Chapter 9
Anticipating Engagement: Pre-service Teachers' Perceptions of Virtual Worlds

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Introduction

Engagement has become a significant driver in the choice of resources that teachers utilise at both university and K-12 level. Educators and governments recognise that increasingly, students are being pushed away from school due to a lack of engagement at a time when the need to have a skilled and educated society is ever more pressing. Information communication technologies (ICTs) are often used as a means to provide engagement. With the now ubiquitous presence of ICTs in classrooms, homes and workplaces, the need to develop high quality learning experiences with ICTs is increasingly apparent.

Virtual worlds are an ICT that, when first encountered, offer what appears to be a highly engaging environment especially for young adults and children. Many virtual worlds have some level of game features such as multiple paths, user-level control, interaction, visuals, risk-taking, rules and goals (Baranauskas et al. 2001; Crookall et al. 1987; Gredler 1996). Malone (1980) suggests that there are four factors of games that contribute to the level of engagement; challenge, fantasy, complexity and control. However, for students at university, these features can possibly act as a motivator or as a deterrent. Most adult students have expectations about what they believe a learning experience should be. Due to the connection they make with games and having fun, games are not traditionally linked to serious learning.

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Background

In 2010 the virtual world of Second Life was introduced to students enrolled in the Bachelor of Education (Secondary) at a regional university in Australia. The students in the Secondary program are required to have content knowledge in at least one discipline that can be taught in secondary schools in Australia. Most of the students will have already completed an undergraduate degree in a specific discipline (Visual Arts, Music, History, Physical Education, Science, or Mathematics). They therefore have perceptions about what university education should be, yet are novices in terms of understanding pedagogy as it pertains to teaching with children.

Since the first introduction of Second Life, a variety of virtual worlds have been utilised in the university. These include OpenSim (JokaydiaGRID), Sim-on-a-Stick (SOAS) and Minecraft. The main discipline in which virtual worlds have been used is in Education.

Literature Review

The literature on engagement is extensive and is framed in various ways such as 'student engagement' (Reeve and Tseng 2011), 'school engagement' (Fredricks et al. 2004), 'learner engagement' (Romero 2012) and 'user engagement' (O'Brien and Toms 2008). The latter term is utilised in the context of human-computer interface or design literature whereas the first three terms are used specifically in relation to teaching and learning. Fredricks et al. (2004) presents the concept of engagement as one that is multifaceted and includes behavioural, emotional and cognitive aspects. For each of these aspects there are degrees of engagement that can vary in both intensity and duration. For example:

> (B)ehavioral engagement can range from simply doing the work and following the rules to participating in the student council. Emotional engagement can range from simple liking to deep valuing of, or identification with, the institution. Cognitive engagement can range from simple memorization to the use of self-regulated learning strategies that promote deep understanding and expertise (Fredricks et al. 2004, p. 61).

Reeve and Tseng (2011) add the notion of agentic engagement as a fourth aspect to the concept of engagement. Agentic engagement is defined as "students' constructive contribution into the flow of the instruction they receive" (Reeve and Tseng 2011, p. 258). Whilst the behavioural, emotional and cognitive dimensions can effectively capture how a student responds to a given learning task, the agentic dimension assists in developing an understanding of the extent to which a student is pivotal in the process of adapting or even formulating learning tasks.

Central to the focus of research on engagement is that it is linked to an improvement in learning outcomes and achievement levels of students and that it is critical in developing qualities such as commitment and active involvement thus preventing students dropping out or becoming alienated. As Fredricks et al. (2004)

point out, there is a presumption that engagement is malleable and as a result many interventions in education settings focus on improving engagement. In the context of this chapter, the focus is on the relationship between ICTs, specifically virtual worlds and the perception of engagement by university students.

Student engagement with ICTs, particularly in relation to game based environments (such as virtual worlds) and intelligent tutoring systems, is often taken as given. However as Rowe, Shores, Mott, and Lester (2011) suggest, there is a concern that such engagement does not necessarily translate to learning. Time on-task is not necessarily an indicator of engagement as learners' attention may be focussed on off-task thoughts that inhibit cognitive engagement (Romero 2012). In this view, the distracting entertainment features (Mayer and Johnson 2010) or the seductive details (Harp and Mayer 1998) promote engagement but not deep learning. Rowe et al. (2011) present research to refute this concern, finding in an empirical study of 153 high school age students that engagement with a particular narrative based learning environment was associated with improved learning outcomes. Rowe et al. (2011) suggest that the story and gameplay design elements are critical to ensure engagement leads to learning. Clearly there is a need to consider the design of both the particular ICT and the learning activity in order to maximise opportunities for engagement.

