’s appearance), but some of them still looked older than required. Based on feedback from participants and project team members, primary school student avatars were updated for Stage 2, with a more child-like physical appearance and clothing that was more recognisable as an Australian school uniform. Uniforms were also colour-coded for each classroom to make it easier to place the primary school student avatars in the correct classroom at the commencement of the role-plays. Figure 3 shows the new role-play primary school student avatars.
Figure 2. VirtualPREX classrooms used for role-plays
Figure 3. Sample of Stage 2 VirtualPREX avatars – also found on the website at: <virtualprex.com/avatars.html>
Refinements were also made to the role-play scenarios. During Stage 1, there were half on-task and half off-task roles allocated in the teaching classroom and no constraints were placed on the off-task role-players. The pre-service teachers found this particularly challenging. Therefore, the number of off-task primary school students was reduced to reflect a more realistic percentage of time that students may be off task in a real classroom. The roles were re-written to ensure that primary school student roles were only off task 20% of the time (i.e., in a 7-minute lesson, that was just one minute and 15 seconds of time to be off task). Role-play scenarios were re-written for greater clarity. The roles were divided into on-task active, on-task passive, off-task active and off-task passive. This meant that in any class, there would only be one primary school student who was off-task active and one off-task passive. The roles can be seen at: <virtualprex.com/roleplayinfo.html>. Included on the website are instructions on how to use the role-plays in a two-hour role-play activity and the roles for the different primary school students in a class.

The introduction to the role-play activity was updated by providing more detailed steps on how to participate in the role-plays. In Stage 2, participants were given the opportunity to refresh their knowledge of the Second Life environment before commencing the role-play activity. More interactive resources were included in the classrooms for the teachers to use during their lessons. These consisted of a chalkboard that could be written on, reading mats, games, and a reading and writing gesture which was added to the primary school student avatar inventory. The pre-service teachers were able to try out the interactive resources during their Second Life refreshment period. In Stage 2, pre-service teachers were also provided with a “cheat sheet” on how to use some of the basics of Second Life and on how to use specific VirtualPREX interactive tools throughout the role-play activity. These can be found in Appendix 9 and is also available at: <virtualprex.com/slhowto.html>.

Results

The results of the surveys administered after Stage 1 and Stage 2 role-play activities are compared in this section. Surveys were completed by UNE on-campus first year pre-service teachers, off-campus later year students and ACU later year on-campus students. Unless UNE off-campus and ACU students are specifically mentioned, the results below compare the two surveys administered to the larger on-campus UNE cohorts.

The Stage 1 UNE cohort had less experience with ICT (19% above average and 13% below average) and virtual worlds (6% above average, 70% below average) compared to the Stage 2 UNE cohort (ICT, 26% above average, 18% below average) and virtual worlds (8% above average, 42% below average).

During Stage 1, there were a number of technology-related issues encountered in the on-campus role-play activity (32% technical and 13% other problems). In Stage 2 there were less issues (7% technical and 5% other problems). The higher percentage of technical problems in Stage 1 can be attributed to an Internet outage experienced campus wide during the first role-play activity.

Table 1 outlines data from the question asking participants to give an overall rating of the role-play activity, separated by institution and mode of study. Participants were requested to rate the activity based on a scale of 1 (not at all) to 7 (extremely). In looking at the comparison between on-campus and off-campus and ACU student responses, there are a number of factors which could have affected responses: on-campus, participation was compulsory, while off-campus and ACU participation was voluntary and these cohorts tended to respond more positively, reporting higher levels of satisfaction with the activity; off-campus participants role-playing the teacher were able to use audio; and off-campus participants were generally more familiar with the Second Life environment. While it is possible that these differences have skewed the data to some extent, the difference in perceptions is still noteworthy.
Table 1. Comparison of the mean (Likert scale 1 [not at all] to 7 [extremely]) across Stage 1/Stage 2 cohorts for the question: “Please use the rating scales below to give an overall rating of the virtual worlds role-play activity you undertook in your role-play activity.”

<table>
<thead>
<tr>
<th></th>
<th><strong>Stage 1</strong></th>
<th><strong>Stage 1</strong></th>
<th><strong>Stage 2</strong></th>
<th><strong>Stage 2</strong></th>
<th><strong>Stage 2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>on-campus UNE (n=70-71*)</td>
<td>off-campus UNE (n=8)</td>
<td>on-campus UNE (n=76)</td>
<td>off-campus UNE (n=3)</td>
<td>ACU (n=8)</td>
</tr>
<tr>
<td>Confusing</td>
<td>3.75*</td>
<td>1.88</td>
<td>3.17</td>
<td>2.00</td>
<td>3.13</td>
</tr>
<tr>
<td>Difficult</td>
<td>3.41*</td>
<td>1.88</td>
<td>3.03</td>
<td>2.67</td>
<td>3.13</td>
</tr>
<tr>
<td>Irrelevant</td>
<td>3.26</td>
<td>2.00</td>
<td>2.95</td>
<td>1.33</td>
<td>2.00</td>
</tr>
<tr>
<td>Boring</td>
<td>3.49</td>
<td>1.00</td>
<td>2.84</td>
<td>1.00</td>
<td>2.25</td>
</tr>
<tr>
<td>Easy to use</td>
<td>4.47</td>
<td>5.75</td>
<td>4.07</td>
<td>4.33</td>
<td>3.57</td>
</tr>
<tr>
<td>Useful</td>
<td>4.08*</td>
<td>6.25</td>
<td>4.21</td>
<td>5.67</td>
<td>4.63</td>
</tr>
<tr>
<td>Interesting</td>
<td>4.77*</td>
<td>6.25</td>
<td>4.49</td>
<td>6.67</td>
<td>4.88</td>
</tr>
<tr>
<td>Enjoyable</td>
<td>4.44</td>
<td>6.62</td>
<td>4.36</td>
<td>7.00</td>
<td>5.25</td>
</tr>
</tbody>
</table>

In general, the responses are quite positive. Encouragingly, the majority of pre-service teachers indicated that they found the activity useful (mean ranges from 4.08–6.25) and interesting (mean ranges from 4.49–6.77). Except for the ACU cohort who had received only a minimal instruction in Second Life, most participants found the VirtualPREX environment easy to use (mean ranges from 3.57–5.75). Most students did not find the activity overly confusing (mean ranges from 1.88–3.75) or difficult (mean ranges from 1.88–3.41), and they indicated that they did not find the activity boring (mean ranges from 1.00–3.49). However, a sizable minority of on-campus pre-service teachers did find the activity confusing (31%) or difficult (29%) indicating that additional support or preparatory training in the Second Life environment may be required. This is supported by the fact that of the off-campus students, who were more familiar with Second Life, only one found the activity confusing and only one found it difficult.

Interestingly, of the UNE on-campus participants who did not have the opportunity to play the teacher role in Stage 1, 90% did not find the activity useful, whereas, of those who did play the teacher role, only 28% did not find it useful. This suggests that playing the role of the teacher is the most important part of the activity from their perspective. However, in Stage 2, only 50% of the on-campus participants who did not play the role of teacher did not find the activity useful.

In comparing Stage 1 and Stage 2 on-campus students on this question, the Stage 2 cohort found the activity: less confusing, difficult, boring, easy to use, enjoyable and interesting, and slightly more relevant and useful. This indicates that the refinements to the VirtualPREX environment did not have a great impact. However, this is in contrast to answers to the question about whether the activity was helpful in preparing them for their upcoming professional experience placement. Answers to this question were distributed relatively evenly among the Stage 1 on-campus pre-service teachers and fell into the following groups: Yes (33%); No (30%); Not really (16%); Kind of, in a way (10.5%); and, Yes and No (10.5%). For the Stage 2 cohort, however, the results were much more positive: Yes (56%); No (15%); Not really (7%); Kind of, in a way (14%); and, Yes and No (7%). This indicates that perhaps the refinements did assist.

Overall, the off-campus cohorts were more positive about the possibilities of the VirtualPREX environment. These students had experienced a greater amount of prior training in Second Life and tended to find the environment easier to use.

VirtualPREX
Two additional questions were added to Survey One in Stage 2. The first question asked the participants about their perceptions (knowledge, experience and confidence) of their preparedness in certain areas for their professional experience placement: lesson presentation skills; providing clear instructions to students; skills in structuring a lesson; skills in moving around the classroom; ability to respond to unexpected occurrences; behaviour management skills; understanding the perspective of students; and self-confidence as a teacher. The second question asked about the value of the role-play activities in contributing to their confidence in these areas.

With regard to their perceptions, the pre-service teachers felt they had the least confidence (44%) and the least knowledge (40%) in responding to unexpected occurrences and the least confidence (40%) and the least knowledge (36%) in skills in structuring a lesson and were the least experienced in skills in structuring a lesson (59%), lesson presentation skills (57%) and responding to unexpected occurrences (56%). Table 2 shows the responses to the question regarding the value of the role-play activities. After the role-play activities the pre-service teachers generally agreed that the activity had contributed to their professional teaching confidence (means ranging from 4.34 to 4.68) with the most benefit coming in the areas of developing their ability to respond to unexpected occurrences (62% agreeing), developing skills in structuring a lesson (60% agreeing), ability to provide clear instructions to students (59% agreeing) and developing behaviour management skills (58% agreeing). These results are very encouraging, suggesting that the role-play activity was very beneficial in developing confidence in areas where pre-service teachers felt they had the least confidence, knowledge and experience.

**Table 2.** Responses for Stage 2 UNE cohort for the question (Likert scale 1 [very strongly disagree] to 7 [very strongly agree]): “Please indicate your agreement or disagreement with the following statements about the value of the virtual worlds role-play activity in contributing to your professional teaching confidence.”
The open-ended questions included questions about what the participants thought was the best and worst thing about the activity, how the activity could be improved and whether they thought it helped prepare them for their professional experience placement.

In both Stages, describing the best thing about the activity, a number of pre-service teachers commented on the value of role-playing a teacher or particular types of primary school students, in particular the off-task primary school student role. Experience in the classroom and experiencing different types of student behaviours and practising their teaching were also highly valued. Students also noted that it was fun, entertaining, interactive and engaging, highlighting the novelty of the experience.

When describing the worst thing, a number of on-campus pre-service teachers mentioned the problem of everybody talking at once in inworld text. A number of pre-service teachers also indicated that having to type messages rather than speak them, made things move slowly and that they found it boring and repetitive at times. This was consistent with the fact that they found it challenging to manage primary school student behaviour. Also mentioned was the fact that off-task students overplayed their roles and couldn’t be controlled.

In Stage 1, when asked to name one thing about the activity that could be improved, a number of on-campus pre-service teachers suggested that the teacher should be able to use the audio talk function (this was subsequently implemented in the off-campus activities). Others suggested the need for stricter guidelines for the activity and restrictions on primary school student actions (for example teachers wanting the primary school students to
respond to their teaching strategies), also implemented for the Stage 2 activities. For the Stage 2 activities, these things were also mentioned, however, being able to teach for a longer period was the main comment (also mentioned in the Stage 1 comments). The Stage 2 cohort also noted that the activity would have been better had they prepared their lessons beforehand.

On completion of the survey, on-campus participants engaged in a short reflective discussion about the activity. Some useful comments emerged regarding the appearance of the primary school students and the classroom. In Stage 1, the participants thought the primary school students looked a bit strange and were difficult to see because they were so small compared to the desks. Comments on the ability of the teacher to see the school children in the classroom were also made in the survey responses. In contrast, in Stage 2, the comments in relation the appearance of the classroom and the primary school student avatars were overwhelmingly positive.

After the completion of their professional experience, on-campus participants were asked to complete a further survey which included open-ended questions designed to find out if they thought the role-play activity had assisted with their real life professional experience. Unfortunately, only eight (Stage 1) and four (Stage 2) pre-service teachers completed the survey and consequently responses may not represent the views of the wider group. In Stage 1, there were mixed results as to whether the activity was useful in preparing them for their professional experience, contrasting comments were:

*The activity was helpful in that we got to experience teaching in a different environment and with different kinds of students. However, it was very difficult as we were not teaching face-to-face and as a teacher, students’ personalities were hard to be able to come across. Also, it was difficult to discipline the students as we only had a chat room to talk and we didn’t use our voices.*

*This activity was highly valuable to my professional skills and confidence because it got me comfortable with teachers and peers, but most importantly the students. I had a rather difficult classroom, but believe I needed the challenge to push myself to strive well in the conditions.*

In Stage 2, there were more positive responses (3) with one negative, which may have been as a result of refinements to the activity and classrooms.

*It prepared me for situations that may occur in the classroom.*

*The two experiences are completely different and as result do not effect/benefit from one another. The virtual worlds role-play activity was fun and interesting, but overall, I believe it had no value into my prac or other reality teaching experiences.*

**Discussion**

The results indicated that VirtualPREX is promising as a space for pre-service teachers to practise their skills and build their confidence before going out on professional experience placement. The participants enjoyed the role-play scenarios and the opportunity to experience teaching activities in the virtual world and many, especially the off-campus students, felt that it would be beneficial in their preparation for professional experience. They also enjoyed the immersion in and authenticity of the environment. From the student reflection group one student commented that she felt like she had just been in a classroom for an hour.

