The creation of a 3D immersive, interactive space for experiential learning: VirtualPREX

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VirtualPREX, or, virtual professional experience, is the term used to describe a 3D virtual world classroom designed for pre-service teachers to practise their teaching skills and use the interactive resources to create immersive experiences to assist their learning. Outlined in this paper is how and why the space was created for the pre-service teachers. Also described and explained are the adjustments made to the space to enable a richer experience for pre-service teachers to role-play and practise their teaching prior to taking the skills to the real classroom.

Keywords: VirtualPREX, Second Life, virtual worlds, professional experience

Introduction

VirtualPREX, virtual professional experience, is a research project that explores this aspect of pre-service teachers' (PSTs) education using Second Life (SL) as their medium. The authors discuss the creation of the VirtualPREX classrooms, avatars and resources as a 3D interactive space for PSTs to practise their teaching through experiential learning. In 2010, the authors, part of a team of eight, received a two-year Office for Learning and Teaching (OLT) grant titled: *VirtualPREX: Innovative assessment using a 3D virtual world with pre-service teachers*. The project's aims are:

> to investigate the design and implementation of a 3D virtual environment to facilitate effective formative assessment of teaching practice, in order to assist pre-service teachers to acquire a better range of professional skills and better confidence in, and more realistic awareness of, their skills before being placed in real life classrooms (Gregory & James, 2011, p. 1).

The focus of this paper is on the construction of the VirtualPREX 3D classroom environment. We provide an overview of the underpinnings of the project, followed by a brief literature review on virtual worlds, Second Life and experiential learning. We then discuss the conceptualisation and design of the classrooms, including their construction and population. We conclude with future uses of the VirtualPREX classrooms. This paper can be used as a resource to enable other educators to use and create a space such as the VirtualPREX classrooms.

Background and overview

Simulations are increasingly being used in education for PSTs to prepare for real life teaching experiences (see Carrington, Kervin, & Ferry, 2011; Foley & McAllister, 2005; Girod & Girod, 2006) and these simulations have been extended to virtual worlds (Cheong, 2010; Mahon, Bryant, Brown, & Kim 2010; Fluck & Fox, 2011). However, these studies have not resulted in the development of a shared space "for use by pre-service teachers in their own time or with peers/educators to practise classroom teaching and management skills" (Gregory & James, 2011, p. 6). Development of such a shared space can be very time-consuming and expensive. The VirtualPREX project has created a sustainable simulation of 3D virtual classrooms that will be freely available from 2013 and beyond.

VirtualPREX is an innovative, forward-looking project that is designed to enable PSTs to "practise their classroom teaching skills through role-play, learning, teaching, evaluation, reflection and self/peer/educator-assessment" (Gregory & James, 2011, p. 1) in a setting which is low risk and can be used repeatedly, synchronously and asynchronously. Teachers can bring all their skills together including theory and practice into the one teaching and learning environment (Carrington et al., 2011). The quality and quantity of available access for PSTs to classroom professional experience has proven difficult (Barbousas & Nicholson, 2009). VirtualPREX aims is to address this problem by providing PSTs with an alternative space to hone their teaching skills prior to embarking on their professional experience.

Literature Review – Second Life and Experiential Learning

SL is one of over 200 virtual worlds available (Gregory et al., 2010). A virtual world is a 3D electronic presence that imitates real life through an avatar (a graphical representation of themselves in the virtual world). SL has had a wide uptake across the educational sector due to its range of features such as the ability to move and interact with others through communication tools that "affords a sense of self and presence which may result in immersion and support socialisation and collaborative learning" (Girvan & Savage, 2010, p. 347). There has been limited research in the areas of interactive simulations using virtual worlds as an educational resource (Graves, 2008). VirtualPREX has been using and researching virtual worlds for simulations through role-plays in an authentic learning environment. VirtualPREX uses a combination of graphics, text and audio communications enabling users to interact with other people and objects in the virtual world and to "experiment with simulated real-life scenarios without real-life consequences" (Gregory & James, 2011, p. 6).