Arnone, Small, Chauncey, and McKenna (2011) emphasise the importance of curiosity in relation to interest and engagement when considering new media technology-pervasive environments. New media environments afford opportunities for new information and new experiences, however these environments can support or detract from curiosity. Arnone et al. (2011) suggest that "the curiosity episode, if resolved satisfactorily, initiates new learning [as in sense-making] but it is curiosity's power to both trigger and be triggered through the development and deepening of interest and consequently, the forms of engagement that result in deep learning and effective participation, collaboration, and affinity" (Arnone et al. 2011, p. 185). Further to this, personal, contextual and situational factors intersect with a students' experience with a new media environment and these need to be considered when seeking to leverage the potential of new media tools to create opportunities for students to experience deep learning (Arnone et al. 2011).

Whilst not directly linking engagement and learning, O'Brien and Toms (2008) deconstruction and definition of the term 'user engagement' does provide a useful framework for understanding how successful ICTs move from being merely usable, to engaging. They defined engagement as "a quality of user experience characterised by attributes of challenge, positive affect, endurability, aesthetic and sensory appeal, attention, feedback, variety/novelty, interactivity, and perceived user control" (O'Brien and Toms 2008, p. 938). Through exploring the experiences of users in relation to online shopping, web searching, education webcasting and video games, O'Brien and Toms (2008) revealed that engagement was a process that comprised of four distinct stages. They called these stages the point of engagement, sustaining engagement, disengagement and possible reengagement.

While O'Brien and Toms (2008) describe engagement as a process in which the participant moves through stages, Conrad and Donaldson (2011) developed a

model of phases of engagement. Their model is designed to assist the instructor to facilitate the student through each of the four phases when engaging in the use of online learning resources. They make the assumption that the learner begins as the 'newcomer' and moves through the phases as 'co-operator', 'collaborator' and finally as the 'initiator or partner'. They define engaged learning as "a collaborative learning process in which the instructor and learner are partners in building the knowledge base" (Conrad and Donaldson 2011, p. vii). Their framework links with the work of Salmon (2002, 2004) in her five-stage model for effective online teaching and learning. Salmon et al. (2010) extended her research involving the stages model to the use of the virtual world Second Life. She describes the importance of students mastering skills and each level in order remain motivated and as a result engage with other students and in the virtual world activities.

Methodology

A mixed method approach using both quantitative and qualitative data collection and analysis was used to assist with the triangulation of emergent themes. The methodological framework was action research, as described by Kemmis and McTaggart (1988). Action research has previously proved productive in the gathering and evaluating of data in a virtual world environment (Carr et al. 2010; Gregory and Masters 2012; Kohler et al. 2011; McKeown and Sanders 2007; McKeown Orwin 2009). Cycles underpin the action research model in order that data may be collected and evaluated to facilitate changes in the subsequent cycles. The testing of different methods for engagement and participation in virtual worlds was made possible by the use of cycles over the three-year period with three cycles being undertaken, one for each iteration of the subject.

Data was gathered from an online survey, observations and blog posts. The survey was designed to capture the knowledge that students had about virtual worlds prior to their introduction to any content about virtual worlds in education. Observation was undertaken both in the virtual world and in face-to-face tutorials. The blog posts were an assessment requirement in which the students reflected on their perception and/or experiences of virtual worlds.

The participants were students enrolled in the Bachelor of Education (Secondary) course at a regional university in NSW, Australia. The use of virtual worlds was embedded in a subject focussing on new media and emerging pedagogies. Part of the requirements for this subject was to read literature about the use of virtual worlds and to attend a tutorial conducted in a virtual world. Over the three cycles a number of different virtual worlds were offered to the students including Second Life, OpenSim, Sim-on-a-Stick and Minecraft. The students made their own choices about their level of engagement and were free to reflect upon their experiences through their blog posts. Three hundred and eleven posts were logged over the three cycles and they contribute to the data analysed in this chapter.

The aim of this research was to ascertain the capacity for virtual worlds to engage pre-service teachers in thinking about the possibilities for virtual worlds in their future classrooms. A secondary consequence of the implementation of virtual worlds in pre-service teacher education was to facilitate a shift in pedagogy by the students to fully utilise the affordances of virtual worlds. From these aims the theme of engagement in virtual worlds emerged as a significant motivator for students making decisions to embrace or reject virtual worlds in education.

