4-2013

Second Life, First Experiences:Using VirtualWorlds in Teacher Education

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Abstract: Innovating in a higher education teaching context is never a straightforward matter. There are many factors influencing how, what, and when we teach, and the students' experiences of these things. This is especially so in the context of pre-service teacher education, forever evolving in response to rapidly changing technological, political and socio-cultural landscapes. In this paper we relate and reflect on the innovation of utilising the 3D immersive virtual world of Second Life in two secondary education units of study. We discuss and interrogate our own and our students' experiences when we used Second Life to teach in during the first unit, and to teach about in the second.

Introduction

This paper describes a pilot study that explored the implications of applying the 3D immersive virtual world environment of Second Life in a Visual Arts 'methods' unit of study. It reports on action research conducted in the context of pre-service secondary teacher education. It discusses the authors' and students' experiences, findings and reflections around using a virtual world to teach in and learn with. Finally, it describes how the findings and experiences of the pilot study were used to inform and integrate teaching *about* virtual worlds, as a significant emerging technological and pedagogical element, into a subsequent unit of study based around the theme of new media in secondary school education.

The implementation of virtual worlds once used only by innovators and early adopters in higher education is now occurring across several disciplines including business, medicine, architecture, the Arts and education. The utilisation of virtual worlds in these contexts has increased substantially over the last decade (Gregory, Lee, Gregory et al., 2010; Messinger, 2008; Moschini, 2010; Warburton, 2009). This is evident in the Australian and New Zealand scoping study conducted by Dalgarno, Lee, Carlson et al. (2010) and in the work presented by a cross section of representatives from higher education institutions at national and international conferences of this nature.

Second Life (SL) is a 3D immersive virtual world environment where participants have 24 hour access to an online environment in which to interact, create and learn. Students enter SL using a free download of the SL application and the creation of a personalised avatar. Environments can be created in SL by the teacher or the student to meet a specific educational context. There are learning environments already available that students can explore either through guidance from their teacher or independently. SL differs from gaming or entertainment virtual worlds in that there are no 'levels' or goals to achieve although these types of activities may be incorporated into the learning design (Jacka & Ellis, 2010). SL was

chosen by the authors as a suitable virtual world environment for the delivery of their course as the university already owned two sims. A sim is often referred to as an island as they appear similar to an island with land surrounded by water. Figure 1 shows the University island on which the unit of study was first taught. The sim is a space on which activities can be undertaken in a similar style to a traditional tutorial, lecture or workshop or using alternative teaching approaches more conducive to emerging pedagogies and new technology.

Figure 1. SCU Island in Second Life

The assumption underlying the 21st century learner/learning agenda in teacher education is that learning programs and learning spaces need to adapt and change in order to cater for today's students' learning needs, contexts, experiences, styles and tools, and to assist them to become "effective, powerful, lifelong learners" (Lara& Malveaux, 2002, p. 505). Darling-Hammond (2006) sums this up as a "spectacular array of things that teachers should know and be able to do in their work" (p. 300). For teachers and teacher educators alike, this is clearly daunting. As lifelong learners, teachers like all other professionals must "continually try to update their skills, challenge their own beliefs, assess their own abilities and expose themselves to current thinking" ('Lifelong Learning' 2006, cited in Ashton & Newman, 2006, p. 827).

The world is a different place for secondary teachers who may have trained a number of years ago, and they recognise the need for quality professional development opportunities to assist them to refresh their thinking and skills in response to the 21st century digital learners in their classrooms. More is expected of teachers than ever before in terms of understanding learning styles, intelligences, diverse backgrounds and experiences (Darling-Hammond, cited in Hall, 2005, p. 200). Education theory and practice is both provoked and contextualised by the possibilities and challenges of the digital age and the global and globalised landscapes across which educational discourses play out.

A specific challenge for teacher educators is to design programs that assist pre-service teachers to "understand deeply a wide array of things about learning; social and cultural contexts…complex classrooms serving increasingly diverse students" (Darling-Hammond,

2006, p. 302).   These programs are the site for both the production and consumption of research associated with effective teacher preparation.   Curriculum designers and managers must possess the ability to respond to changes and challenges in the context of teacher education, and in the design and delivery of pre-service teacher education programs. Moreover, their role is to foster and promote adaptability and flexibility in the teams that deliver these courses through a constant cycle of innovation, implementation, evaluation and review.

In 2010 a major curriculum review of the secondary education courses at Southern Cross University (SCU) commenced, affecting a range of awards including combined discipline/education degrees, a two-year bachelor of education, and a one-year graduate diploma in education.   The initial impetus for the review was the necessity to meet the new external accreditation requirements of the NSW Institute of Teachers (NSWIT).   The course review process presented a significant opportunity to rethink the design of the course, to reconceptualise the entirety of the core secondary education units of work in terms of their flow, connectivity and integration, and to introduce some new curriculum elements.