In Stage 1 there were numerous comments from pre-service teachers about the fact that the amount of off-task or disruptive behaviour was unrealistic and made it difficult to focus on the teaching aspects of the role-play. Although there were some comments along these lines in Stage 2, there seemed to be substantially less, indicating that the revised task
descriptions did improve the role-play activity. Nevertheless, the feedback from Stage 2 suggests that further refinement to this aspect of the role-play is necessary. The introduction of the bots into the classroom may assist with this.

The sizable minority of pre-service teachers indicating that they either found the activity to be confusing or they found that the environment was not easy to use suggests that for some pre-service teachers additional practice using the Second Life environment in general, and the VirtualPREX classroom environment in particular, may be necessary to allow them to obtain maximum benefit from the role-play activity.

The survey results from Stage 2 activities are encouraging. Even though on the quantitative question there was not a sizable increase in the positive comments on the environment, there was a decrease in the negative responses and also a marked increase in the perception that the role-play activity would be helpful in their preparation for professional experience.

A recurring theme in feedback from on-campus participants is that the use of text rather than audio makes it more difficult to create the smooth communication flow necessary for an orderly lesson. The fact that the off-campus students, who were able to use audio communication when undertaking the role of the teacher, tended to rate the activity more positively suggests that this approach is worth exploring for on-campus cohorts.

The use of text chat vs. audio was a theme that occurred on all occasions over the stages, however, it was less of an issue in Stage 2 where pre-service primary school teachers appeared to be more immersed in the role-play activity. There are pros and cons to the use of both the text chat and audio. The advantage of using audio is that talking is more authentic if in the teacher role. Participants lamented the fact that they could not use intonation in their instructions to students. However, having primary school avatars use text chat has significant advantages, as outlined in the following points:

- Immersion
- Quietness
- Concentration
- Focused
- Anonymity

Some of the disadvantages of using text were:

- Time taken to type
- Authenticity of typing instead of spontaneously speaking

One significant disadvantage of using audio was that it is more obvious who the person is undertaking the role and their age/gender. Therefore the activity may not be as authentic when a female is playing the role of a male or the actor is obviously not a child when taking on a primary school role.

**Stakeholder feedback**

Academics from both UNE and ACU who observed the Stage 2 VirtualPREX role-play activities were asked for feedback along with academics from CSU who participated in a demonstration on VirtualPREX as part of their professional development. Pre-service teachers who had undertaken the role-play activities also volunteered to participate in interviews on the efficacy of the VirtualPREX environment as part of a student reference group. The results of their observations are outlined below.
When asked what they thought of the appearance of the classroom, all responses were positive:

*Excellent. 100% improvement on the Pilot Study classrooms.*

*Great – much more opportunity to interact with objects around the classroom i.e. dice, chalkboard etc.*

*Excellent very realistic*

*is good... grouped desks, boards, posters, windows, clocks and spacing – all of these elements make the room realistic.*

*Two chairs only – is there a group option?*

When asked what they thought of the appearance of the student avatars, again responses were positive:

*Avatars looked great. Sometimes they grew tall but then settled down again.*

*The avatars all look different from behind which makes it easier to differentiate characters.*

*Are good – they look like children – the uniforms are helpful, hair etc is appropriate.*

Observers were asked about their impressions of the role-play activities.

*What I liked is that many games, etc, that I have used are tied to a problem this is more flexible/adaptable and therefore a more useful tool as it can be re-used.*

*I felt that it was very well researched and prepared. I liked the characterisation of the teacher and the students as well as the environment of the classroom and the local environs.*

*I think it has quite a lot of potential especially for distance students in preparing them for professional experience in real classrooms although I do not see it as replacing real situations.*

*It was quite exciting – I liked using the virtual technology and experiencing “second life”. As a novice, I did find it quite difficult to utilise the technology at the same time as being required to interact as a class member. The classroom was set up and looked like a real classroom and I was able to become to the character quite easily. I did become a bit anxious when I accidently roamed outside the classroom walls (a feeling of a lost child who couldn’t find her mum in a crowd). I was also very amused by the actions and responses of other classmates – particularly being able to fly!*

*I found the role-play activity quite engaging. Given the capacity to create a variety of scenarios within the role-plays, I believe it has the potential to give pre-service teachers some good practise of skills (similar to a ‘micro-teaching’ situation) prior to as well as alongside their placements in schools.*

Observers were asked if they felt that the VirtualPREX environment was suitable for practising teaching skills.

*Timing, lesson planning requirements, some realisation that not all students are paying attention.*
I feel that the capacity to give explicit instructions anonymously is useful; whilst we could (and do) provide opportunities for our pre-service teachers to role-play being the teacher, they are still working with their peers – not children. In the virtual world, the teacher does have the capacity to become the teacher and instruct children, without peer pressure. Having said that, the time delays in the responses from “students” creates a somewhat false environment and those who played the teacher found it very difficult to deal with the amount of text that was not necessarily being received in the correct order. The differing abilities of students to use the technology would affect the success of the interactions.

I think the virtual classroom has real potential with distance education students as well. Much of my teaching is with this group and giving them meaningful opportunities to practise skills is a far more challenging proposition than for internal students. Often, distance education students seem to head out to their practicums with little/no chance to have engaged in skills development in areas such as classroom management. They often seem to struggle as a result.

Just the opportunity to try to practise their responses to various classroom scenarios will help to build their capacity to respond appropriately to these. Also has the potential to help build collaborative skills if they were to be working in groups (as we were) in the online environment.

Finally academics made the following comments in relation to whether the VirtualPREX role-play activities would help pre-service teachers prepare for their professional experience.

One of the aspects of VirtualPREX that I like is that PST [pre-service teacher] have a chance to connect theory with practice in a safe place, without consequences. It also gives PST an opportunity to try skills, language and behaviour management strategies.

I can see some value in looking at the virtual environment from the perspective of how to and why we establish the physical environment of the classroom the way we do. e.g. seating arrangements for classroom management, spacing and proximity to resources for students with disabilities. In a general sense it also provides teachers with an “in” to the world of second life that students may be engaging with in their social time.

The chance to go over a lesson/sequence again and again, getting the ‘script’ for a lesson clear in the students’ mind—this is why I think the pre-programmed students would be useful.

The student reference group were asked a number of questions. This is a sample of their responses to some of the questions. Firstly, they were asked what they learnt from participating in the activity?

I learnt that, like, you’re gonna have a whole range of different kids and they’re gonna, some are gonna be rowdy and some are gonna be, like, just sit there and participate, and you’ve just gotta learn to try and keep up with all the activities that they’re doing to distract the class. That you’ve got to settle them down ’n yeah.

It’s not just about classroom management either, you have to teach the class, so you can’t spend all your time focusing on managing the class.

They were also asked if they thought it was a good place to practise their pre-service professional experience? All agreed that they would use it. One comment was:

I think it works better when you don’t know whose who, like, cause we knew basic, like, a bit where the groups were in the classroom like in this group we knew like roughly who was who so we knew like what they’d do and stuff like that but if we had of like scattered the cards around in the different colours I think it would have been a
bit harder to distinguish who was who and what they were doing

Finally, they were asked what aspects of the role-play were the most valuable to them and why?

Probably the interruptions, dealing with the interruptions.

I think being in a classroom environment without being in a physical classroom.
Chapter 3 – Assessment and learning resources

VirtualPREX machinima

In terms of the VirtualPREX project, machinima creation involves the recording, editing and disseminating of inworld video. Machinima were recorded of all role-play activities. Machinima creation of the teaching role-play scenarios were used as educational artefacts for assessment and reflection and also for analysis of the VirtualPREX environment. Camtasia was used to video and edit the machinima. There is, however, a variety of software to choose from. Once all activities were complete, editing was undertaken of the role-play machinima.

The use of machinima, for assessment and reflection, is an integral facet of VirtualPREX, one that negates the need to video in a live classroom. The machinima demonstrate teaching in a risk-free environment and also overcomes the privacy and ethical issues of filming real children. Machinima have been used in other educational projects across a range of disciplines including business, law, health and emergency training (Alden, 2008; Butler, 2010; Dreher, Reiners, Dreher, & Dreher, 2009; Grace, 2009).

All machinima were created using a template. There were two beginning slides, a concluding slide and the same background music used for all machinima. When editing, text scripts of inworld conversations were also provided to make it easier to add to the machinima. Editing of the scripts required cutting to the best shot and adding all the conversation to a pane at the bottom of the screen so that the lesson conversation could be easily read. Figure 4 is a screen shot of a machinima scenario that has been created. These can be found on the VirtualPREX website at: <virtualprex.com/machinima.html>

Figure 4. Screen shot of one of many machinima available on the VirtualPREX website
Exemplar machinima

An adjunct to the machinima described above has been the development of what have been termed “exemplar” machinima. These machinima were created to provide example teaching scenarios created by the VirtualPREX project team. The first scenario looked at aspects of classroom management while the other machinima was developed with a focus on a lesson introduction and conclusion.

The exemplar machinima were developed from a template designed for the purpose. The template is generic in nature so that it can be used for any scenario and also can provide a guideline for anyone who wishes to develop their own machinima. The template includes:

- The title and overview of the scenario;
- The lesson content and main teaching strategies demonstrated;
- The actors, their roles and their primary school student avatar names;
- The additional primary school student avatar controllers and machinima production staff roles;
- A description of the virtual classroom, layout and initial positioning of the primary school student avatars; and
- A table containing the sequence of events, the timing of each and the camera positions.

The VirtualPREX role-play machinima (see: virtualprex.com/machinima.html) and four exemplar scenario templates can be found on the VirtualPREX website (see: virtualprex.com/exemplarscenarios.html). These machinima have the capacity to be used in a variety of ways including skill development, critical reflection and as the basis of assessment tasks. Figure 5 depicts the introduction to a lesson scenario.

Figure 5. Screen shot of role-plays being recorded for exemplar machinima
VirtualPREX framework for assessment activities using machinima

The VirtualPREX assessment framework has been guided by Boud’s Assessment 2020 propositions (Boud, 2010) and the Australian Institute for Teaching and School Leadership (AITSL) National Professional Standards for Teachers (<teacherstandards.aitsl.edu.au/Standards>).

Boud’s Assessment 2020 propositions emphasised that assessment is most effective when it is designed around key principles facilitating active engagement of the pre-service teacher in not only undertaking a meaningful task but also active engagement in understanding standards of achievement with respect to pre-service teacher responses.

The AITSL Framework and associated Standards are designed to facilitate high quality teaching through articulating and supporting the development of common standards which outline what teachers should know and be able to do as part of their professional practice. Teacher educators and pre-service teachers use these standards as external points of reference for their learning and assessment activities. VirtualPREX has incorporated the AITSL standards as part of the assessment activities that teacher educators can use when designing assessment tasks using machinima created as part of the VirtualPREX project.

The four key principles used in the VirtualPREX Framework are:

1. Assessment is used to engage pre-service teachers in learning that is productive

The VirtualPREX machinima are designed to focus the attention of the pre-service teacher on key learning outcomes associated with the practical component of their program – being in a classroom with their own primary school students. The machinima direct the pre-service teacher’s attention to what needs to be considered when they are in a classroom with a mixed group of primary school students who may be on task or off task. Analysing and critiquing the machinima enable pre-service teachers to reflect on their approaches to dealing with diverse learning situations in a real classroom and to assemble a set of responses to different scenarios. Analysing and critiquing the machinima requires a significant engagement from the pre-service teacher and can be seen as an authentic activity as it encourages the construction of usable approaches to classroom management expected to be found in the real world.

The machinima can be used effectively for both formative and summative tasks, depending on the activity set by the teacher educator.

2. Feedback is used to actively improve pre-service teacher learning

The use of machinima facilitates the development of effective feedback from both pre-service teachers and teacher educators. For institutions that wish to generate machinima themselves, pre-service teachers can view machinima from other pre-service teachers and provide feedback, or teacher educators can view machinima prepared by pre-service teachers and provide feedback on that. For institutions that do not wish to generate their own machinima but use those produced by VirtualPREX or others, feedback can be provided on the analysis and critiquing activities. These can be undertaken as individual or group activities. The use of machinima allows significant flexibility in designing many feedback opportunities.

Once feedback has been provided, pre-service teachers can use that feedback in the next activity they undertake. This can be creating a new machinima for those institutions making their own machinima or in a subsequent analysis and critiquing of a pre-existing machinima. Pre-service teachers can then update their planned approaches to classroom activities when they enter a real classroom and provide their own reflective description of the efficacy of
the virtual activity and resultant feedback in assisting them to formulate strategies for effective classroom management.

3. Pre-service teachers and teachers become responsible partners in learning and assessment

The use of machinima allows teacher educators to actively engage pre-service teachers in developing methods and techniques to improve their critical thinking abilities, including self-critique and reflective judgement.

By observing the machinima in a safe environment pre-service teachers are enhancing their ability to make informed judgements about what they have observed. By coupling the analysis and critiquing of machinima with group reflection and discussion the teacher educator will be able to promote pre-service teacher confidence and competence in understanding standards and expectations of real teachers in the classroom. The group discussion provides a good opportunity to reach consensus about what is expected of an effective classroom teacher.