Analysis

Approximately 18% (n = 56) of all the students enrolled in the subject that included virtual worlds responded to the survey. They survey asked them:

(1) Whether they used social networking applications or played computer games;
(2) If they were familiar with the term virtual world and understood what a virtual world was;
(3) If they had visited a virtual world before; and
(4) If they could see the possibilities for virtual worlds in the classroom

Of those who responded 85% (n = 48) used social networking applications and 23% played computer games (n = 13). Familiarity with the term virtual worlds and what a virtual world is was relatively high at 78% (n = 44) of the respondents. Sixteen per cent (n = 9) were familiar with the term but not what a virtual world is, and 2% (n = 1) indicated that they were familiar with neither the term nor what a virtual world is. These response rates indicate that the students overall had a high level of awareness about virtual worlds. In response to whether they could see the possibilities for virtual worlds in the classroom 60% (n = 34) indicated that they could see the possibilities, 32% (n = 18) were unsure and 3.5% (n = 2) indicated that they couldn't see the possibilities. These figures indicate that while the majority of students (78%) were familiar with virtual worlds a smaller number (60%) could see the possibilities.

The blog post responses displayed patterns that became evident as phases of engagement with virtual worlds for education. These phases are different in nature to those identified by O'Brien and Toms (2008), Conrad and Donaldson (2011) and Salmon (2002) in their studies into engagement and online learning. The phases that are proposed indicate the extent to which the students felt compelled to realise the potential for virtual worlds in their studies and/or teaching through to the students embracing the virtual world as having the capacity to affect their pedagogy and to utilise the technology fully in the classroom. As such their level of willingness to engage with virtual worlds is being assessed and has been categorised in relation to their capacity to articulate how they would utilise virtual world in a K-12 classroom.

The term phase has been used as individuals demonstrated that they moved between each of these phases yet did not necessarily start at the first phase. The

Table 9.1 Characteristics from the blog posts used to categorise the comments into phases of engagement

Phase	Characteristics espoused in student feedback
Pre-realisation	Could not see the benefit of using virtual worlds in education Would not use virtual worlds in education
Realisation	Could see the benefit of using virtual worlds in education Stated a number of barriers that would restrict their actual use of virtual worlds in education Unlikely to use virtual worlds in education Demonstrated a conflict in perceived benefit versus barriers May not like virtual worlds themselves but can see that students will
Replication	Could see the benefit of using virtual worlds in education Likely to use virtual worlds in education Some barriers may still exist Demonstrated the ability to link the way they would use virtual worlds in education to their current pedagogy
Re-imagining	Excited about the use of virtual worlds in education Most likely to initiate the use of virtual worlds in education Could describe how they would use virtual worlds demonstrating innovative teaching practice Minimal or no barriers if barriers were discussed they were done so with solutions offered

students may have engaged with the readings and activities and then made a choice not to engage with the concept of actually using the virtual world in a classroom setting. The characteristics of the responses that were used to place the comments within each phase are indicated in Table 9.1.

Pre-realisation Phase

The pre-realisation phase is identified by responses that indicate that they would never use virtual worlds and they could not see any benefit of using them in an education setting. The percentage of students who were categorised as making responses in the pre-realisation phase was 12% of the total students (n = 37).

The students in this category may have fully engaged in the tasks required of them to complete their study of virtual worlds and then become disengaged in the concept of actually using virtual worlds in the classroom. O'Brien and Toms (2008) suggestion that engagement moves through phases that includes the point at which someone becomes disengaged is evident with the responses in the realisation phase. As one student stated:

> I can't say I really understand the point. Going even further, even despite our discussion in class, I can't really understand how Second Life could be functional or relevant to a high school setting. I do understand how the program can be used for students develop their technology skills, however I don't believe it holds a place in the classroom (Cycle 1).

This comment highlights the contextual issues that Arnone et al. (2011) state as impacting in students' engagement. The student took the first steps of engaging in the activities of reading the online resources and joining in the class discussion but when asked to engage with actually using virtual worlds in the K-12 classroom there were too many contextual barriers.

What was evident in the comments made by students who were categorised as pre-realisation was that they were not approaching the virtual world with negative perceptions but were trying to reconcile their own capacity to utilise virtual worlds in the classroom. The virtual world experience was often referred to as being fun, which they equated with students not studying in a serious manner or being off-task. The following comment illustrates the juxtaposition that the student made between learning and fun and what they felt was appropriate pedagogy:

> I understand that people learn best when they are having fun…. I don't think that this means everything in a classroom should be a game. Why isn't it fun for students to talk and interact face to face? I am tech savvy, I was and am a part of the technological revolution, and I still think virtual worlds should be played with in their own time (Cycle 1).