The following describes the experiences of teacher educators and students around the introduction of one of these new elements, involving embedding a series of virtual world learning experiences into a Visual Arts unit of study (Visual Arts 1). It also recounts the more recent experience of the integration of virtual worlds into a 'core' (common) unit in 2011 and 2012.

Background

Teacher education courses in NSW as outlined by the NSWIT require a significant level of accountability in terms of curriculum coverage. Approval of courses rests on demonstrable addressing and achievement of graduate teacher standards, and the integration of 'mandatory areas' such as literacy education, ICT (information communication technologies), Aboriginal education, teaching NESB (non-English speaking background) students, and classroom and behaviour management.

The first stage of a three-year secondary curriculum renewal process beginning in 2010 involved a review of the curriculum specialisation units, or 'methods' units (in the Humanities; English; Maths; Science; Music; PDHPE [Personal Development and Physical Exercise Studies]; and Visual Arts).   The curricula in these units of work were redesigned and rewritten to ensure that they aligned with the mandatory areas of study and subject content, assessment and curriculum requirements outlined by the NSWIT, and the NSW Board of Studies (BOS).

Intersecting with this curriculum renewal process in the School of Education was a major SCU-wide project exploring 'converged delivery', and the opportunity for certain units to pilot this delivery style. This university-wide project constituted an important context, indeed an impetus, to some new thinking around the delivery of the secondary education teaching methods units of work.

The converged delivery pilot project arose out of the educational philosophy that:
> … every Southern Cross University student should have a range of pedagogically sound study options to best suit their learning preferences and their work and life demands. This vision would see all students, whether geographically in close proximity to a campus or not, provided with equitable learning opportunities through a single enrolment mode (New Directions for Delivery Action Group, 2007, p. 3).

The term converged delivery is to date uncommon in Australian universities, and is somewhat akin to, but not the same as, the more common notion of 'blended' delivery, which has been described by Chew, Turner and Jones (2010) as a "combination of face-to-face learning and teaching mediated by technology" (p.22).

Whilst incorporating these principles the SCU pilot project had an additional focus of 'learning-centredness' and proposed the following definition for converged delivery:

> … a learning centred approach (that) directs teaching, curricula and pedagogies towards the complete learning process, acknowledging the attributes and active roles of learners alongside those of teachers, the discipline, and the community. Such an approach means that students and teachers are partners in learning and that disciplinary ways of knowing and doing are valued (Taylor & Newton 2011a, p. 10)

Core objectives of the suite of SCU's converged delivery pilot units, including Visual Arts 1, included the development of a range of learning and delivery designs that collapsed divisions between 'external' and 'internal' modes of enrolment to cater for student diversity and, irrespective of location, to offer flexible learning resources (Taylor and Newton 2011a, p.5). Importantly as these authors point out, where converged delivery differs from these traditional modes is the reliance of the former on the "significant incorporation of learning technologies into all aspects of a student's life" (Taylor & Newton 2011a, p. 3).

Piloting the converged delivery of Visual Arts 1 offered the possibility of applying these elements into a traditional teaching method area, and to equip students with the skills to apply emerging technologies and new media into effective, engaging and creative teaching and learning settings in secondary education. Incorporating the 3D immersive virtual world of Second Life as an aspect of the converged delivery roll-out of Visual Arts 1 in 2010 presented both the students and the teaching staff with an opportunity to explore exciting possibilities for 21st century learning. As Savin-Baden (2011, p7) recommends, virtual worlds are useful in higher education because:

- experimentation can occur in ways that are not possible in real life
- for online and distance education it offers opportunities to develop communities, create trust and increase the sense of 'presence' in learning
- it offers an opportunity to play with roles and identity, and
- activities tend not to have real life consequences.

The ability to bring together students from geographically remote locations into the one 3D space to discuss, create and explore concepts pertinent to the delivery of visual arts was a major factor in choosing SL as a delivery platform. Visual Arts 1 constituted the first of two units students undertake in preparation for teaching specialist visual arts in secondary schools in NSW. This unit of study previously required students to attend ten weeks of three-hour face-to-face workshops. The cohort included a total of twenty students at three different campuses with the workshops taught by three different expert visual arts teachers. However, the introduction of a converged delivery model sought to bring the students together to form one cohesive cohort. It was envisaged that the use of an immersive 3D virtual world could provide this opportunity without diminishing the quality of face-to-face interaction.

Research Design

In keeping with the focus of converged delivery as providing the students with "a range of pedagogically sound study options" (New Directions for Delivery Action Group, 2007, p. 3) a variety of both technology focussed and non-technology focussed learning activities, resources and expert tuition were provided to students. A website was created and linked to the SCU-wide Learning Management System (LMS), 'Blackboard'. In previous years the tutor had observed that some students required a detailed step-by-step coverage of every aspect of the syllabus and the attendant teaching strategies, while other students who were retraining in additional method possessed many years of experience and did not require face-to-face weekly tutorials that revisited content with which they were already conversant. The website thus provided a learning space that students could use to work through the material independently and at their own pace. A web site design was chosen over the traditional 'Blackboard' LMS as it provided a more visually appealing interface to the content and could be navigated in a non-linear manner thus being responsive to students prior knowledge and current needs. Resources such as pdfs, video and links could sit within the site and behave in a more dynamic way than the LMS.