4. Pre-service teachers are inducted into the assessment practices and cultures of higher education

Machinima provide a convenient way to induct pre-service teachers into the assessment standards of classroom management. Analysing, critiquing and discussing what is observed in the machinima allow pre-service teachers to test their own understanding and expectations of what it will be like in a real classroom when they are responsible for what happens.

For those institutions that wish to make their own machinima, the opportunity for pre-service teachers to develop their ICT skills is also possible.

VirtualPREX machinima aligned to the Australian National Professional Standards for Teachers

The AITSL National Professional Standards for Teachers comprise seven Standards which outline what teachers should know and be able to do (<teacherstandards.aitsl.edu.au/Standards>). The Standards are grouped into three domains of teaching: Professional Knowledge, Professional Practice and Professional Engagement. The relationship between the standards and how the use of machinima might facilitate the attainment of the standard is outlined in Table 3.
Table 3. AITSL Standards mapped against use of machinima for learning and assessment

<table>
<thead>
<tr>
<th>Domains of teaching</th>
<th>Standards</th>
<th>Use of machinima</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Professional Knowledge</strong></td>
<td><strong>Standard 1:</strong> Know students and how they learn</td>
<td>Pre-service teachers can view in the machinima the actions of “primary school students” from various backgrounds and reflect on how to engage them in productive learning. They can plan how to structure their lessons to meet the physical, social and intellectual development and characteristics of their primary school students. Pre-service teachers can create machinima to use with their primary school students or get their primary students to create machinima. Both actions will engage the pre-service teacher in the process of learning and understanding of the processes involved.</td>
</tr>
<tr>
<td><strong>Standard 2:</strong> Know the content and how to teach it</td>
<td>Pre-service teachers can plan how to incorporate active learning strategies around the discipline content. The use of machinima allows pre-service teachers to experience the use of technology in learning. Annotation of the machinima provides evidence of the development of ICT skills in pre-service teachers. The making of machinima also provides the pre-service teacher skills in relation to the content of their lesson and how to teach the lesson. The viewing of machinima provides the pre-service teacher with ideas on how to develop the lesson to incorporate into their own resources.</td>
<td></td>
</tr>
<tr>
<td><strong>Professional Practice</strong></td>
<td><strong>Standard 3:</strong> Plan for and implement effective teaching and learning</td>
<td>Pre-service teachers are able to practise making learning engaging through the analysis and critiquing of machinima. They can plan how to develop appropriate communication techniques for on-task and off-task classroom activity.</td>
</tr>
<tr>
<td></td>
<td><strong>Standard 4:</strong> Create and maintain supportive and safe learning environments</td>
<td>Pre-service teachers can develop a repertoire of effective teaching strategies and discuss how these might be used to implement effective learning activities in the classroom after viewing the machinima. They can evaluate their own and others’ teaching practices by reflecting on the machinima to ensure they will meet the learning needs of their real primary school students.</td>
</tr>
<tr>
<td></td>
<td><strong>Standard 5:</strong> Assess, provide feedback and report on pre-service teacher learning</td>
<td>Pre-service teachers can plan assessment tasks around the lessons demonstrated in the machinima and develop feedback skills when viewing the performance of others.</td>
</tr>
<tr>
<td><strong>Professional Engagement</strong></td>
<td><strong>Standard 6:</strong> Engage in professional learning</td>
<td>Pre-service teachers can model effective approaches to learning by using self and peer feedback, analysis and critique. Group discussions about machinima facilitate the development of reflective analysis skills as well as how to interact with colleagues.</td>
</tr>
<tr>
<td></td>
<td><strong>Standard 7:</strong> Engage professionally with colleagues, parents/carers and the community</td>
<td>After viewing and reflecting on the machinima, pre-service teachers are better placed to engage professionally with parents/carers and the community on topics of on- and off-task classroom intervention strategies.</td>
</tr>
</tbody>
</table>
Assessment activities using machinima

Suggested assessment activities using machinima, either as a single instance or as multiple instances, have been made available on the website at: <virtualprex.com/assessment/existingmach.html>

An example of a pre-recorded machinima available for teacher educators to use is the “Counting machinima” which can be found at <youtube.com/watch?v=iKXvPOa26o0&feature=youtu.be> (see Figure 6).

![Figure 6. Example of pre-recorded machinima on VirtualPREX website](image)

Following are Rubrics (Tables 4 and 5) that can be used for assessment activities, again, available on the VirtualPREX website.

**Table 4. Rubric for observing key characteristics of teacher portrayed in single machinima**

<table>
<thead>
<tr>
<th>Criterion</th>
<th>No evidence</th>
<th>Some evidence (example)</th>
<th>Extensive evidence (examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-service teacher provided evidence that they could teach appropriate small group activities and lessons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-service teacher provided evidence that they could establish clear and achievable learning goals for primary school students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-service teacher provided evidence that they could engage primary school students in productive learning</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5. Rubric for observing key characteristics of teacher portrayed in multiple machinima

<table>
<thead>
<tr>
<th>Criterion</th>
<th>No evidence</th>
<th>Some evidence (example)</th>
<th>Extensive evidence (examples)</th>
<th>Comparison of effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>machinima 1</td>
<td></td>
<td></td>
<td>machinima 1</td>
<td></td>
</tr>
<tr>
<td>machinima 2</td>
<td></td>
<td></td>
<td>machinima 2</td>
<td></td>
</tr>
<tr>
<td>Pre-service teacher provided evidence that they could teach appropriate small group activities and lessons</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-service teacher provided evidence that they could establish clear and achievable learning goals for primary school students</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-service teacher provided evidence that they could engage primary school students in productive learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Constructing your own machinima – designing your own role-plays

Activities for constructing your own machinima and designing your own role-plays have been made available on the VirtualPREX website at: <virtualprex.com/assessment/constructmach.html>

The SLURL for the VirtualPREX classrooms is: <slurl.com/secondlife/Australis%204%20Learning/145/189/300>. You may choose any available classroom – there are four to choose from – red, yellow, green or blue.

Role-playing is an experiential activity that allows the pre-service teacher to act out a variety of scenarios and reflect on the consequences of the choices they made during the role-play (Gregory & Masters, 2012). By allowing pre-service teachers to practise in a virtual classroom, the teacher educator can allow the pre-service teachers to test their strategies and approaches in a safe environment; they can also facilitate the recording of the role-play for later analysis and critiquing by the teacher educator, the pre-service teacher and their peers. A suggested outline for the components of a role-play is outlined in Table 6.
Table 6. Suggested set of activities for the teacher educator in setting up a role-play

<table>
<thead>
<tr>
<th>Introduction</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Brief profile of actors</td>
<td>Provide a brief summary of the different actors and their roles.</td>
</tr>
<tr>
<td>Summary of the scenario</td>
<td>Provide a summary of the scene and its purpose. Relate this to key learning outcomes that are to be assessed.</td>
</tr>
<tr>
<td>Details of software to be used (if applicable)</td>
<td>Provide relevant URLs and any instructions.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Participation and engagement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Have pre-service students outline their approach to the role-play</td>
<td>Pre-service teachers are to outline their approach, what role the various actors will play, what they expect to do in the scenario and how the scenario will potentially pan out.</td>
</tr>
<tr>
<td>Pre-service teacher activities</td>
<td>Decide how assessment marks/grades will be awarded. What will the teacher educator expect to see in the machinima? Decide on core activities that must be present for satisfactory performance and what is additional. What feedback will you provide?</td>
</tr>
<tr>
<td>Analysis of machinima</td>
<td>Will you give marks/grades for the quality of the machinima or just the analysis of the actions and reflections of the pre-service teachers?</td>
</tr>
<tr>
<td>Annotated machinima</td>
<td>Will you expect pre-service teachers to annotate their machinima with commentary so you can mark/grade their reflections on their own work? Will peer assessment be used where other pre-service teachers comment on each other’s machinima?</td>
</tr>
<tr>
<td>Debriefing sessions</td>
<td>Will you choose some machinima for class discussions?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grading/marking and feedback</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Group work</td>
<td>Will you allow pre-service teachers to work in groups or will this be an individual activity?</td>
</tr>
<tr>
<td>Weighting of assessment components</td>
<td>What will be the weighting for the assessment? Will the quality of the machinima count for marks/grades? Will you have set questions for the reflective components?</td>
</tr>
<tr>
<td>Peer assessment</td>
<td>Will you use peer assessment for summative or formative purposes?</td>
</tr>
<tr>
<td>Feedback</td>
<td>What form will the feedback take for the machinima?</td>
</tr>
</tbody>
</table>

A list of available tools has been made available on the website at: <virtualprex.com/assessment/resources.html>. Recording the role-play in the virtual world as a video (machinima) provides a graphical, audio and text record of the activity that can be stored for reuse as a learning or assessment artefact. A useful resource is Snelson (2010) for pointers on educational machinima based on Second Life.

Pre-service teachers can develop a rubric against the AITSL standards (see Table 7) and this has been made available on the VirtualPREX website at: <virtualprex.com/assessment/developrubric.html>
Table 7. Rubric for identifying activities that evidenced the AITSL National Professional Standards for Teachers in the chosen machinima

<table>
<thead>
<tr>
<th>Domains of teaching</th>
<th>Standards</th>
<th>Observation of machinima</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Knowledge</td>
<td>PK1. Know students and how they learn</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PK2. Know the content and how to teach it</td>
<td></td>
</tr>
<tr>
<td>Professional Practice</td>
<td>PP1. Plan for and implement effective teaching and learning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PP2. Create and maintain supportive and safe learning environments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PP3. Assess, provide feedback and report on student learning</td>
<td></td>
</tr>
<tr>
<td>Professional Engagement</td>
<td>PE1. Engage in professional learning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PE2. Engage professionally with colleagues, parents/carers and the community</td>
<td></td>
</tr>
</tbody>
</table>

Annotation of video (machinima)

A list of instructions and available tools has been made available on the website at: <virtualprex.com/assessment/annotatemachinima.html>. Please view instructions for Rubric A and B on the website (see Tables 8 and 9).

Table 8. Rubric A for annotation of machinima

<table>
<thead>
<tr>
<th>Observed in machinima</th>
<th>No evidence</th>
<th>Some evidence (example)</th>
<th>Extensive evidence (examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-service teacher provided evidence that they could teach appropriate small group activities and lessons</td>
<td></td>
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</tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pre-service teacher provided evidence that they could engage primary school students in productive learning</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 9. Rubric B for annotation of machinima

<table>
<thead>
<tr>
<th>Observed in machinima</th>
<th>No evidence</th>
<th>Some evidence (example)</th>
<th>Extensive evidence (examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence of lesson plan effectiveness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning activities were contextual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evidence of strategy behind approach to primary school student engagement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evidence of strategy behind approach to classroom management</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Resources for teacher educators and pre-service teachers can be found on the VirtualPREX website at: <virtualprex.com/assessment/resources.html>
Chapter 4 – Bots: Achievements in theory and practice

An aim of the VirtualPREX project was to create a prototype for primary school student bots and an automated classroom where pre-service teachers could practise teaching their skills asynchronously. Role-plays in education rely on the need of multiple participants who are in the same space at the same time. The same applies in the VirtualPREX classroom with pre-service teachers controlling all primary school student avatars as described in the VirtualPREX role-play activities. The alternative is to have some of the primary school student avatars being controlled by the computer; so-called bots or non-player characters.

For the VirtualPREX project, a number of bots have been created. Eight have been programmed from scratch and three using Second Life bot software (6 male and 5 female). These are outlined in more detail below. A separate classroom was built on Australis 4 Learning to house these bots. The bots have been dressed in a similar fashion to the primary school student avatars in the VirtualPREX classrooms, however, they are not coloured coded and wear white shirts.

Bots, computer-controlled avatars interacting with the virtual environment, are used to fill gaps where the context needs background, but without using real humans to control the avatars. Most important is the automation of processes, imitating the behaviour of real users and providing an impression that the bots are not following predefined orders (scripts), but that they react to stimuli in context and provide a realistic look and feel.

The use of bots will enable pre-service teachers to repeat lessons to perfect their teaching skills. The scenarios can also be repeated with the bot in a controlled environment. With role-plays using real people, there is no control over the behaviour of the primary school student avatar and there is no guarantee that the pre-service teachers operating the primary school student avatars will follow certain sequences. In contrast, the bots are programmed to respond in certain ways to certain triggers and they will exhibit pre-defined reactions and each pre-service teacher will have the same experience. The same scenario can be repeated with the bot with multiple pre-service teachers controlling the teacher avatar.

Levels of complexity for bots

With the advancement of bot technology, which permits increased interaction, bots are now able to exhibit similar behaviours to those shown in role-plays. The stages of interactivity are visually outlined in Figure 7 and demonstrate the levels of complexity of bot development.

**Level 1:** Bots merely reflect characteristics of a background actor without speaking or acting parts.

**Level 2:** Bots are linked to the environment, are interactive and react to direct mapping of stimuli to a predefined reaction, including other objects, avatars, or bots in the virtual environment. Bots have a predefined set of sensory detectors and the corresponding actions to be triggered.