The media image of Second Life was a particular concern to those in the pre-realisation phase. The following response shows the way that the students found it difficult to reconcile the media image of Second Life and the potential use of virtual worlds other in an educational setting.

> While we were in Second Life we saw many weird and unsavoury characters that I would not like my students to meet or even see. I believe there could be a danger with using Second Life in schools, and I doubt many parents would like their children to be in that sort of environment (Cycle 1).

As a result of the responses from the group in Cycle 1 who expressed concern over the use of Second Life the type of virtual world used for tutorials was changed to a number of other virtual worlds that the students might perceive as less threatening. In Cycle 2 the students were given the option of exploring Second Life, JokaydiaGRID or the open-sim grid created as part of the Pathways for Learning, Anywhere, Anytime, a Network for Educators (PLANE) developed by the NSW Department of Education. In Cycle 3 they were given an introduction to JokaydiaGRID where there are two islands with work created by primary school children. From an analysis of the responses over the three cycles the percentage of students who were categorised as pre-realisation dropped. This indicated that the situational factors of the type of virtual world and the perceived appropriateness of that virtual world to an educational context played a significant role in the level of engagement that the student undertook.

Realisation Phase

The realisation phase is the phase after pre-realisation but it may be the point at which the student starts, rather than a movement occurring sequentially from one to

the other. The indicators in the blog post responses that put the students in the realisation phase were that they could see the benefit of virtual worlds but also stated a number of barriers or concerns that would impact on their capacity to actually utilise virtual world in education. In their reflections, they either indicated that they were unlikely to use virtual worlds in education or they presented a number of issues that expressed that it would be extremely difficult for them to implement the use without a high level of support. Other factors that came through in the realisation phase was the ability to distinguish between their own feelings of discomfort or difficulty with virtual worlds but recognising that their future students will need to be aware of the ICTs and may well be already using them. The percentage of students who were categorised as making responses in the realisation phase was 42% of the total students (n = 129).

The realisation phase responses were most likely to have not reconciled their personal position and the perceived benefit of the virtual world. Comments such as the following make this point as they can 'identify the usefulness' and see that students would be engaged however they are concerned about 'online bullying and other associated issues.' The concern about online bullying represents a perception not founded in their actual experience but relevant in that it impacted on their capacity to engage in the concept. The following comment shows the conflict that the student had between using a resource that they believe would be engaging to their students and having emotional factors influencing them. Those factors of fearing what might occur in the virtual world based on their perceptions based on media reports and hearsay:

> After undertaking the module on virtual worlds I'm still undecided on my feelings towards the incorporation into the classroom. I can identify the usefulness of the virtual learning. It lends itself towards student's directed learning and allows the students to engage in a game-based type learning. I think this would engage students more. It would also allow a greater collaboration for students who cannot be in the actual classroom. However, this type of learning and world opens itself up to online bullying and other associated issues. If I were to employ this type of learning in my classroom I would need to ensure the students (online) safety with rules and expectations (Cycle 2).

The main difference that put the student in the realisation phase instead of the replication phase was that they were engaged in the concept of virtual worlds in education but were not engaged enough to actually take it to the step of implementing it in the classroom. They expressed that they would most likely use virtual worlds if others around them were doing so or if the barriers to use with removed.

> There really are endless possibilities with the use of virtual worlds, but I still don't think I am ready to embark upon that journey. Even though I would still be hesitant to use them with my students, mainly through my own lack of capabilities, I can certainly now understand and value their use (Cycle 3).

The realisation phase is an important phase as it is the place where most novice users of virtual worlds might start when trying to apply virtual worlds to education. From my analysis of the data it appeared that students who indicated this phase had engaged with the content provided as part of the topic in the unit of study. They had

not always experienced the virtual world. If they did experience the virtual world, it tended to be only on the one occasion in the tutorial with the whole group.

Replication Phase

The replication phase was signified when the students' reflections demonstrated that they were engaged in the concept of virtual worlds in education to the extent that they were likely to use it in their future classroom. This phase was also signified when the students could make links to their current pedagogical practice, thus replicating current ways of teaching yet adding the virtual world as a resource or tool. They would be placed in the replication phase and not the re-imagining phase if they were still acknowledging barriers or if their description of use was still similar to current pedagogical practices. They were placed in the replication phase and not the realisation phase if they expressed a desire to implement the use of virtual worlds regardless of whether they felt they had the capacity yet to do so. The percentage of students who were categorised as making responses in the replication phase was 23% of the total students (n = 70).