Table 1 outlines the structure of the unit and the activities undertaken across the ten week teaching session. Jacka and Ellis (2010) describe in detail each of the virtual world activities and the connection to specific teaching strategies. The outline of the unit of study included an introductory week when all students attended a one-day on campus intensive. They were introduced to SL and briefed on face-to-face tutorial expectations. The remaining weeks included four tutorials in SL with a visual arts teacher expert in SL, four face-to-face workshops with an expert art teacher and two weeks designated as student centred time when they could make consultations with the tutor or work independently using the web site for support. The main tutor provided consultation options in SL. She also met with students at a regular weekly time as a supplementary activity to extend students skills and understanding about the use of virtual worlds. The places they visited in SL often simulated real world environments such as shopping centres, cities, museums and galleries. They talked to artists in-world and built 3D artefacts such as sculptures and gallery spaces as depicted in Figure 2. The authors designed the unit to be delivered in this way as they believed that it offered the students an effective mix of learning opportunities – aligning with students' preferred learning styles - whereby the face-to-face sessions would alternate with the sessions conducted in SL, with each building on and scaffolding the other.

Figure 2: Visual Arts 1 students creating art spaces on SCU Interaction island in SL

Week	Module Focus	Mode			Tutorial Activity
		On Campus	Independent Study	Virtual World	
1	Introduction	X		X	Students undertook an intensive workshop on campus and were introduced to all aspects of the new unit. VW tutorial was undertaken that orientated students to the use of the virtual world including audio and navigation.
2	Syllabus		X		Students worked independently on activities outlined in the bespoke website.
3	Syllabus		X	X	Content delivered in the VW using ppt slides about the Visual Art syllabus. Student discussion. Student's explored VW sculpture and visited the Sistine Chapel in SL. This tutorial was repeated for some students who had trouble accessing SL.
4	Planning	X			Students met with a tutor in a classroom setting on campus to explore specific skills and concepts in relation to teaching visual arts.
5	Planning		X		Students worked independently on activities outlined in the bespoke website.
6	Planning		X	X	Notecard posted to give instructions about the task for the session. Students were asked to get into groups and share their lesson plan ideas. The tutorial took place in the SCU island sandbox with each student's avatar navigating the space set up by the tutor.
7	Study Break				Assignment Due
8	Assessment	X			Students met with a tutor in a classroom setting on campus to explore specific skills and concepts in relation to teaching visual arts.
9	Assessment		X	X	Students met in the SCU island sandbox to build art gallery spaces and display their work.
10	Classroom	X			Students met with a tutor in a classroom setting on campus to explore specific skills and concepts in relation to teaching visual arts.
11	Classroom	X	X		Students met with a tutor in a classroom setting on campus to explore specific skills and concepts in relation to teaching visual arts.
12	No Classes				
13	No Classes				Assignment Due

Table 1: Summary of weekly sessions and activities in Visual Arts 1

Although the specific focus of this paper is the students' and the authors' reflections on the SL learning experiences and outcomes in this unit, a variety of other learning opportunities were made available to students as part of the specially designed website and the LMS (as shown in in Table 1). These included online materials such as video clips, podcasts, Camtasia, Blackboard based tests and surveys, narrated presentations as well interactive tools such as Collaborate, Wikis and the Discussion Boards.

Despite the available choice of both internal and external enrolment modes for all the core secondary education units, ninety-two per cent of the twenty students in this unit were enrolled internally for all of their units of work (however only the option of internal enrolment was available for Visual Arts). Demographically these students were mixed, ranging from students in their early twenties to students who were late middle-aged. Many were parents, and most were working full or part time. Thus all had multiple time commitments in addition to their studies.

Towards the conclusion of this pilot, lasting over ten teaching weeks in 2010, the students were asked to take part in a specialised non-compulsory online questionnaire that was administered as part an evaluation of the university-wide converged delivery pilot. Twenty students were enrolled in the visual arts pilot, with thirteen (65%) taking part in this first survey, the results of which are presented in Table 2. Research findings from the university's 2008 'First Year student technology use' survey (Newton & Ellis, 2012) formed the basis of the technology use questions on this questionnaire. Other questions were also based on the effectiveness measures in the 'Quality Matters' rubric criteria (Quality Matters Program (QM), 2013). This tool consists of a set of standards used to evaluate the design of online and blended courses, and is used across universities in the United States as a quality assurance measure for online unit delivery. In addition the questions were also peer reviewed by academic members of the university's Converged Delivery Project's Steering Committee.