**Level 3:** The bots require knowledge and experience from previous scenarios being stored in the form of scripts, and reactions are triggered and executed in response to given stimuli. Due to their past experiences they can decide on the best possible reaction given a specific scenario. The same stimuli could therefore result in a completely different reaction.
**Level 4:** Bots demonstrate an artificially intelligent behaviour. They can develop individual characteristics to become unique even though they start with exactly the same setting. They evaluate each stimuli-reaction for improvement in their artificial intelligence and interpret stimuli on the basis of these experiences rather than a database. Individuality enables the creation of bots with unique starting parameters, providing a stronger immersion and authenticity to the virtual world environment.

**Level 5:** Bot behaviour appears to be autonomous detached from any predefined script, their reaction becomes an interaction with the virtual world environment where the stimuli causes the reactions but the bot is able to initiate actions on its own.

![Complexity of bot interactivity](image)

**Figure 7.** Complexity of bot interactivity

**Development of the VirtualPREX bots**

**Programming behaviour of bots**

The VirtualPREX bots were developed so that pre-service teachers could undertake role-plays asynchronously, without the need for their peers to take on a primary school child role. Figure 8 shows one simple example of how the programming of a bot can be represented. Figure 9 is a more detailed example. Here, the bot has three different states (“on task”, “off task” or “disruptive”) and different transitions from one state to the next. The arrow indicates the direction of the transition, while the caption describes the required action for initiating the transaction; with a given probability that the transition will be actually followed up. For example, with a probability of 90%, the bot will stay focused on the task if the teacher addresses the class (using voice or chat); while in 10% of the cases the bot drifts in to an off-task state. The off-task state has multiple transitions; the first one is about the teacher ignoring the primary school student bot that will cause either no changes (90%) or put the bot into a disruptive state (10%). The second transition is about the teacher actually addressing the primary school student bot (looking at, addressing or being in close proximity to the bot) and by this, reminding the primary school student bot to be on task again (90%) or alternatively, not achieving any transition (10%).

The states are associated with specific inworld scripting, which is executed whenever a transition to this state is complete. The bots being built based on this model are rather simplistic. However, they are very effective in representing an interactive background performance in a scenario. The bots respond to changes in the environment (such as something being added, deleted or moved) or to being directly addressed. The script being
executed on transitions are, in principal, unrestricted and can be everything from a simple gesture being played inworld or complex tasks. These tasks could be anything from standing up, walking over to the window and looking outside before returning to the desk and continuing with another activity.

The initial sequence of the given behaviour is that the bot is walking from the login location to sit at an assigned desk within the classroom. The initial state is set to be on task. The server is “listening” for a specific action to occur in the environment; e.g., every movement of a teacher avatar is recognised so that distances to the bot (including the point of view to where a teacher avatar is looking) can be calculated to trigger possible actions. In this case, the bot programming is mainly focusing on playing gestures and therefore visually represents the behaviour according to the state. Reading a book, paying attention or writing in a book represents the on-task state. The off-task primary school student bot may be dancing or making noise or misbehaving. In cases when the teacher ignores the primary school student bot they may become disruptive. From this stage, the only action allowed by the current script is either the passing an object (e.g., book to read, crayons to paint) to the bot or talking to them to them calm down or to direct to them to read a book.

![Figure 8. Basic schematic for bot programming](image)

Figure 8 is a schematic developed to demonstrate the processes of interactivity between the primary school student bots and the human-controlled teacher. The bot will go to an on-task or off-task behaviour depending on the input it receives from the teacher. Behaviour has the potential to escalate depending on the decisions the teacher makes.
Figure 9 outlines a more detailed schematic for bot programming demonstrating various ways in which a bot may react to certain strategies being used by the teacher. For example, the teacher may say the bot’s name and therefore the bot may progress to on-task. The schematic demonstrates that the bot can take different actions depending on the response from the teacher. Some of the branches are random, others are dependant on the reaction of the teacher.

![Schematic for Bot Programming](image)

**Figure 9.** Comprehensive schematic for bot programming

**Process and outcome**

For VirtualPREX, different technologies were investigated, however, it was decided to proceed with a new, unique development and use bots available through Second Life technology as filler bots, not for interacting with the teacher. The development was kept general for reusability in future environments and to allow for extensibility. Requirements for VirtualPREX were:

- Server-based development for autonomous bots;
- Control of bots by non-technical users;
- Scripting bot behaviour by non-technical users.
Server-based development to control bot behaviour

The continuous availability of bots in the virtual worlds requires a server-based development of bots. In addition, the bots have to be programmed to exhibit basic behaviour if there is no simulation running, yet be able to be programmed to work in specific scenarios. Another requirement is to be programmed by non-technical users; at least with respect to simple but sophisticated behavioural patterns. One example is certain state-diagrams, where the bot changes between different states based on stimuli; reacting with certain actions such as gestures (see Figures 8 and 9). The development of the VirtualPREX bots used LibOpenMV. VirtualPREX bots have been developed to Level 3, as outlined in Figure 7. The bot programming is complex and difficult and requires a considerable amount of time; thus the final result resembles an experimental prototype rather than a final release candidate.

Control of bots by non-technical users

There were three bots created for the VirtualPREX project as Pikku bots. These bots are a registered Second Life user but are created so that they can be programmed as per the requirements of their “master”, in this case Jass Easterman. The Pikku bots also have a Pandora script embedded in them so that they can interact in basic conversations with other avatars. Finally, a logic system has been created so that the bots can carry out tasks.

Figures 10 and 11 displays the three Pikku bots and the classroom on Australis 4 Learning in Second Life. These bots can be used by anyone and there is a comprehensive “How to” section constantly being updated on the VirtualPREX website. These can be found at <virtualprex.com/sshowto.html>

Figure 10. Three Pikku bots in Australis 4 Learning classroom as part of VirtualPREX

Figure 11. VirtualPREX classrooms used with bots
Chapter 5 – Reflections on the success and limitations of the VirtualPREX project

Factors that were critical to the success of the VirtualPREX approach

There were a number of factors that were critical to the success of the VirtualPREX project:

- It was a crucial part of the project design to have varied experience and expertise among the project members which gave the project a broad knowledge base to draw upon. This enabled team members to know what their specific roles and responsibilities were within the project and worked very successfully.

- The close communication and collaboration between the project team members and the close working relationship established between the team leader and the Project Manager was a feature of the project. Monthly face-to-Face Skype meetings and targeted face-to-face team meetings assisted in keeping team members informed and identifying goals and actions to progress the project.

- The excellent mentoring by the project’s independent evaluator and regular meetings between the project leader, project manager and independent evaluator enabled the smooth running of the project.

- The efficient and timely development of the VirtualPREX infrastructure such as the virtual classrooms and primary school student avatars allowed the project to progress on target.

Factors that impeded the VirtualPREX approach

- A number of team members changed institutions during the life of the project. This had varying effects ranging from one team member having to leave the project to other team members having to reduce their input due to increased time pressures from their new positions.

- With regard to the bots, a number of factors impeded their development. Bots proved to be difficult to program to the levels of complexity required in this context and environment and it was discovered that different levels of bots were required. The delay in the development of the bots meant that we were unable to test the classroom with the pre-service teachers asynchronously.

- There were problems experienced at some institutions with regard to computer capacity to run Second Life successfully for all their students. This meant we were unable to pilot test the VirtualPREX environment at all the institutions.

- The project leader was in contact with the three reference group members, however, was unable to progress discussions due to everyone’s busy schedules.

Evaluation

There were various methods of evaluation throughout the project.

Self-evaluation

- Team meetings via Skype – during the course of our monthly meetings, team members constantly checked with each other on project timelines and goals and ensured that the project was on task.

- Face-to-face meetings – goals were set at these meetings and revisited to ensure that the project was able to meet outcomes and deliverables.
Team workshops – during all face-to-face meetings the team participated in workshops run by other members of the team to demonstrate the resource that they were developing. This enabled team input. Also, on two occasions, when all the team could not come together, team members with the relevant expertise met at different workshops to design and develop various resources. On several occasions, during Skype meetings, team members would conduct an online workshop demonstrating a resource they were developing.

Evaluating the VirtualPREX environment

- Surveys were sent to all students who undertook role-play activities to evaluate the VirtualPREX environment and provide feedback on ways in which it could be altered or improved.
- Questionnaires were completed by all academics who had made observations or participated in demonstrations as part of their professional development to ascertain their view of the VirtualPREX environment, the classrooms, primary school student avatars and role-play activities.
- Clustr maps were created for the VirtualPREX website on 16 August 2011. Since this time to 15 December 2012, there have been 1,081 visits to the website. The main breakdown is as follows:
  - Australia – 592 visitors (New South Wales 339, Victoria 95, Queensland 47, Western Australia 31, Australian Capital Territory 14, Tasmania 10, South Australia 8 and N/A 48)
  - USA – 210 visitors
  - Canada – 27 visitors
  - United Kingdom – 22 visitors
  - With the rest spread evenly across Europe, Asia, South America and the Middle East
- Google Analytics was established in November 2011 – some statistics are as follows:
  - 26.03% of visitors to the VirtualPREX website are returning visitors
  - 91.7% are from English speaking backgrounds
  - The average duration of each visit is 58 seconds

Independent evaluation

- An independent evaluator undertook summative and formative assessment of the project (report available in Appendix 1).

Sharing of Project Outcomes

A protocol for sharing of the VirtualPREX resources has been made available on the VirtualPREX website: <virtualprex.com/outcomes.html>
Dissemination

In addition to the number of publications resulting from the project, other methods of dissemination were as follows:

- The VirtualPREX team participated in an online presentation of VirtualPREX and discussion and demonstration of TeachLivE with the TeachLivE team (Mike Hynes, Angel Lopez, Jacqueline Rodriguez, & Morgan Russell) at University of Central Florida, US.
- Three team members: Sue Gregory, Yvonne Masters and Vicki Knox met with a focus group of teacher educators to discuss the project and gather data to inform the VirtualPREX role-plays, UNE, Armidale.
- Three team members: Sue Gregory, Yvonne Masters and Vicki Knox gave a demonstration of VirtualPREX to ACU education staff, ACU, Strathfield, Sydney.
- Two team members: Sue Gregory (online in Second Life) and Barney Dalgarno gave a demonstration of the VirtualPREX classrooms and role-play to education staff at CSU, Wagga Wagga and Bathurst, synchronously.
- The VirtualPREX newsletter was sent out to all members of the Australian and New Zealand Virtual Worlds Working Group, educators in the UNE School of Education and was posted on the VirtualPREX website – see Appendix 14.

Linkages

Knowledge gleaned from Boud’s ALTC Fellowship (2010), Student assessment for learning in and after courses, and Crisp’s ALTC Fellowship (2011), Rethinking assessment in the participatory digital world – Assessment 2.0, have informed the assessment strategies undertaken in this project and

The VirtualPREX project has lead to Torsten Reiners, in collaboration with Sue Gregory, the successful submission of an OLT project (ID, Round 2, 2012) “Development of an authentic training environment to support skill acquisition in logistics and supply chain management”. This new OLT project will benefit from VirtualPREX as the current bots will be enhanced to increase their capabilities for interaction in the classroom.
Chapter 6 – Future directions

The VirtualPREX project has developed and pilot tested the VirtualPREX role-plays and the VirtualPREX classroom environment. The pilot tests showed that these are valuable resources and the next stage of development is to get these resources into the curriculum and have them utilised by teacher educators. To this end the next steps following this project will be:

- Opening up of the VirtualPREX classrooms to pre-service teachers and teacher educators. The challenge will be to get stakeholders engaged with and utilising the VirtualPREX environment. There needs to be a process of engaging other institutions in the use of the VirtualPREX role-plays, classrooms, bots, machinima and assessment tasks.
- Further enhancement of the interactive tools available in the VirtualPREX classrooms and environment.
- Further development of the bots and the asynchronous component of the VirtualPREX role-play with the bots.
- The VirtualPREX project was targeted at primary school students. The ability to use VirtualPREX now needs to be extended across the sector into the areas of secondary teaching and early childhood.
- The primary school student avatars can be developed to permit a range of practice situations e.g., cultural awareness, behaviour disorders.
- It would be useful to test VirtualPREX with a wider range of people/groups across other settings.
- VirtualPREX could be transferred to another virtual world platform to widen its usability with other audiences.
- While machinima have been created and assessment rubrics developed, there was not time in the life of the project for these to be modelled or trialled. Assessment on machinima could be trialled across a wider body of institutions.
- It would be beneficial to have machinima shared across the sector with teachers developing their own machinima and placing them on a common website and sharing learning activities, assessment tasks and rubrics.
- Use of the environment and role-play possibilities would be useful for research on teacher identity.
- There were mixed responses to the use of text chat and audio. If audio were to be used in a computer laboratory, then suitable equipment would need to be purchased. This could provide more authentic learning experiences for the on-campus pre-service teachers. Further study needs to be undertaken comparing these modes of communication efficacy within the Second Life environment for VirtualPREX purposes.
- VirtualPREX could be expanded with a focus on the impact of VirtualPREX environments on student learning and professional experience placements.
- VirtualPREX be expanded across other discipline areas and applications beyond pre-service teacher practice.
Conclusions

The VirtualPREX project has developed a prototype for pre-service teachers and later year students to practise their teaching skills either synchronously or asynchronously. Machinima for assessment has been created for use in both formative and summative assessment by self, peer and teacher assessments. Bots have been developed for teachers to practise their skills when peers are not available for role-play activities. The project has produced a space that now provides potential for academics to use with pre-service teachers in a unique and risk free environment. VirtualPREX activities do not work with real children but virtual avatar school children. This enables pre-service teachers, in the initial stages of their professional learning, the ability to test strategies that cannot be undertaken in the real classroom as this can be a risk to school children. Machinima has been created through the use of primary school children avatars so that real children are not required, again, minimalising the risk. The VirtualPREX environment provides additional elements not available through traditional role-play activities with peers. It provides anonymity as the teacher doesn’t know who their peers are when undertaking the role-play activities. It also puts the role-players into the form of primary school children and adult teacher for the role-play adding to the authenticity of the activity.