The description in the following quote shows the student has been able to articulate how they could use the virtual world in the subject area of Physical Education. They state that:

> The PDHPE 7-10 syllabus has a strong focus on developing protective factors and behaviours around risk taking. Students are taught about road safety, drug and alcohol education and increasing resiliency, as well as many other important skills such as communication, decision-making and interacting. Designing activities that incorporate these aspects into virtual learning would be of great benefit to students and provide them with something new and interactive. I believe this would encourage student interaction, critical thinking and involvement in the tasks (Cycle 3).

However, the same student reflected on the issues that they perceived such that they felt that the virtual world "should be used sparingly, as an over reliance on ICTs can cause problems when issues arise with the ICTs" (Cycle 3). This type of concern in relation to ICTs in general indicates that the student was not engaged sufficiently that they would make extra effort to implement virtual worlds in their future classroom even though they can describe why and how they might use virtual worlds.

A consistent factor that motivated the students to show engagement in virtual worlds was their perceptions about their future teaching environment and their future students. Comments such as the following demonstrate this characteristic: "although I do feel that virtual worlds will not be used in many schools at present, I do think it is a thing of the future. A future that I will be teaching" (Cycle 3).

The following comment articulates both the personal engagement with the virtual world and the perceived engagement of their future students. The concept that their students would be engaged was highly motivating for the students and

motivated many of them to engage with the virtual world to the point of being outside their own comfort zone:

> I must admit I was pretty fascinated interacting in the JokaydiaGRID world. The many benefits became evident. It can be used for all ages and enhances motivation and learning. Students are likely to become more interested and engaged in the work they are doing. Furthermore, as teachers we are able to guide and/or scaffold to a desired level throughout the assessment process. We can provide rewards for progress and completion of work. We and the students can access this, and interact with one another from any location (Cycle 3).

Re-imagining Phase

Reflections in which the students described experiences and environments that are difficult or impossible to create in real life signify the re-imaging phase. When students have either reached this phase or started in this phase they are most likely to fully utilise the affordances of virtual worlds. They will be describing the use of virtual worlds beyond the 'distracting entertainment features' (Mayer and Johnson 2010) or the 'seductive details' (Harp and Mayer 1998). They are describing ways to utilise the affordances of virtual worlds to create engagement in knowledge creation. The percentage of students who were categorised as making responses in the pre-reimagining phase was 24% of the total students (n = 70).

Students in this phase are generally excited about the use of virtual worlds in education and use words such as fascinating, exciting, astounding, wow, fun and inspired. Comments included "it was a fascinating experience and I enjoyed the experience more than I thought I would" or "I was inspired" or "I feel I need to reiterate how amazed I am by the educational possibilities of virtual worlds" or "the clip on virtual learning blew my mind! How fantastic would it be to have a school website that was a virtual world - gathering information could be fun and students hard work could be exhibited on a global scale" were synonymous with the engagement that the students experienced. The following comment succinctly expresses both the excitement of the student and their imagined possibility for their music class beyond what they had experienced or what was a reality in the classroom without virtual worlds:

> Wow! Again, I can't believe how much education has changed. I'm really looking forward to using these virtual worlds in my classroom. I can just imagine having a Jimi Hendrix-like avatar shredding it up on the virtual stage (Cycle 3).

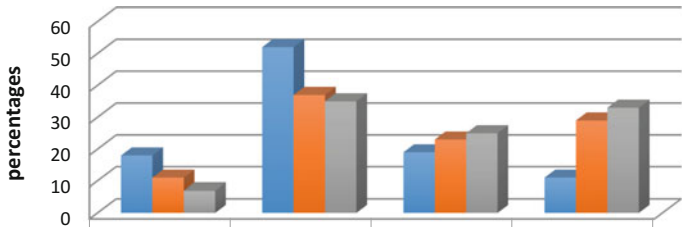
From the evidence of these comments it does not require a lot of time experiencing virtual worlds to be at the reimagining phase. The students were able to describe different models of teaching and learning after only one experience or interacting with one resource. An important aspect of the reimagining phase was the ability of the student to articulate what they might do with virtual worlds in their future classroom. The types of examples that they provided included activities that are dangerous such as in science experiments where "it would allow them the