A second survey was administered (also non-compulsory) as the 'standard' university-wide online end of session student evaluation. Eleven students (55%) took part in the second survey, the results of which are presented in Table 3.

The majority of the questions in both surveys employed five-point Likert scales. However, students were also given the opportunity on both questionnaires to contribute qualitative commentary and feedback. Questions were designed to explore students' perceptions regarding opportunities to access and engage with learning experiences in the converged delivery pilot units, for example, teaching activities, learning resources, teacher support, and student interaction.

These two surveys delivered important feedback – in the form of both quantitative and qualitative data - to the authors about the use of new and emerging online technologies such as virtual worlds. Although the students' feedback was at times not as positive as might have been hoped, the pilot was a salutary learning experience for staff and students alike. The survey findings are discussed in the following section of this paper.

Findings

N = 13 or 65% total unit of work enrolment (20 students)	Useful/Very useful	Not useful	Other
Usefulness of learning opportunities:			
(1) How useful were the face to face tutorials provided on campus for your learning	77%	0%	13%
(2) How useful were the practical (face-to-face art making workshops) on campus for your learning	92%	0%	8%
(3) How useful were the Second Life sessions for your learning	54%	46%	0%
(4) How useful were the Second Life interactions for communications with other students	62%	15%	13%
Prior to studying this unit I was provided with information about:			
	Agree/Strongly agree	Disagree/Strongly disagree	Neutral
How the unit was to be delivered	31%	38%	31%
How to get started and find the study materials	39%	38%	23%
The software I would need to study	47%	38%	15%
The technical equipment I would need to study	39%	46%	15%
The technological skills I would need to study	47%	30%	23%
The way this unit is delivered allows me to:			
Manage my time effectively	31%	38%	31%
Study at a pace that suits me	46%	23%	31%
Study at a time of day that suits me	54%	38%	8%
Study at a place that suits me	54%	23%	23%
Study in a way that suits me	39%	46%	15%

Table 2: Student Survey One: Converged delivery online survey April, 2010

[The first scale "usefulness of learning opportunities" consisted of four items. The overall scale had a Chronbach's of -.3. Closer examination of the items revealed that Question 3, "How useful were the Second Life sessions for your learning?" was negatively correlated to the other three items. The second scale "prior to studying this unit I was provided with information about" consisted of five items (Chronbach's α=.968), and the third scale "the way this unit is delivered allows me to" consisted of five items (Chronbach's α=.916)]

The responses from the first survey were heartening. To achieve over 50% agreement when asked if the SL sessions were useful for their learning (element 3) and over 70% and 60% (elements 4 and 5) respectively, when asked whether communications with and between lecturer and students was adequate/improved, demonstrated that one of the affordances of virtual worlds, enhanced communication, was being realised.

One of the key motivators for using a virtual world in Visual Arts 1 was to connect students on the three geographically separated campuses of the SCU as though they were there, together. That the practical art making sessions and on campus face-to-face tutorials rated more highly was of no surprise as the students were provided with expert tuition by practising secondary visual arts teachers in very specialised small classes (as low as five students in some cases).

N = 11 or 55% of unit enrolment (20 students)	Agree/Agree strongly	Disagree/ Disagree strongly	Average
Students were asked to rate their level of agreement with the following statements along a 5-point Likert scale: 1= Disagree Strongly; 2 = Disagree; 3 = Average; 4 = Agree; 5 = Agree Strongly			
(1) The objectives and performance standards in the unit were made clear	45%	36%	18%
(2) This unit helped me to develop some valuable skills/attributes	63%	18%	19%
(3) I am satisfied with the way this unit was taught/delivered	36%	54%	10%
(4) Overall, I am satisfied with this unit	45%	54%	0%
(5) The learning resources in this unit were really good	54%	36%	10%
(6) The staff member makes it clear what I need to do to be successful in this unit	63%	0%	36%
(7) The staff member is well prepared for classes	72%	0%	27%
(8) The staff member seems to have a good knowledge of the subject area	91%	0%	9%
(9) The staff member shows a genuine concern for the quality of my learning	63%	9%	27%

Table 3: Student Survey Two: End of session university-wide online student unit evaluation, June 2010

The qualitative data obtained from the open-ended questions in the two surveys were used to interpret and add understanding to the quantitative data presented in Tables 2 and 3. The following summarises these findings with reference to four main themes or patterns in the data:

- Clarity of unit structure student support and technological requirements
- Student choice
- Making the links – seeing the 'big picture'
- Technical issues

Clarity of Unit Structure, Student Support and Technological Requirements

In the first survey there was a split evident (refer Table 2) in the students' responses concerning the sufficiency of information provision prior to the commencement of the unit about how it would run. Students were mixed in their perceptions about their satisfaction levels with this process, and their responses to the surveys' open-ended questions likewise enforced this variance. For example:

One student commented:
I was disappointed that we had no warning that this unit would be delivered predominantly through Second Life. Many of us had no access to the [necessary] technology…

Others:
I loved this unit. I found it really interesting and very well planned out and presented to us
I found all the info easy to find and very well organised

Once the unit commenced however the students reported they felt that support was solid for accessing the resources of teaching staff, online materials and information about assessment tasks. There was thus little or no disagreement with any of the items in the second survey concerning the diligence of the staff member mainly responsible for the delivery of the SL workshops. 91% (Table 3) of the students reported that they agreed or

strongly agreed that the staff member had a "good knowledge of the subject area" and 72% (Table 3) that the staff member "is well prepared for classes". This probably reflects the huge time input into student communications by the teaching staff in this unit, given its novel nature.

One student commented that:

the tutor made herself available pretty much 24/7, this showed that she cared…. She also offered valuable feedback.

Teaching staff in the Visual Arts unit provided students with a detailed flow chart mapping the website and re-visited this often in both face-to-face and virtual world workshops. While the intention was that the students navigate their own path through the content, it was realised that many students were anxious that they may not have covered everything due to their unfamiliarity with the website and/or non-linear learning strategies. It is interesting to note that student feedback on the university-wide converged delivery pilots generally indicated a desire for more information about unit material, and for access to resources and technologies required before the teaching session started. The survey data indicated that students wanted a clear 'road map' for their units including detailed information in the unit web site at the beginning of the session about how the unit is structured, learning options and where to access resources and printing requirements (Taylor & Newton, 2011a, p, 4).

Student Choice

A second theme was that of student choice, a key principle informing the offer of converged delivery. Although there were only four sessions in total that actually utilised SL, many students did not like the fact that the SL workshops were compulsory. Students expressed that they would have liked more choice in alignment with their own learning styles. There were also weak levels of agreement that the design of the delivery enabled students to study in a place (54%) and at a time (54%) that suited them (Table 2).

Students were less certain that the *format* of the delivery (most notably, but not exclusively, the SL workshops) suited their learning styles. Further, the data in Table 2 indicate there was a perception held by some students (39%) that the way the unit was delivered did not allow them to manage their time effectively, and in a way that suited them (46%). Such sentiments were evident in the following student responses:

I would prefer to work through … a booklet than a website. That way it can be highlighted, written on etc
Maybe offer this course internally OR externally
Second Life would be better if it were introduced just before the school holidays and tutorials during the school holidays could be attended from home

The irony in the following student response did not escape the authors' attention:

I found the 'flexible delivery' of the course very difficult. I enrolled in the unit expecting it to be on campus at fixed times. The way it was so 'flexible' made it incredibly difficult to juggle other family and work commitments

Making the Links – Seeing the 'Big Picture'

The following comments demonstrated the importance of making explicit links between the educational learning design and the students' learning journey. The students' negativity, and perhaps even frustration, was evident in their feedback about how they felt about the delivery of the unit and in particular the use of SL. They believed it was:

… an interesting resource that did not relate well to assessment

…picking up the phone would have served exactly the same purpose…we didn't meet at all (referring to the tutor)

I didn't find any of the Second Life content useful or relevant to the unit

I would have preferred practical lessons, lessons where we discussed the assessments...would have been much more useful than Second Life…there's no way I can use second Life in a real classroom

I'm paying a lecturer to teach me what I need to know for my future, to have that lecturer deliver face-to-face classes. I have also found it extremely difficult to study the content online

Because the content was online and it was 'work through at your own pace' there were no set deadlines despite the assignments. My other units got priority

These comments reflect the stage at which the students were at in their learning journey to become teachers. As a unit located fairly early in their course the students were not yet prepared for the very important role they would play as independent, life long learners required to incorporate technology and teach 21st century visual art. For example, as demonstrated in the comment by one student that "Second Life, although a wonderful tool, did not supersede practical face-to-face training", the use of the term 'training' suggests that the student believed that they were to be 'trained' to be a teacher not educated about teaching and learning.

However, a number of students *did* demonstrate that they had made some significant links between their own learning journey in this unit and the pedagogy underpinning it, as demonstrated in the following feedback:

…it was refreshing and exciting to have the opportunity to learn through a virtual dimension, I commend the University for making this possible

I think it is necessary to remain very positive about where it is going as it can become an interesting unit

It does appear however that in the light of the following student responses, educators utilising virtual worlds might still have some distance to travel in terms of implementing the above vision:

the class would have benefited from a traditional tutorial where we are able to sit face-to-face WEEKLY with the lecturer and ask questions regarding assessment tasks and the unit

I do not pay university fees to be told that all the information I need is on the Internet and I am to fend for myself

It (Second Life) should not have been used as a replacement for …face-to-face learning

I feel that the delivery of the unit with such an emphasis on self-regulated learning reflects my performance in the first assessment task

While the above comments reflect the frustration that some of the students experienced during the delivery of this unit, they also reflect their overall lack of awareness of the design intent of the use of virtual worlds in this unit. It must be conceded that this outcome may have been mitigated if the links between our pedagogical purposes and the delivery design of the unit had been made clearer. In this respect we did not succeed in

making our thinking sufficiently 'visible' (Ritchhart, Palmer, Church & Tishman, 2006), and nor were the students reminded often enough that it was a pilot unit and as such, all involved were sharing a learning journey in an action research setting. A type of setting, it would be hoped, that our students might aspire to emulate in other pre-service and graduate capacities as lifelong teacher-researchers and reflective practitioners.