Dissemination of this project can be found on the VirtualPREX website <virtualprex.com> and information on how to get started using the resources already created and available to anyone wishing to use the VirtualPREX classrooms, resources, machinima and assessment tasks.
Publications and presentations from the VirtualPREX project

The VirtualPREX team have disseminated various publications through book chapters, conference proceedings and presentations, which are detailed below. These can also be found on the VirtualPREX website, which will continue to be updated beyond the life of the project: //virtualprex.com/dissemination.html

Book chapters


Reiners, T., Gregory, S., & Knox V. (forthcoming, Editors acceptance). Virtual bots, their influence on virtual worlds and how they can increase immersion in VirtualPREX. In S. Gregory, M.J.W. Lee, B. Dalgarno, & B. Tynan (Eds.), *Virtual worlds in online and distance education.*

Article


Refereed conference papers


Gregory, S., & Gregory, B. (2011). Do virtual worlds have a role in increasing student engagement as measured by their higher academic grades? In M. Docherty & M. Hitchcock (Eds.), *CreateWorld 2011 Proceedings* (pp. 40–50). Brisbane, Australia: Griffith
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Conference papers and presentations


Gregory, S. (2012, March). VirtualPREX: Virtual professional experience with bots and state of play of virtual worlds in Australia. Online presentation and panel discussion to the Follow the Sun Conference, University of Athabasca, Canada.


Gregory, S., & Gregory, B. (2010, December). Do virtual worlds provide an avenue to engage students in their studies? Presentation at CreateWorld2010, Brisbane.


**Seminar presentations**


References


External Evaluation Final Report of the OLT Funded Project: VirtualPREX

November 2012
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The external evaluator would like to gratefully acknowledge all willing participants who gave up their time to provide valuable feedback through their participation in surveys and interviews.

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EXECUTIVE SUMMARY

Purpose

This evaluation is not an evaluation of the impact of the project outputs. Instead, the evaluation strategy is aimed to monitor project progress; provide formative input towards supporting the project to achieve the intended aims; and provide a summative view of the project’s capacity to achieve the project aims and intended outcomes.

Key findings

The evaluation found evidence of a sustainable framework of resources, a sound awareness raising dissemination strategy and robust project processes that facilitated these developments. In particular, the evaluation found evidence of:

- The development of re-useable resources that can be used in preparation of pre-services teachers in synchronous and asynchronous activities;
- The development of resources that can be used to support teaching, learning and assessment;
- The development of assessment activities and guidelines to support the implementation of VirtualPREX;
- Pilot testing of the resources in a range of settings;
- A high level of awareness raising dissemination activities in the form of conference presentations, seminar presentations and journal articles;
- Development of an ongoing website hosting all materials;
- Focus on the development of the resources, especially the 3D virtual environment rather than on wider dissemination and encouraging uptake resulting in project outcomes that are poised for further development and implementation.
A: INTRODUCTION

Background and context

The overarching purpose of the VirtualPREX project is to investigate how to design and implement a 3D virtual environment that is able to facilitate effective formative assessment of teaching practice. The design will assist pre-service teachers acquire a better range of professional skills, be more confident of their skill set and develop a more realistic understanding of their abilities before being placed in real classrooms.

Project aims

The VirtualPREX proposal aimed to:

- support deeper professional learning experiences for pre-service teachers by providing expanded opportunities for quality professional practice sessions using formative assessment activities in a highly interactive, 3D virtual world;
- transfer emphasis to peer- and self-led learning, with less reliance on supervisors, as well as providing greater flexibility and access to off-campus students through the use of automated robots as an alternative to humanly-controlled avatars;
- provide a national, comprehensive, immersive, 3D virtual environment with spaces and resources designed to facilitate authentic teaching practice and formative assessment activities;
- address attrition/loss of undergraduate and novice teachers by better equipping them for their professional roles;
- leverage the Government’s broadband initiatives and provide diverse professional experience options for off-campus students, particularly remote and regional users;
- encourage partnerships to develop and implement a national approach to a virtual pre-professional experience space to reduce fragmentation of effort, make best use of investments, minimise barriers to effective use and sharing of resources, and maximise access;
- promote and support strategic change for access to this pre-professional experience for pre-service teachers;
- embed formative assessment into Australia’s national pre-service teacher curriculum in a consistent way independent of specific technologies; and
- extend the VirtualPREX concept across the higher education and VET sectors nationally.

Project deliverables

The project proposed to develop a series of outputs that could be disseminated:

- documentation of principles and guidelines for developing and implementing formative assessment in a 3D virtual world based on application of social constructivist pedagogy for learning activities
- a broader evaluation of the usefulness of Second Life in meeting the project aims for pre-service education students across the five institutions
- the creation of a prototype primary school student bot and an automated classroom where pre-service teachers can practice teaching skills by themselves, with other students and/or their academic teacher
- a space to create and use machinima for self, peer, formative and summative assessment
guidelines for using machinima as a resource for assessment tasks and discussion of standards
assessable tasks for individuals or groups for use by higher educational institutions worldwide
guidelines for encouraging effective teaching strategies through role-play
an agreed protocol for sharing future use and development of VirtualPREX

Project intended outcomes
The project aimed to develop, refine, document, evaluate and disseminate a methodology designed to directly address the learning and teaching of disciplinary epistemologies within university classrooms.

External evaluator
Deanne Gannaway is a Lecturer in Higher Education in the Teaching and Educational Development Institute (TEDI) at the University of Queensland. Since joining TEDI in 2008, she has assumed the role of Head of the Evaluations Services Unit, where she is responsible for the day to day management of the student evaluation of teaching processes within UQ. This function includes oversight of quality assurance and enhancement of activities such as supporting academics conduct evaluation of teaching and learning activities; supporting curricula reviews; reporting to the University on national surveys and participating in institution-wide committees related to the policy and strategic dissemination and use of data collected. Her research interests focus on the development of evidence-based frameworks for evaluation and enhancement of higher education curriculum. As such, Deanne is frequently called on to offer advice on appropriate evaluation approaches and methods for large scale teaching and learning projects and curriculum based activities. Deanne has been actively involved in a number of national teaching and learning funded projects. She has also been commissioned as the external evaluator on a number of large scale ALTC-funded projects and fellowship programs.

The evaluation approach
This external evaluation proposes to adopt an approach recommended by the Key Evaluation Checklist developed by Scriven to develop an analytical framework. The Scriven (2007) (see Stufflebeam, 2001; Davidson, 2005; Martz, 2010) framework has been commonly used to evaluate programs, plans and policies and allows for a multi-layered mixed method mode of investigation. The approach adopts a formative evaluation approach that facilitates the project team to reflect on the project progress rather than solely adopting a summative approach that measures impact or attainment. The project evaluation aims to track the project team’s sphere of influence and potential for sustainability beyond the life of the project.

This evaluation is not an evaluation of the impact of the project outputs. Instead, in keeping with the Scriven approach, the evaluation aimed to ascertain the success of the project in relation to its vision, mission, goals, deliverables and plan. The evaluation strategy aimed to ascertain the success of the project in relation to its vision, mission, goals, deliverables and plan. In keeping with the Scriven approach, the following broad criteria were identified in the project proposal as a guide for the evaluation process

- measurement of achievement of project goals, objectives and intended outcomes;
- assessment of whether needs of stakeholders such as students, staff, project participants and funding body are being met;
- advice on the relevance, appropriateness and quality of the chosen investigation and project management strategies used in the project;
- identification of good practice and areas for improvement across the project life; and
- appraisal of effectiveness of dissemination and take-up among stakeholders.
These criteria informed the development of the key evaluation questions:

1. Were project goals, objectives and intended outcomes achieved?
2. How relevant and appropriate were the chosen project plans, activities and strategies for achieving the project aims?
3. How effective are the chosen dissemination strategies?

The formative evaluation approach adopted requires a close working relationship between the project leaders and the project team and the external evaluator in order to monitor and advise on evaluation, dissemination, resourcing and investigation strategies adopted by the project team. This approach enables the identification of good practice and areas for improvement across the life of the project and, most importantly, enables the project team to respond to the areas identified.

The evaluation activities began in April 2011 and concluded in November 2012.

About this report

This summative report offers an overview of the external evaluation approach and method, an overview of the data collection strategies and a synthesis of findings against each of the above questions, before offering conclusions. The report concludes with an invited response from the project leader to the evaluation findings prior to submission to the funding body.
B: EVALUATION PROCESS

The following data collection strategies were used to collect and analyse the required data against the relevant evaluation questions:

1. **Were project goals, objectives and intended outcomes achieved?**
   - a. Review of project deliverables
   - b. Semi-structured interviews with project team members
   - c. Email survey of stakeholders

2. **How relevant and appropriate were the chosen project plans, activities and strategies for achieving the project aims?**
   - a. Monitoring project progress through regular evaluation meetings with project leader and project officer
   - b. Observation of project team meetings
   - c. Review of project plans and reports and project activities conducted
   - d. Review of investigation through independent analysis of evaluation data collected across the life of the project

3. **How effective are the chosen dissemination strategies?**
   - a. Monitoring of potential influence
   - b. Review of project reach

**Achievement of project goals, and intended outcomes**

1. **Review of project deliverables**

Project deliverables were reviewed across the life of the project, with input provided as part of the development process. The evaluator is not a content expert and is not in a position to evaluate the accuracy or relevance of the resources developed. Instead the resource was evaluated according to the following criteria: (a) accessibility by potential end users; (b) quality of evidence base used towards development; and (c) alignment with project aims and goals. Drawing on these criteria, the external evaluator acted as a critical friend, providing formative input across the development processes.

2. **Project team members interviews**

Project team members were interviewed on two occasions: the first an informal interview by the external evaluator at a face-to-face meeting early in November 2011 and the second a series of telephone interviews conducted by an independent researcher employed by TEDI. In both cases a semi-structured interview format was used and in both instances 6 of the 7 team members contributed a statement. All interviews were summarised and subjected to a thematic analysis. The semi-structured questions are included as Appendix 1.

3. **Email survey of stakeholders**

An email survey was conducted, targeting participant observers who are potential adopters of project outcomes. In acknowledgement of possible survey fatigue, rather than an online survey, a quick email-based survey was sent to participants. A copy of the questions is available as Appendix 2.

The survey was sent to 7 individuals resulting in only two responses. Due to the limited sample and the limited response, the survey data were not used in this report.

**Project progress**
1. Monitoring project progress through regular evaluation meetings with project leader and project officer

Since April 2011, the project leader, project officer and the external evaluator have conducted monthly “check-in” meetings to monitor project progression. These were conducted, in the main, as Skype meetings. The evaluator acted as a sounding board and a critical friend in these interviews. Most of these meetings were summarised and notes kept from each occurrence in the form of interim evaluation reports. These reports were reviewed before each meeting to ensure continuity between each meeting and to establish whether issues raised previously had been addressed by the next meeting.

2. Observation of project team meetings

In addition to focused evaluation meetings, the external evaluator participated as an observer in face-to-face project team meetings and most Skype meetings.

3. Review of project plans and reports

Progress reports submitted to the OLT since July 2011 were reviewed prior to submission and feedback given. Project plans were discussed during the evaluation meetings and project timelines reviewed.

4. Review of data collected by project team

The external evaluator reviewed survey instruments and data collected and provided feedback for refinement of the instrument. Advice was offered regarding observation strategies and tools for gathering observational data. Feedback on the materials developed for this purpose was also provided.

Effectiveness of dissemination strategies

1. Monitoring of potential influence

Data were gathered regarding potential influence of the project on the potential uptake of project deliverables beyond the project team. This strategy included recording details regarding potential adopters who observed student workshops and people who indicated their interest in following up project progress.