In the VirtualPREX environment PSTs access knowledge through experiential learning. The founders of experiential learning were John Dewey, Kurt Lewin and Jean Piaget, but Kolb described the methodology as "immediate, concrete experiences" (cited in Miettinen, 2000, p. 54). Experiential learning is learning by experiencing or, more simply, learning by doing. It is a holistic method of learning. VirtualPREX has been using the experiential methodology to underpin PSTs learning experiences by giving them an immediate, concrete experience in undertaking their role-play activities.

Conceptualising and designing the VirtualPREX classrooms

In 2009 two members of the project team trialled virtual classroom role-plays in SL (Gregory & Masters, 2012). SL was chosen as the University of New England owned one-third of an island; Australis 4 Learning. When designing VirtualPREX, it was decided to build the classrooms 300 metres in the sky above the existing classroom as there was no space left on the ground level. A teleporter (location mover) was placed for easy access. Considerations in the design of the VirtualPREX classrooms were:

1. The classroom was to be an immersive environment for experiential and authentic learning. Therefore, it should be recognisable to users as a representation of a "normal" primary public school classroom where PSTs could practise or be exposed to real-life scenarios that they might encounter in a real-life classroom. The classroom had to display materials found in a real classroom; bright colours on walls e.g. posters and many resources such as interactive books, chalkboard, reading mats and not be too formal.
2. PSTs were provided with teacher and school children avatars to increase the immersiveness of the experience, and the authenticity of being in a classroom. Child avatars had to be created that appeared authentic i.e. they had to look, act and dress like real children, and animate like real children (see Figure 2). Teacher avatars had to be unique but created in a way so that it was obvious which classroom they belonged to. They had to be made to look casual but professional.
3. The classrooms had to be located in such a way that participants in nearby classrooms could not hear the teaching and/or conversations in another classroom.
4. The size of the desks and chairs had to be proportional in size to child avatars.
5. A variety of interactive tools would be required to use by teachers or students when undertaking role-play activities. These included interactive tools on desks, walls, floors, in the avatar's inventory or through a HUD (Heads Up Display – with clickable toggle switches to activate gestures by the avatars).
6. Each classroom created had to be unique so it was easy for PSTs to establish which one to go to. However, the classrooms also had to be similar so that each PST would have the same experiences.

Classroom Construction
Constructing the classrooms on Australis 4 Learning was comparatively low-cost. One-third of the island cost US$1,180. Several objects were purchased through SL Marketplace, including many free purchases. The classroom purchased for VirtualPREX (US$5.41) was one that could be modified and copied. Four coloured classrooms (red, yellow, blue and green) were created from this purchase. Included in the classroom purchase were furniture, classroom desks and chairs, chalkboard, school bell, clock that could be set to any time zone, customisable corkboard and a pencil giver (that is, when clicked the avatar was given a pencil which was placed in their inventory), modifiable classroom posters and a classroom plant that could be changed. Figure 1 shows the VirtualPREX classrooms. Each classroom was built to accommodate a teacher (the option of male or female was available) and 10 students (five male and five female). The area between the classrooms has potential for further development to incorporate outdoor activities. The classrooms were colour coded to enable ease of use. If someone were to say "meet me in the yellow classroom", one would know immediately which classroom was

suggested. The layout of the classroom is as per a typical classroom found in many schools, with two students sitting together and a teacher desk out the front. The current structure is the layout of the classroom as it was purchased with slight modifications. Future classrooms will have the option of differing configurations for the desks and the PST will be able to choose which configuration would be most suitable for their lesson.