The students thus made many assumptions about what university teaching and learning should look like as the following comment suggests:

…we had to do all the teaching and learning ourselves.

This comment is noteworthy. It could in fact be interpreted as a positive aspect of this unit's delivery style for as pre-service teachers, we might expect them to seize opportunities to develop metacognitively in relation to both teaching and learning.

Technical Issues

Finally, the students reported a range of technical difficulties (both at home and on campus) in terms of accessing SL and many felt that this affected the quality of their learning experiences and subsequent engagement in this unit, as the following student responses indicated:

Beginning learners lose confidence and experience frustration if they don't have enough understanding (quoting Mayer)
Students needed a lot of individual attention to master the basic concepts
I can see how it (Second Life) may have worked, but there were too many technological problems…I spent 80% of the time trying to make it work

Such factors may well have operated as significant barriers not only in the students' technical abilities to participate successfully in the virtual world, but also as inhibitors to their thinking or 'openness' to using this technology. A number of students proactively developed informal 'buddy' systems and took part in the virtual world tutorials in pairs on campus in the computer lab. There they felt they could support each other and access technology that was superior to what they had at home. The tutor delivered the virtual world tutorials from a computer lab on one of the campuses so that students who needed assistance could attend.

While students appreciated the flexibility of converged delivery, a number of them struggled with the concept of the use of a 3D immersive virtual world as a teaching and learning tool in a curriculum specialisation unit. It was apparent that despite SL being used in only 40% of the allocated tutorial time (and not at all for   assessment purposes), the issues students encountered overshadowed and dominated their overall perceptions of the unit, as the following comments exemplify:

Actually teach students how to write a lesson plan, not mess around on Second Life all the time
… we had no warning that this unit would be delivered predominantly through Second Life

The use of the word 'predominantly' is interesting, as there were only four workshops held in SL over the ten weeks. Nevertheless, the impact on many of the students' recollections was such that it was as if the entire unit had seemingly been delivered in a virtual classroom. This finding surprised the authors as they had even organised extra face-to-face workshops to mitigate students' anxieties and technical issues, and were constantly monitoring the students' anxieties and levels of 'comfort' around the virtual world tutorials,' through their interactions with students in face-to-face and online settings and by more informal means such as the students' email to staff and their interactions on the unit's online 'discussion board'.

Discussion

The students' views ranged widely about whether the virtual world was of value to them in either their own learning or their future practice as teachers. Of the twenty students who were enrolled in the unit, four continued to meet regularly with the tutor in SL after the unit had concluded. These students related that they gained confidence as they invested more time in the virtual world. Only one of the twenty students had previously used virtual worlds. Nevertheless, and regardless of technical issues and anxieties around these, most students in the pilot group did acknowledge the potential usefulness of virtual worlds due to the inherent possibilities for teaching Visual Arts in the highly visual environment, combined with the knowledge that their future secondary school students would be at ease in the digital world.

Clearly, influencing the uptake of such a new technology in education contexts is the openness of the user to exploration and imaginings around its applications and enhancements in relation to their own learning. In relation to pre-service teacher education contexts Gill & Dalgarno (2008) suggest that the main factors underlying many students' unpreparedness or unwillingness to implement technology include their perceptions of its usefulness, its ease of use, and their own ability and confidence to use the technology. These findings are in line with an earlier study of pre-service teachers conducted by Cox, Preston and Cox (1999) who applied Davis, Bagozzi & Warshaw's (1989) Technology Acceptance Model (TAM) and found that "… the teachers who are already regular users of technology have confidence in using technology, perceive it to be useful for their personal work and for their teaching and plan to extend their use further in the future" (p. 10).

Our initial experience of teaching using a virtual world similarly highlighted the importance of students first perceiving its usefulness and then possessing an ease of use with virtual worlds. In this respect it is instructive to refer to Ashton and Newman (2006) who underline the importance of revealing to students the pedagogical purposes of technologies in flexible learning settings. They argue the need for "an educational rationale or revised methodology to guide changes in pedagogy" (p. 827).