2. Review of project reach

Monitoring of the dissemination activities conducted by the project team meant that it was possible to establish whether there was a potential to spread project outcomes beyond the life of the project. Project activities were recorded. Both of the above datasets were collated into a Wheel of Influence Tool (King, 2010). This tool was used to track the spheres of influence of the project program. The combination of an Excel spreadsheet and visual representation of the data has been used to provide a clear picture of the spread of dissemination activities. The data were reviewed to determine the possible breadth of participation.
C: FINDINGS

1. Achievement of aims and outcomes

Soon after project progress, the website was established. The aims and goals were publicised and reframed as short term and long term goals. The following were reclassified as short term goals:

- support deeper professional learning experiences for pre-service teachers by providing expanded opportunities for quality professional practice sessions using formative assessment activities in a highly interactive 3D virtual world
- documented principles and guidelines for implementing role-plays and formative assessment activities (especially self-review)
- transfer emphasis to peer- and self-led learning, with less reliance on supervisors, as well as providing greater flexibility and access to off-campus students
- use automated bots as an alternative to humanly-controlled avatars

The following goals were classified as medium to longer term aims:

- provide a national, comprehensive, immersive, 3D virtual environment with spaces and resources designed to facilitate authentic teaching practice and formative assessment activities
- address attrition/loss of undergraduate and novice teachers by better equipping them for their professional roles
- leverage the Government’s broadband initiatives and provide diverse professional experience options for off-campus students, particularly remote and regional users
- encourage partnerships to develop and implement a national approach to a virtual pre-professional experience space to reduce fragmentation of effort, make best use of investments, minimise barriers to effective use and sharing of resources and maximise access
- promote and support strategic change for access to this pre-professional experience for pre-service teachers
- embed formative assessment into Australia’s national pre-service teacher curriculum in a consistent way independent of specific technologies
- extend the VirtualPREX concept across the higher education and VET sectors nationally

There is evidence from across the life of the project that elements of the short term goals were achieved.

- An interactive 3D classroom has been developed to allow professional learning experiences for pre-service teachers. These sessions provide opportunities for professional practice sessions. The classroom sessions have been tested across three institutions using different delivery strategies. Data have been collected about the possible impact of the experience on student learning through surveys, observations and feedback from potential academic users. The materials and the workshop developed emphasise peer- and self-led learning.
The online nature of the materials, in principle, ensures that there is greater flexibility and access for off-campus students, although across all informants, there is a concern that the technological skills required for successful interaction require prior experiencing with the virtual world and a familiarity with the context.

- In addition, the development of automated bots as an alternative to humanly-controlled avatars should enhance the capacity of pre-service teaching students to engage in self-directed learning. This capacity has not yet been proven as the bots are still in testing phase.
- A series of machinima and assessment tasks have been developed for formative assessment activities. Principles and guidelines for implementation that meet national accrediting body standards and documented good practice have been developed. They are made available via the project website and the final project report.
- An outcome of the project has been to develop a stable immersive, 3D virtual environment with spaces and resources designed to facilitate authentic teaching practice and formative assessment activities. This resource is available for other academics with responsibility for pre-service teaching experiences.

In short, the project has resulted in the development of a re-useable resource that can be used in preparation of pre-service teachers in synchronous and asynchronous activities which have been pilot tested in a range of settings. In addition, resources have been developed that can be used to support teaching, learning and assessment, as well as assessment activities and guidelines to support the implementation by other academics responsible for supporting practical experiences of pre-service teachers.

As previously mentioned, there is consensus across the various project informants that the technological expertise required to use the 3D immersive environment may be a hindrance. However, the assessment tasks and guidelines and the machinima resources developed out of the 3D environment are viewed to be potentially highly useful. These materials have not yet been tested and the testing across different institutional contexts should be the focus of any projects that emerge from this one.

Resources (machinima and 3D environment) developed have a focus on one aspect of classroom management at this point: behaviour management. Given that this type of management requires a high level of interaction, the choice of this focus for testing the proof of concept seems appropriate.

Infrastructure issues at RMIT, CSU and ACU in initial testing phases indicate that a fair degree of preparation and investment of time and resources beyond the academic interested in adopting the resource is required. While this is not insurmountable and was resolved in most instances, it does provide a potential further hurdle that may reduce the capacity of academics to take up the resource in institutions where there is not already a high degree of use of similar resources. The adoption of this resource is not a simple “plug and play”, suggesting that interested academics may need to be on the look out for certain institutional conditions in order to use the 3D environment. This is not the case in the machinima resources, suggesting that there may be a potential higher degree of uptake in these areas.

**Recommendation:**

That a set of guidelines or tips for implementation be made available in either the final report as an appendix or on the website that outlines possible processes or hints for adopting academics to be aware of prior to adoption, including the sizeable investment of time prior to adoption.

It is always a challenge developing these types of projects in the comparatively short time frame allocated to these collaborative projects. It is necessary to spend time establishing the project: employing project staff; working through institutional contractual process; establishing working procedures across multi-states all require time. Developing, testing and refining of prototypes need
to happen before it is possible to initiate the longer term outcomes of changing practice of academics and learning of pre-service teachers – the items identified as the mid-term and longer term goals as the project progress. This project was ostensibly a “proof of concept” project; identifying what is required to make a “VirtualPREX” environment work in terms of infrastructure, technological requirements; scripting and evidence of learning. This proof of concept has been achieved. The project deliverables are now at a point where it is possible to be adopted by other teachers and institutions. What is unclear at this point is what the impact on student learning is (in particular, the effect on retention), or what the issues may be in transfer of project deliverables beyond use by project team members to the wider community. In essence, at this point of the project, it is not possible to say with any confidence that any of the following mid- or long-term goals have been achieved:

- leverage the Government’s broadband initiatives and provide diverse professional experience options for off-campus students, particularly remote and regional users
- encourage partnerships to develop and implement a national approach to a virtual pre-professional experience space to reduce fragmentation of effort, make best use of investments, minimise barriers to effective use and sharing of resources and maximise access
- promote and support strategic change for access to this pre-professional experience for pre-service teachers
- embed formative assessment into Australia’s national pre-service teacher curriculum in a consistent way independent of specific technologies
- extend the VirtualPREX concept across the higher education and VET sectors nationally

What is clear, however, is that the project team and the project deliverables are at a point where there are clear, logical “next steps” to enacting these aims. Further testing needs to include a wider group of practitioners.

What is perhaps not clear at this point of the project life is what the proven benefit of the implementation of the VirtualPREX environment is in preference to other experiential mechanisms, such as microteaching, video teaching etc, particularly in light of the substantial investment of time, resources and technical skills required when adopting these tools. There is substantial evidence that alludes to the potential for these resources to afford the opportunity to practise the skills, but at this point, this project only offers the potential for these activities – there is no evidence, yet, that they do indeed do so. This is appropriate at this stage of a research and development project; indicating that the project outcomes are poised to be used as a case in point to test whether these types of tools and mechanisms do, in fact, achieve their promised potential.

**Recommendation:**
That a further supplementary project with a focus on expanding the user group of the resources be developed that implements project outcomes from this project to test (a) the potential for this type of learning environment to be expanded beyond the project team and to identify what the limiters are to successful adoption; (b) the impact of VirtualPREX environments on student learning; and (c) the benefit of the adoption of these mechanisms in preference to other similar mechanisms to achieve the expected pedagogical outcomes. A further project of this nature has implications for other discipline areas and applications beyond pre-service teacher practice.

In addition to the outcomes and deliverables planned and attained, this project also has potentially introduced an additional unintended outcome: a schema of increasing complexities of interactions with bots in a virtual world. This schema has potential for further wide reaching application including research and teaching applications. This development should be monitored in the future.
2. Project process

A key feature of this project has been the cohesive project team. It is rare that a project team across such a wide geographical area, with such diverse interests and expertise and project roles, from such a range of institutions can act in such a cohesive manner. This is particularly evidenced by interviews with project team members whose answers to interview questions were completely consistent. All project team members interviewed referenced the crucial roles of the project leader and project officer in keeping project activities on track and adhering to the project plans timeline and budget.

The project team met regularly (monthly) via Skype with sound minutes and agendas circulated in a timely manner with action sheets clearly delegating responsibilities and deadlines. The periodic face-to-face meetings were of great benefit, effectively creating a series of milestone dates. These meetings allowed for complex issues to be identified and resolved in a highly productive manner.

The manner in which the project was managed and the project plan structured kept the team on task and on track and on budget, a rare feature in other highly collaborative projects. The ability of the project leader to travel and link with members of the project team at various points was highly beneficial. The project leader, in particular, capitalised on travel associated with other events and activities outside of this project to create space to resolve issues when the pressures of other academic workloads and personal issues seemed to have potential to slow project progress.

It should be noted that there was limited involvement in project activities by the reference group members despite attempts to include members at particular points along the project life. This limitation may be the result of a lack of clarity regarding the expected role and contribution to the project by members of the reference group. This phenomenon is a common feature of other projects I have been involved in and is potentially an area that could be addressed by the OLT through drafting supporting guidelines for future project leaders applying or managing grants.

3. Dissemination strategies

A potential limitation of the project was the failure of the project team to identify a clear target audience who would be potential adopters of the project outcomes. This may be the result of the need to build and test the tools, meaning that potential adopters could only be identified later on. This limitation did mean, however, that it was difficult to engage meaningfully with a target audience who could be clear adopters. Examples of this challenge is the project team’s attempt to develop a newsletter outlining project progress. Without a clear audience for the newsletter, however, this activity did not become a major dissemination device. Instead, the dominant dissemination methodology was to raise awareness through conference presentations and presentations to key stakeholders such as the NSW Deans of Education and education staff at partner institutions. These activities successfully identified potential adopters who have expressed interest in the project outcomes. These linkages could be capitalised on in a future project.

The limited range of “disseminatees” for this project did raise a challenge for the external evaluation as there were few opportunities to elicit responses to questions of potential uptake of project outcomes beyond the project team. Hence this aspect remains an unknown.

The awareness raising strategies have been wide reaching and an impressive range of publications have also resulted from this project. These strategies may be more appropriate for what is, in essence, a proof of concept project, and perhaps evidence of implementation beyond the project team would be inappropriate for a project of this nature.

The project team composition and the changes within the team also had an impact on the level of uptake across the partner institutions. The project team was roughly divided into 2 groups: technical experts (in e-learning and e-assessment) and practitioners. One team member changed institutions mid project, effectively reducing the number of institutions with the potential for implementing project outcomes into pre-service curriculum (this institution did act as an initial test site in preliminary project phases).
The website developed as a repository for project outcomes has been visited by a range of individuals, the activity on the site seemingly increasing as a result of conference activity.

**Recommendation:**
The analytics from the website should form some interesting data to inform strategies to target future project participants and potential adopters, should a follow up project be considered a worthwhile activity.

**D: CONCLUSION**

In summary, this project has successfully developed the intended deliverables. These have been pilot tested and are ready for wider circulation and testing. The project has developed a series of resources which have the potential for improving pre-service student teacher practical experiences. In the words of a potential adopter:

*At a time when placements in schools are becoming more difficult to procure, the tool provides an opportunity for pre-service teachers to practise classroom skills in an environment that approximates that of the classroom. I see even greater benefits for students studying education in distance mode. Unlike students studying internally, who have tutorials etc as opportunities to engage with a variety of skill building exercises, these students have little/no opportunity to practise critical skills (such as classroom management skills) prior to practicum placements. This tool can provide them with such an opportunity.*

The VirtualPREX project suggests that the tools developed can, indeed, provide pre-service teacher students with this opportunity – the next task is to see whether this holds true for other aspects of classroom management beyond the behavioural issues scenarios established thus far and whether this is possible using the machinima as well as the 3D virtual world environment. It also remains to be seen whether these issues hold true for institutions and academics outside of the project team. It is highly recommended that a second phase of this project focused on wider implementation and testing be considered by this project team and other interested parties, possibly with the view to compare other mechanisms, resources and pedagogies which aim to the facilitate the ability to practice workplace skills of future teachers.
A response is invited from the project leader to respond to the evaluation findings prior to submission.

From a Project Leader’s point of view, it is invaluable having a critical friend removed from the project to ask relevant questions which enabled the Project Team to stay on task and ensured that they were addressing the project outcomes. The External Evaluator did a brilliant job at doing this. Meetings with the Project Leader and Officer on a regular basis ensured that project deliverables were being met and concerns were addressed. Attendance at the monthly meetings and face-to-face meetings with the Project Team enabled the External Evaluator to grasp the tasks the team were setting out to achieve. We agree with the External Evaluator’s findings.
F: REFERENCES


G: Appendices

Appendix 1: Project team semi-structured interview questions

- To what extent do you think that the project has been able to achieve the project goals, objectives and intended outcomes?
- What are the key successes?
- What are the key factors that have led to this success?
- What do you think are the key challenges that have been faced by this project?
- Any lessons emerging from this project?
- Is there potential for sustainable up-take at your institution?
- What potential do you see for up-take beyond project participants?

Appendix 2: Email Survey

Subject: External Evaluation of OLT funded project "VirtualPREX"

"VirtualPREX" is an Office of Teaching and Learning (OLT) funded project led by Sue Gregory at the University of New England. The project is coming to conclusion with the final report due to the OLT in early January. The materials developed as a result of this project are available [http://virtualprex.com/](http://virtualprex.com/). The project aimed to offer a virtual world space, hosted in Second life, where pre-service teachers can:

- Practise teaching skills prior to practicum placements
- Use the space synchronously or asynchronously, by themselves or interacting with peers, academics and/or ‘bots
- Machinima, for self, peer, formative and summative assessment
- Practise teaching skills with the ‘bots programmed to react to certain triggers
- Experience a range of scenarios in a risk-free environment
- Assessable tasks, using ‘bots to teach, peers to role-play teaching and/or machinima to reflect, assess and provide feedback

A requirement of OLT funded projects is that the project be externally evaluated. I have been working with Sue Gregory in this capacity across the life of this project and am currently drafting the final external evaluation report.