In 2011, Phase 1 of the project, a pilot study was conducted to test the efficacy of the VirtualPREX classrooms. Seventy-two on-campus PSTs participated in role-play scenario workshops where one PST presented a 7-minute teaching episode and their peers role-played primary students using teacher and student avatars. PSTs completed a survey answering questions on the role-play and the classroom environment in which it was located. They also participated in a reflection session on the workshop. Results from these two activities showed that PSTs thought that VirtualPREX was a promising environment to prepare them for their professional experience, however, results were mixed and a number of renovations and adjustments were made to the classrooms and the avatars due to their feedback (see Gregory et al., 2011, for further details of this study). Adjustments were made and the environment was retested with 82 on-campus PSTs in 2012, Phase 3 of the project. Phase 2 of the project was the creation of bots (non-player characters) to enable PSTs to asynchronously practise their teaching with pre-programmed child avatars (see Reiners, Gregory, & Knox, forthcoming).

Figure 1: The VirtualPREX classrooms – Phase 1 and Phase 3

The location of the classrooms was changed from Phase 1 to Phase 3 to allow access by large groups of PSTs at the same time and to allow Local Chat to be used instead of Group Chat. In Figure 1 (bottom left) the red classroom is between the green and blue classrooms. The red classroom was moved to the other side of the yellow classroom (bottom right) to provide more distance between all the classrooms. The green classroom was also recoloured so that it was not so dark when inside. From feedback, the classroom table and chairs were resized for better proportionality and increased visibility of the students. More interactive tools were bought for the classroom for Phase 3, including a chalkboard where anyone, teacher, student or visitor, could write on the board. This assisted in teacher roles where they could write the name of the lesson, or their name, on the board. Dice were added to the list of resources available which meant that teachers could have lessons or games based on mathematics. Reading and writing animations were also supplied to the child avatars so they appeared to be actively participating in the lesson. A reading mat was added so that teachers could use this as a reward or as a time-out area. Larger interactive dice were added to the classroom as a place where the students could play games such as "Peas Porridge" or "Facepalms".

Teacher and student avatars
Forty child avatars were created, ten for each classroom. Each child avatar has a colour-coded school uniform corresponding to their classroom so that PSTs instantly know where their avatar belongs. Initially, in Phase 1 of the Project, the avatars were mostly smaller versions of adults wearing a coloured polo shirt and cargo pants. After the completion of role-plays with on- and off-campus PSTs in 2011, it was decided to update the student avatars' appearance and uniforms for Phase 3. The original school uniforms came with the classroom. However, these were not copyable or transferable and each avatar had to purchase (for zero dollars) the uniform. The shirt was changed to the colour of the student's classroom. Figure 2 shows a selection of the child avatars and the four different coloured school shirts. The cost to upgrade the child avatar's look was around US$2.00 each.

Figure 2: Phase 3 - VirtualPREX child avatars – school uniforms colour coded for their classroom

Preliminary Feedback from the upgraded Phase 3 VirtualPREX role-plays
Feedback from Phase 3 of VirtualPREX was very positive. Some of the PSTs thought the best thing about the activity was "being able to consider unexpected occurrences within the classroom and approaches in how they can be overcome", that they could connect to a group of people in a casual environment where learning still occurred and being "put on the spot" provided a good understanding of professional experience. Most PSTs thought VirtualPREX would be helpful in preparing them for their professional experience and they responded that it enabled them to realise the behavioural issues that may occur within a classroom and that it was good to experience a classroom environment without a classroom. One student responded that they felt the only way to become confident with teaching was through first hand experience and did not think it would be helpful.

Discussion and future uses of the VirtualPREX classrooms

Two important issues with creating spaces for teaching and learning in a virtual world such as SL is expense and time. VirtualPREX was relatively inexpensive although considerable time was taken to create the space. In 2013, VirtualPREX will be open for all educators to use with their students. Therefore, the time and expense to create the learning environment has been eliminated. VirtualPREX, by providing classrooms in the innovative and emerging technology of Second Life, can be used to reinforce and practise fundamental teaching skills. Teacher educators can integrate it into their academic programs as an adjunct to lectures and as a means of supplementing their students' professional experience before entering the real-life classroom. A blueprint for how to use, develop and implement VirtualPREX will ensure resource sustainability. Educators world wide will have access to VirtualPREX which will be available from the website: http://www.virtualprex.com.

Acknowledgements

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