On the one hand it might be that the students' feedback demonstrated a lack of deep engagement on their part, of their not being sufficiently willing to 'join the dots', of not being able nor willing to make sense of why, and in what contexts, virtual worlds may have a place in their future teaching. On the other hand, and importantly for our future practice, the students' comments led us to reflect on the level of change management involved in expecting them to undertake study in a different manner and a different space. Furthermore the expectation that students would be willing to move outside of their comfort zone at such an early stage of their teacher education was perhaps an overestimation. Students at this stage appear on the most part concerned with the 'nuts and bolts' of the classroom. These points informed our subsequent utilisation of virtual worlds in a core secondary education unit of study the following year, as outlined in the next section of this paper.

Taylor and Newton (2011) observed "students are looking towards clarity of support for learning and studying, whether it be student-teacher, student-student, or student-other support" (p. 4). The students in both the Visual Arts pilot and the university-wide pilots expressed a desire for the provision of on-campus/off-campus experiences at beginning of teaching session to orientate them to the delivery approach (pp. 58/9). These authors' recommendations for a university-wide strategy, unknown to us prior to our pilot study, would have greatly assisted us to achieve success:

- clear information on supported technologies before the session commences
- clear information about the level of technical skill required

- clear information on classroom technologies and associated hardware requirements before the session commences
- easy seamless packages to enable self-use of technologies
- clear strategy for experimentation with new classroom technologies and spaces, and online technologies

Ashton and Newman (2006) asserted that we need a new "gogy", one that "effectively captures the way that knowledge needs to be created in a global world" where technology is 'readily accessible', and one that "facilitates the skills and dispositions" required of 21st century educators (p.828/9). They suggested the term 'heutagogy' - the promotion of the importance of relationships in teaching where the responsibility for knowledge appropriation is with the learner, and where knowledge is shared not hoarded. In relation to virtual worlds the term 'avagogy' has been also suggested as the virtual world presents a complete shift in how we approach teaching and learning. Cheney and Bronack (2011) suggested that "avagogy is the set of skills, dispositions, strategies, and styles instructors employ via their avatars" (p. 80). Savin-Baden (2011) purported that "developing pedagogies and learning spaces for Second Life requires a new kind of professional place making where we learn to create spaces for the mediation of learning, and for repositioning learning as a shared power between staff and students"(p. 77).

Taylor and Newton (2011) remarked that there are large individual differences between students in how they experience 'the blend' in learning delivery: "It seems to be important that students understand the role of technology in their learning and the implications for their study strategies and engagement in learning activities" (p. 23). The strong student internal enrolment preference identified earlier may well have had a bearing on their degree of receptiveness to using a virtual world. The fact that only a small percentage (7%) of these students had elected to enrol externally in one or more of their other units and their strong expressed preference for face-to-face delivery in both surveys, was in hindsight, an important indicator of how and where they probably may have preferred to learn and of what we were up against. However there remains the issue that while the students have a preference for small face-to-face classes this model is unviable for this university, and very possibly most other universities.

Beyond the Pilot: Emerging Pedagogies, Keeping the Narrative Going

Drawing on the experience of the converged delivery pilot in visual arts described in previous sections of this paper, a new module (three topics as part of a larger core unit of study) was developed around the idea of providing space in the course to teach *about* emerging pedagogies such as the use of virtual worlds and game-based learning. *All* students undertaking a secondary education course at the SCU now spend some time experimenting with and learning about virtual worlds, their pedagogical purposes, possibilities and applications in teaching contexts.

This module has now been undertaken by several hundred students over three iterations during 2011-2012 both internally and externally. Every student was required, as an assessment item, to write a blog post reflecting on their perceptions and experience of virtual worlds for use in education.

Using the qualitative data analytic and organisation capabilities of Nvivo software, the students' blog posts (up to 100 words each) were categorised into four stages of conceptualisation by the students about the use of virtual worlds in their future teaching environments.

These stages were:

1. *Pre Realisation* – indicates that they wouldn't use virtual worlds in their teaching and/or could see no place for virtual worlds in education.
2. *Realisation* – comments reveal a conflict between seeing the benefits but being concerned about the barriers.
3. *Replication* – they are able to describe how they would use virtual worlds but weren't going to make a big effort to initiate the use. They would use virtual worlds if they were already in place in the school setting.
4. *Reimagining* – these students describe ways to use virtual worlds in their teaching that are different from the type of activities already happening in the classroom. They also show an eagerness to adopt the technology regardless of how difficult it might be.

These data have been used to make improvements to each iteration of the module and to assist students move from a pre realisation stage to realisation and beyond, for example the provision of more resources to help students understand how virtual worlds are being used in education and how to get started in a virtual world. These resources include videos of teachers using virtual worlds that can be viewed without the students actually entering the virtual world, introductory sessions scheduled for small group experiences and the use of virtual worlds other than SL. In addition a dedicated Education Research Island in SL was developed for all pre-service teachers at SCU to have access to a space to learn *about* and *in* virtual worlds. The dedicated island has an Early Childhood Centre, Interactive Maths Playground, lecture theatre, building area and displays of student created work.