I am contacting you as a potential user of these resources. The external evaluation of this project would greatly benefit from your input regarding the following:

1. Your views on whether the tool would be an advantage
2. Opportunities and hindrances you envisage in implementing VirtualPREX into supporting pre-service teachers
3. Any other comments you may have regarding the possible use of VirtualPREX

A short response to one or both of the above via reply email would be most helpful. You are also welcome to provide commentary on any other aspect of the project deliverables or processes.
Your responses will remain confidential and you will not identified in the report unless you specifically request to be so identified. The external evaluation report is publicly circulated only to the project leader and to the OLT as part of the OLT required “part 2 report”, which is not made publically available. If you would be willing to respond, could you please do so by the 19th of November. Please do not hesitate to contact me with any questions or queries.

I look forward to hearing from you

Regards
Deanne
Appendix 2: Stage 2 Survey 1

VirtualPREX Survey 1
(for completion immediately following the in class virtual worlds role-play activity)

Participant Consent

I understand that by clicking the submit button on the online survey indicates that:

I (the participant) have read the information contained in the Information Sheet for Participants and any questions I have asked have been answered to my satisfaction. I agree to participate in the online survey, realising that I may withdraw at any time. I understand that research data gathered for the study will be published and give my consent for it to be used in this manner provided my name is not used or I am not identifiable in any regard.

This project has been approved by the Human Research Ethics Committee of the University of New England (Approval No. HE11/102 Valid to 16/05/2012.

Should you have any complaints concerning the manner in which this research is conducted, please contact the Research Ethics Officer at the following address:

Research Services
University of New England
Armidale, NSW 2351
Telephone: (61 2) 6773 3449 Facsimile (61 2) 6773 3543
Email: ethics@une.edu.au

Participation in this survey is voluntary. Completing and submitting this survey gives your consent to this part of the research. If you do not wish to participate in the research, please leave this site and do not continue any further.

In this survey, a virtual world is an online electronic presence that imitates real life in the form of a personal presence through someone’s avatar (the alter ego which is a graphical representation of themself in the virtual world).

Thank you for continuing and completing this survey

As explained on the first page, this survey is voluntary.

The survey should take approximately 15 minutes to complete. Questions marked with an * require an answer.

Should you decide that you do not wish to continue participating at any time during the survey, close your browser and the data will not be saved.

Once you reach the end of the survey and click the ‘done’ button, your answers will be saved and will be visible to the VirtualPREX team.

Thank you again for assisting us, Sue Gregory, Yvonne Masters, Barney Dalgarno, Heinz Dreher, Geoff Crisp, Torsten Reiners and Vicki Knox
A. Demographic Information

Please select the most appropriate answer:

**General Information**

1. *Name (Included to allow matching with your responses to a future survey)*
   
2. *Age:
   - ☐ under 21
   - ☐ 21 to 25
   - ☐ 26 to 35
   - ☐ 36 to 45
   - ☐ 46 to 55
   - ☐ 56 to 65
   - ☐ Over 65

3. *Gender
   - ☐ Male
   - ☐ Female

4. My place of residence when not attending university is:
   - ☐ Rural – living on land/property
   - ☐ Rural Town – less than 5000 people
   - ☐ Small Regional Town/City – 5000-18000 people
   - ☐ Small Non-Regional Town/City – 5000-18000 people
   - ☐ Regional City – 18000-50000 people
   - ☐ Non-Regional City – 18000-50000 people
   - ☐ Regional Major City – 50000-250000 people
   - ☐ Non-Regional Major City – 50000-250000 people
   - ☐ Capital City – 50000++ people

5. *The postcode of my place of residence during the semester is: _______________

6. *Institution:
   
7. *Faculty/School/Department:
   
8. *Course enrolled in: _______________

9. *a Academic Year (e.g. Year 1, Year 2, Year 3 or Year 4 of your course):
   
9 b. How many years have you attended university (include the total number of years for all previous courses)? e.g., if you were part time, it may have taken you 8 years to complete a 3 year course - therefore the number required here would be 8. [Please insert a number]
B. Skills and Experience

10 *a. How would you rate your skill level with respect to ICT in general prior to commencing your current course?

- Very high
- High
- Average
- Low
- Very low

10 *b. How would you rate your skill level with respect to ICT now?

- Very high
- High
- Average
- Low
- Very low

11 *a. How would you rate your skill level with respect to virtual worlds prior to commencing your current course?

- Very high
- High
- Average
- Low
- Very low

11 *b. How would you rate your skill level with respect to virtual worlds now?

- Very high
- High
- Average
- Low
- Very low

12 *a. How often do you use the following tools (technology/applications)? Tick the category that is applicable to you at the moment. If you don’t understand a question or have not heard of the tool please select N/A.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Daily</th>
<th>Several times a week</th>
<th>Several times a month</th>
<th>Infrequently</th>
<th>Never</th>
<th>Not Applicable (N/A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Internet in general</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Smartphone</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
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<tr>
<td>Social networking (eg MySpace, Facebook, Twitter)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Networked Games (eg World of Warcraft, Maple Story)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Other 3D Games</td>
<td>☐</td>
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<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Virtual Worlds (eg Second Life, Active Worlds, OpenSim, Club Penguin, Barbie World)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
12 b. Please rate your current perception of your preparedness for professional experience placement in the following areas (on a scale of 1 to 5: 1=very low; 2=low; 3=average; 4=high; 5=very high).

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>1</th>
<th>2</th>
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<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>a. lesson presentation skills.</td>
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<td>b. providing clear instructions to students.</td>
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<td>c. skills in structuring a lesson.</td>
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<td>d. skills in moving about the classroom.</td>
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<td>e. responding to unexpected occurrences.</td>
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<td>f. behaviour management skills.</td>
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<tr>
<td>g. understanding the perspective of students.</td>
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<tr>
<td>h. developing self-confidence as a teacher.</td>
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</tbody>
</table>

12 c. How many professional experience placements have you completed? [Please insert a number]
C. Views and beliefs about virtual worlds for learning and teaching

13 *Please rate the importance of each of the following learning benefits of virtual worlds.

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Extremely Unimportant</th>
<th>Very Unimportant</th>
<th>Unimportant</th>
<th>Neutral</th>
<th>Important</th>
<th>Very Important</th>
<th>Extremely Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. They can assist learners in developing familiarity with a place and the objects within it.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>b. They can be motivating and engaging for learners.</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
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<tr>
<td>c. They can lead to improved transfer of learning to real situations.</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
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<td>☒</td>
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<tr>
<td>d. They can enable more effective collaborative learning.</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
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<td>☒</td>
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</tr>
<tr>
<td>e. They can allow learners to learn through experience in context.</td>
<td>☐</td>
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<td>☒</td>
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</tr>
</tbody>
</table>

D. Evaluation of the virtual worlds role-play activity

14 Which of the following roles did you carry out during the virtual world role-play activity (tick all that you carried out)?
   □ Teacher
   □ Student

15 a. Please use the rating scales below to give an overall rating of the virtual worlds role-play activity you undertook in your workshop. 1=Not at all — 7=Extremely

<table>
<thead>
<tr>
<th>Quality</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confusing</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Difficult</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Irrelevant</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
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<tr>
<td>Interesting</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Easy to use</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
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<tr>
<td>Useful</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Boring</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
</tr>
<tr>
<td>Enjoyable</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☒</td>
<td>☒</td>
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<td>☒</td>
</tr>
</tbody>
</table>

15 b. Please indicate your agreement or disagreement with the following statements about the value of the virtual worlds role-play activity in contributing to your professional skills and
confidence.

<table>
<thead>
<tr>
<th></th>
<th>Very Strongly Disagree (1)</th>
<th>Strongly Disagree (2)</th>
<th>Disagree (3)</th>
<th>Neutral (4)</th>
<th>Agree (5)</th>
<th>Strongly Agree (6)</th>
<th>Very Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. The activity will help to develop my lesson presentation skills.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>b. The activity will help to develop my ability to provide clear instructions to students.</td>
<td>☐</td>
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<td>☐</td>
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<td>☐</td>
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</tr>
<tr>
<td>c. The activity will help to develop my skills in structuring a lesson.</td>
<td>☐</td>
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</tr>
<tr>
<td>d. The activity will help to develop my skills in moving about the classroom.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
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</tr>
<tr>
<td>e. The activity will help to develop my ability to respond to unexpected occurrences.</td>
<td>☐</td>
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</tr>
<tr>
<td>f. The activity will help to develop my behaviour management skills.</td>
<td>☐</td>
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<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>g. The activity will help me to understand the perspective of my students.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>h. The activity will help to develop my self-confidence as a teacher.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

16 Did you have any technical problems with the virtual worlds role-play activity?
☐ Yes
☐ No

If yes, what were these problems and how did you resolve them?
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
17 Aside from technical issues, did you have any problems undertaking the virtual worlds role-play activity?
   ☐ Yes
   ☐ No

If yes, what were these problems and how did you resolve them?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

18 What was the best thing about the activity?
________________________________________________________________________

19 What was the worst thing about the activity?
________________________________________________________________________

20 What is one thing about the activity that could be done differently to improve it?
________________________________________________________________________

21 Do you believe that the virtual worlds role-play activity was helpful in preparing you for your upcoming professional experience placement? If so, in what way? If not, why not?
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

22 Would you like to receive a copy of the final report for VirtualPREX, when it becomes available in December 2012?
   ☐ Yes
   ☐ No
Appendix 3: Stage 2 Survey 2

VirtualPREX Survey 2
(for completion following the completion of the block professional experience placement)

Participant Consent

I understand that by clicking the submit button on the online survey indicates that:

I (the participant) have read the information contained in the Information Sheet for Participants and any questions I have asked have been answered to my satisfaction. I agree to participate in the online survey, realising that I may withdraw at any time. I understand that research data gathered for the study will be published and give my consent for it to be used in this manner provided my name is not used or I am not identifiable in any regard.

Click here to continue on to the Survey

This project has been approved by the Human Research Ethics Committee of the University of New England (Approval No. HE11/102 Valid to 16/05/2012.

Should you have any complaints concerning the manner in which this research is conducted, please contact the Research Ethics Officer at the following address:

Research Services
University of New England
Armidale, NSW 2351
Telephone: (61 2) 6773 3449 Facsimile (61 2) 6773 3543
Email: ethics@une.edu.au

Participation in this survey is voluntary. Completing and submitting this survey gives your consent to this part of the research. If you do not wish to participate in the research, please leave this site and do not continue any further.

Thank you for continuing and completing this survey

As explained on the first page, this survey is voluntary.

The survey should take approximately 15 minutes to complete. Questions marked with an * require an answer.

Should you decide that you do not wish to continue participating at any time during the survey, close your browser and the data will not be saved.

Once you reach the end of the survey and click the ‘done’ button, your answers will be saved and will be visible to the VirtualPREX team.

Thank you again for assisting us, Sue Gregory, Yvonne Masters, Barney Dalgarno, Heinz Dreher, Geoff Crisp, Torsten Reiners and Vicki Knox
1 *Name (included to allow matching with your responses to the earlier survey):

___________________________________________________________________________

A. Overall value of the virtual worlds role-play activity

Questions in this section relate to your perception of the value of the virtual worlds role-play activity that you undertook prior to your professional experience placement, in helping to prepare you for your placement.

2 Please indicate your agreement or disagreement with the following statements about the value of the virtual worlds role-play activity in contributing to your professional teaching confidence.

<table>
<thead>
<tr>
<th></th>
<th>Very Strongly Disagree (1)</th>
<th>Strongly Disagree (2)</th>
<th>Disagree (3)</th>
<th>Neutral (4)</th>
<th>Agree (5)</th>
<th>Strongly Agree (6)</th>
<th>Very Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. The activity helped to develop my lesson presentation skills.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>b. The activity helped to develop my ability to provide clear instructions to students.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>c. The activity helped to develop my skills in structuring a lesson.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>d. The activity helped to develop my skills in moving about the classroom.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>e. The activity helped to develop my ability to respond to unexpected occurrences.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>f. The activity helped to develop my behaviour management skills.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>g. The activity helped me to understand the perspective of my students.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>h. The activity helped to develop my self-confidence as a teacher.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
3 Did you find the virtual worlds role-play activity valuable in contributing to your professional teaching confidence.

If yes, please comment on why you think the activity was valuable.

________________________________________________________________________

________________________________________________________________________

If no, please comment on why you did not think the activity was valuable.