Interestingly, and perhaps reflecting the diversity of the three cohorts, despite the availability of resources and support, the authors have not observed a significant difference to the students change in perceptions over the three iterations. The majority of the students are situated in the realisation stage with a much smaller number able to reimagine ways that virtual worlds might be used in education. However, the students whose blogs aligned with the realisation stage have very clearly engaged with the resources as evident in their blog posts. In many cases the students' shift in perceptions has achieved the effect desired by the authors in that they have demonstrated an acceptance of the applications of virtual worlds for them in their future teaching. The following comment is typical of students' response in this category:

> *At first, I felt intimidated with the idea of incorporating virtual worlds into the classroom because I hadn't had any experience with this technology. I've played The Sims before but didn't have a clue how I would go about implementing it in a classroom. I found that after looking at the lesson plans on the Worlds of Education website and watching the YouTube video, Practical Examples of using a Virtual 3D Environment for Learning in High School I am feeling more confident and enthusiastic about using virtual worlds within a classroom.*

Important to note is that the students undertaking this unit of study were unlikely to have any prior experience of virtual worlds in education and were only asked to enter the virtual world on one occasion. This process highlights some of the barriers to uptake of virtual worlds as an educational tool, and reflects the necessity to integrate the use of new technologies such as virtual worlds over an extended period of time. By so doing students are given the opportunity to experience, question and reflect thus gaining confidence in the usefulness and usability of an emerging technology and the accompanying appropriate pedagogy. The authors are optimistic that the utilisation of a virtual world by pre-service teachers has potential that we are yet to fully realise. Studies such as Masters et al (2012) investigation into the use of virtual world practicum for pre-service teachers supports our outlook.

Conclusion

Twenty-first century learning theories emphasise the importance of students' learning 'authentically' (Mims, 2003), of having opportunities to develop their creative and critical thinking skills through constructivist inquiry and problem-based learning, and of the need to be able to tackle big ideas confidently through inter-disciplinary curricula. Teachers as well are expected to be technologically literate, culturally aware and competent, and design and make the best use of flexible learning spaces. There is thus a lot to be brought into consideration in the design of teacher education courses, and as anyone who has done this knows, political and social agendas surrounding this process are dynamic. Constant shifts are occurring and these are not necessarily driven by sound, evidence-based effective pre-service teacher education program design. Rules, regulations, curriculum, funding, accreditation and teacher and teaching standards are not fixed goal posts – indeed they are anything but certain.

In 2010 the authors took an innovative and exciting leap into designing a secondary pre-service teacher education unit of work involving students exploring the virtual world of Second Life. Looking back, the term innovative could still justifiably be applied, but in hindsight a second adjective – brave - could possibly be added, as our own experiences and initial student reactions testified.

There is an emerging body of research, both in Australia and overseas, that is challenging the myth that younger students are universally the 'digital natives' that back in 2001 Prensky claimed them to be. Students' abilities, agilities and ease of access and use around technology in their learning environments are often over estimated (Bennett, Maton & Kerwin, 2008; Coombes, 2009; Taylor and Newton, 2011), and the technologies that students are comfortable using in social settings are "not necessarily the same technologies they can and want to use in educational contexts" (Taylor and Newton, 2011, p.166).

At SCU the authors discovered a definite intersection between anxieties around a new digital technology and not feeling competent at it. This on occasion tended to dominate many of the students' overall feelings of dislike about it, including their perceptions around its potential usefulness in teaching settings.

Wilson, Chan and Brogan (2005) pointed out that to be successful, modifications to teaching practice need firstly, "to be grounded in the relevant literature", and secondly " to be placed in a context in which the academic will really use them and be tested against reality" (p. 6). The action research reported in this paper did not have the huge benefit of the former. Current literature certainly reflects the interest in virtual worlds in higher education but there is not a significant amount of literature specifically relating to the use of virtual worlds in pre-service teacher education. Equally there is a paucity of literature that describes the use of virtual worlds as part of a non-technology specific course.

Few longitudinal empirically-based studies addressing the use of virtual worlds in higher education have been undertaken and reported on. However, as more pre-service teacher education institutions become involved in their use the literature is slowly expanding, and it is hoped that the experiences reported on above will assist qualitatively in this expansion of knowledge.

Along our learning journey with the integration of 3D immersive virtual worlds for teacher education we began to "reconceptualise ourselves as academics" (Ashton & Newman, 2006, p. 827). Collectively in higher education we have started moving beyond being andragogues or pedagogues, to become knowledge brokers or heutagogues, pushing the use of technology in a technologically resourced world. Notwithstanding some of the more practical issues in need of addressing at the institutional level around technical support and enormous tutor time input for these types of innovations, such movement is no longer just a choice but is fast becoming an imperative in contemporary higher education learning design.

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