________________________________________________________________________

________________________________________________________________________

4 Please indicate your agreement or disagreement with the following statements about the virtual worlds role-play activity.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Very Strongly Disagree (1)</th>
<th>Strongly Disagree (2)</th>
<th>Disagree (3)</th>
<th>Neutral (4)</th>
<th>Agree (5)</th>
<th>Strongly Agree (6)</th>
<th>Very Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. The virtual classroom environment was realistic.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>b. The children in the virtual classroom behaved like real school children.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>c. I would gain more value from the activity if I could have more practice at playing the role of the teacher.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

5 Please comment on how the nature of the activity or the virtual classroom environment could be improved to make the experience more valuable.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
B. Confidence in your acquisition of professional skills

6 Please rate the following according to their importance in developing your professional teaching confidence.

<table>
<thead>
<tr>
<th></th>
<th>Extremely Unimportant (1)</th>
<th>Very Unimportant (2)</th>
<th>Unimportant (3)</th>
<th>Neutral (4)</th>
<th>Important (5)</th>
<th>Very Important (6)</th>
<th>Extremely Important (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. My university lecturers who teach in my professional experience subjects.</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. My other university lecturers.</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. In-class activities undertaken in professional experience subjects.</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Out-of-class activities and assessment tasks undertaken in professional experience subjects.</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. My university textbooks and other readings.</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. The virtual worlds role-play activity.</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. My supervising teaching while on placement.</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. Other teachers in the school while on placement.</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. My student peers.</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>j. Other</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>k. If Other, please specify:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Appendix 4: VirtualPREX role-play activity questionnaire for observers**

<table>
<thead>
<tr>
<th>VirtualPREX Pre-service Teacher Role-play Workshop: Questions for Observers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>We would like to collect your name and email address if you would be willing to be contacted for the purposes of evaluating the VirtualPREX Project:</strong></td>
</tr>
<tr>
<td><strong>Name:</strong> ……………………………………………… <strong>Email:</strong> ………………………………………………………</td>
</tr>
<tr>
<td>Q1: Please describe your impressions of the VirtualPREX role-play activity?</td>
</tr>
<tr>
<td>Q2: What do you think of the VirtualPREX classroom as a place for pre-service teachers to practise their teaching skills?</td>
</tr>
<tr>
<td>Q3: What aspects of the VirtualPREX role-play activity will be useful in helping pre-service teachers prepare for their professional experience?</td>
</tr>
<tr>
<td>Q4: What aspects of the VirtualPREX classroom and student avatars would be useful in teaching your students?</td>
</tr>
</tbody>
</table>
### VirtualPREX Pre-service Teacher Role-play Workshop: Questions for interviewing Pre-service Teachers

If you would like to be part of our Student Reference group please give me your name and email address.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1: What did you learn from participating in the VirtualPREX role-play activity?</td>
<td></td>
</tr>
<tr>
<td>Q2: Would you use the VirtualPREX classroom to practise your teaching skills again?</td>
<td></td>
</tr>
<tr>
<td>Q3: Do you think the VirtualPREX classroom is a good place for pre-service teachers to practise their teaching skills?</td>
<td></td>
</tr>
<tr>
<td>Q4: Do you think that practising in the VirtualPREX classroom will help pre-service teachers prepare for their professional experience?</td>
<td></td>
</tr>
<tr>
<td>Q5: Can you think of any ways that the classrooms might be better?</td>
<td></td>
</tr>
<tr>
<td>Q6. Did you find that you were learning things when it was your turn to be a student?</td>
<td></td>
</tr>
<tr>
<td>Q7. Were you learning things from the other teachers while you were the student?</td>
<td></td>
</tr>
<tr>
<td>Q8. Did you use some of the strategies that you saw other teachers use?</td>
<td></td>
</tr>
<tr>
<td>Q9: What aspects of the VirtualPREX role-play activity were most valuable to you and why? What was least valuable and why?</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix 6: Observation of VirtualPREX role-play questionnaire

<table>
<thead>
<tr>
<th>Types of activity</th>
<th>Yes</th>
<th>Sometimes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are students paying attention to the introduction instructions?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are students enjoying the activity?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role-play 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role-play 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role-play 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role-play 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role-play 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role-play 6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role-play 7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do students seem bored with the activity?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role-play 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role-play 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role-play 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role-play 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role-play 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role-play 6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role-play 7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are students immersed in the virtual environment?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are students distracted by their peers?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Types of activity</td>
<td>Yes</td>
<td>Sometimes</td>
<td>No</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----</td>
<td>-----------</td>
<td>----</td>
</tr>
<tr>
<td>What sorts of body language are students displaying?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eye-contact with the lecturer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facial expressions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body language</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engagement with the activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. What do you think of the appearance of the classroom?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. What do you think of the appearance of the student avatars?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Are the student avatars behaving as you would expect?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 7: VirtualPREX resources available on the VirtualPREX website

Assessment guidelines and rubric
<virtualprex.com/assessment.html>

Self-directed use of VirtualPREX classrooms and role-plays
<virtualprex.com/slhowto.html>
<virtualprex.com/roleplayinfo.html>

Role-play machinima
<virtualprex.com/machinima.html>

Exemplar scenario scripts and machinima
<virtualprex.com/exemplarscenarios.html>

Images of classrooms
<virtualprex.com/classrooms.html>

Sharing project outcomes
<virtualprex.com/outcomes.html>
Appendix 8: VirtualPREX Spring 2011 Newsletter

VirtualPREX Spring 2011 Newsletter which was sent to all members of the Australian and New Zealand Virtual Worlds Working Group, all employees of the UNE School of Education and is also located on the VirtualPREX website: <virtualprex.com/dissemination.html>

VirtualPREX, Virtual, Professional, Experience!

Innovative!assessment!using!a!
3D!virtual!world!with!!
pre-service!teachers!

VirtualPREX is a mechanism whereby pre-service teachers can gain skills, confidence and techniques to support their real life professional experience prior to practical by the use of virtual worlds!

Newsletter$ 1st$edition$ Spring 2011

VirtualPREX:
VirtualPREX is virtual professional experience where pre-service teachers can experience teaching in a virtual environment prior to their real life professional experience. This experience can be through a role-play activity or with bots. Currently the virtual classroom has been created in the virtual world of Second Life. Role-play activities have been experienced by pre-service teachers. To see more of what has been happening in VirtualPREX, visit their website http://www.virtualprex.com. VirtualPREX is part of an ALTC funded project with the University of New England, Charles Sturt University, Curtin University, Australian Catholic University, Royal Melbourne Institute of Technology University and University of Hamburg.

Upcoming presentations:
The VirtualPREX team will be presenting preliminary findings at the following conferences:
- ICDE 2011, Bali, October 2011 – presenting an overview of the Project
- ascilite2011, Hobart, December 2011 – presenting preliminary findings from Pilot study
Professional experience is a hot topic at present. What should happen? How should it be structured? What do students need to know? There are huge advantages in the affordances of VirtualPREX: its ability to allow role-play either synchronously or asynchronously; the capacity to build up basic skills before placements; the use of machinima as tools for critical reflection. As more students study purely online, this innovation will bridge the gap between physical and virtual reality to the point where the gap will cease to exist. Trialling the spaces with distance education students is going to be a huge leap forward.

Proposed Solution
- Researching the feasibility of providing pre-service teachers with classroom teaching practice in a virtual environment.
- This experience initially used to help prepare students for professional experience placement.
- Possible that this experience could also supplement actual placements and allow specific aspects of pre-service teachers’ pedagogy to be explored and practiced.
- We see this as of potential value for all teacher-education students but of particular value for distance students.

Four phases to the study:
- **Phase 1** (complete)
  - Focus group session conducted with experienced teachers to identify the aspects of teaching practice to be included within VirtualPREX role-play scenarios, and;
  - Pilot study of pre-service teachers undertaking a role-play activity using the initial version of the VirtualPREX environment has been undertaken.
- **Phase 2**, the VirtualPREX environment will be further developed, including the creation of bots representing school students exhibiting particular problematic behaviours;
- **Phase 3**, the VirtualPREX environment will be trialed with cohorts from each of the partner institutions.
- **Phase 4**, data collected during Phase 3 will be analysed and the results reported in various formats.

VirtualPREX classrooms on Australis 4 Learning in Second Life
http://slurl.com/secondlife/Australis+4+Learning/134/136/22
**Appendix 9: Guide to Second Life and using VirtualPREX resources**

Information provided to students on how to use Second Life and use some of the tools in VirtualPREX – also provided on the website at: <virtualprex.com/slhowto.html>

<table>
<thead>
<tr>
<th>To sit on an object, right mouse click and choose “sit here”</th>
<th>To stand up, click on the “Stand” button on the bottom of the screen</th>
<th>To stop animating your avatar, go to the Me menu, choose Movement and then Stop Animating Me (Me/Movement/Stop Animating Me). You do this if your avatar won’t stop moving, dancing or is still in a sitting position because you forgot to click on stand after walking off.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touch</td>
<td>Stand</td>
<td>Me</td>
</tr>
<tr>
<td>Edit</td>
<td></td>
<td>Communicate</td>
</tr>
<tr>
<td>Build</td>
<td></td>
<td>World</td>
</tr>
<tr>
<td>Open</td>
<td></td>
<td>Build</td>
</tr>
<tr>
<td>Sit Here</td>
<td></td>
<td>Help</td>
</tr>
<tr>
<td>Stand Up</td>
<td></td>
<td>Ad</td>
</tr>
<tr>
<td>Object Profile</td>
<td></td>
<td>Tools</td>
</tr>
<tr>
<td>Zoom In</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Put On</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take Copy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you want to **point at something** so that someone else sees you doing this, right mouse click on an object. This will animate your avatar to look as if it is pointing – you don’t need to choose any of the options in the drop box that appears.

To animate your avatar to **look** in specific directions or at specific things move your cursor in the direction you want your avatar to look. This includes:
- Left
- Right
- Up
- Down

To animate your avatar to **read**:
- Click on inventory
- Type reading
- Right mouse click on “Reading Book AFK v1.1”
- Choose wear

To animate your avatar to **write**:
- Click on inventory
- Type drawing
- Right mouse click on “Notepad”, choose wear
- Right mouse click on “Pencil”, choose wear
- Double click on “LP_Drawing”, choose “Play in World”
The Sloodle HUD (Heads Up Display) is a window on your screen. Just click on the image to animate your avatar (that is, make your avatar do the gestures). The following Sloodle HUD gestures are available:

- Hand up (raise arm) (toggle key – click to turn on and turn off)
- Wave hand (toggle key – click to turn on and turn off)
- Clap (short animation)
- Huh – when surprised or you don’t know answer (short animation)
- Yes – to nod (short animation)
- No – to shake head (short animation)

To view things in close up, use the Camera Controls (button on the bottom of your screen). You will open a window (see right). Click on the plus or minus to zoom in or out. Click on the button on the left, to move the camera angle around your avatar’s body. Click on the button on the right to move the camera across the screen, left and right, and up and down the screen.

If Second Life is at night time you need to change the Environment settings. Second Life is on a four hour cycle. One hour night, one hour sunrise, one hour midday and one hour sunset. To change back to midday when it begins to get dark, you need to go to the World menu, then down to Sun and choose Midday (World/Sun/Midday).
The teacher may wish to use the **chalkboard** (or may get the students to use it). Please follow the instructions below. Type /99 and the text you want displayed or /99 wipe to erase the board completely.

**Books** on the desks - You may choose to base your lesson around images – there are many images in the books on the desk and the pages are able to be turned. To turn pages in the books, just click on the pages and they will turn.

If the teacher is using the **dice** during the lesson, there are dice to throw. Just click on them with the hand (your mouse will turn in to a hand) and they will be thrown. There are a variety of lessons/activities that you can base around dice.

You may consider using the **whiteboard** out the front of the classroom to base your lesson on. There is a Code of Cooperation, Foundation Style writings and information on Adding Fractions.

You might have the opportunity presented by the Teacher to play on the large red dice, called **Dados**. Click on one of the red dotted squares and choose “Sit”. Another window will come up asking which animation you would like your avatar to do on the dice (as shown below). Many people can use the dice at the one time.
You may find the Teacher asks you to go to the **Reading Rug**. There are a couple of features of the rug – touch the colouring pages and it will give you a crayon. Touch the pillows and you will be given a book to read while you lay down.

You can choose to colour in or read a book – like that shown in the window below.

You can place notices on the **Noticeboard**. Click on the board and choose Add Item. Then type the note.

There are a variety of images around the classroom that your students have created. You may wish to use these to base your lesson around.

The **Interactive Whiteboard** is very slow and probably wouldn’t be a good utilisation of your time. However, you can think of activities around its use. Click on the menu button to get a window with more information.

You could consider using the atlas or clock (set to Australian AEST) behind the teacher’s desk to base your lesson on.
To talk to anyone that is nearby, talk in the Local Chat window (see right). Just click on the Chat button on the bottom of the screen. The arrow to the right of the chat window enables the window to be open so that you can see more of the conversation.

To talk in Group Chat (see below) – right mouse click on yourself. Choose “My Groups” and then click on the group you want to talk to. Then choose Group Chat. You will then have another window open in which you can liaise and interact with other members of your group. When using Group Chat, anyone that is not a member cannot hear what you are saying, even though they may be next to you.

To the right is an example of the Group Chat window.

Click in the white area to say something via text.