freedom and confidence to conduct experiments and perform reactions in a virtual laboratory that may otherwise be considered too expensive, toxic or dangerous in the 'real' world" (Cycle 3). Activities that were otherwise impossible to undertake such as visiting the Sistine Chapel for "art students to experience one of the true master pieces without having to paying thousands of dollars to travel to Italy and see it in real life" (Cycle 1). Other activities included things such as stimulating students' imagination by using the virtual world "to give my students inspiration for writing, to perform plays, to script their own plays, to do all sorts of stuff" (Cycle 3). One student described a number of different ways that authentic experiences could be designed for students such as "virtual stores that could teach students about commerce in an environment where they can trade goods and services for real rewards" or "virtual governments could teach students about civics and responsibility. Historical characters can be brought to life and scenes re-enacted" or how "theoretical mathematics could be given real (virtual) world applications" (Cycle 3).

The students who were most able to reimagine the types of activities and the teaching-leaning process were those who experienced the virtual world, particularly if they had a positive experience that included interactions in spaces that revealed new ways of thinking about their discipline. Having had those experiences, they made comments such as: "the idea of having interaction and the almost game-like feel would be enticing to many students who many not normally feel as engaged in the typical pen to paper or whiteboard classroom scenario" (Cycle 1).

Differences Between Cycles

There are some distinct differences in the results when comparing the three cycles (see Fig. 9.1) that demonstrate the impact of changes made in the delivery of the unit over the three iterations. The percentage of students in the pre-realisation phase decreased from 19% in Cycle 1 (n = 19) to 11% in Cycle 2 (n = 9) and a smaller



	Pre-realisation	Realisation	Replication	Reimagining
Cycle 1	18	52	19	11
Cycle 2	11	37	23	29
Cycle 3	7	35	25	33

Fig. 9.1 The variation in students categorised in each phase over the three cycles

decrease to 9% in Cycle 3 (n = 9). At the same time the number of students who demonstrated characteristics of the re-imagining phase increased from 11% in Cycle 1 (n = 12) to 40% Cycle 3 (n = 32). One of the possible explanations for this change in characteristics between cycles was the result of the change of delivery in the face-to-face lecture and tutorials. The emphasis on Second Life as the virtual world of choice was shifted to virtual worlds that the students perceived to be more appropriate for education (such as SoaS, JokadiaGRID, PLANE and Minecraft). The delivery of content in Cycle 2 and Cycle 3 was able to include an increase in examples of how virtual worlds were being used in primary schools due to the work that had begun by some of the students from Cycle 1. In Cycle 3 one of the students who had been using virtual worlds in local primary schools became one of the expert tutors and spoke with the students. The work undertaken by this student is discussed in Jacka and Booth (2012, 2013).

Barriers to Engagement

Patterns emerged from the data about the perceived barriers to the use of virtual worlds in education and as such the phase of engagement in which the students were currently situated in. The perceptions about their future students, virtual worlds in general and in the classroom as well as their personal experiences and apprehensions all impacted on their responses. These contextual and situational factors impacted on the level of engagement (Arnone et al. 2011). Some factors that were considered as barriers by some students were perceived as beneficial by the students who were most engaged.

In Cycle 1 the main barrier that was raised was that their future students would be too engaged by the virtual world to the point of being distracted and in turn would find it difficult to remain on task. This view is reflective of Rowe et al. (2011) suggesting that engagement does not necessarily translate to learning and that time on-task is not necessarily an indicator of learner engagement (Romero 2012). The aspects that the students found distracting were what Mayer and Johnson (2010) call the 'entertainment features' and Harp and Mayer (1998) refer to as the seductive details. There are studies that have shown that these 'entertainment features' can be linked to improved learning outcomes as students engage with what is often a 'narrative based learning environment' (Rowe et al. 2011).

The barrier of the students being too engaged to the point of being off-task was not expressed so highly in Cycle 2 or Cycle 3. This may have been due to the change in the virtual world being utilised. In Cycle 1 Second Life was the main virtual world. Second Life does not have the classic features of a narrative based environment as it can be designed by the teacher to be structured and to include game elements as well as traditional pedagogical tools. However, the ways that Second Life was used in Cycle 1 were very unstructured and exploratory in nature. The students were given free reign on the University's education island, as a way to discover the tools, navigation and orient themselves. Many of them found that the

space was highly engaging and entertaining and they expressed in their reflections that they found it difficult themselves to remain on task. Comments the students made about the level of engagement and being on-task included:

> The use of Second Life in the classroom has the potential to enhance student engagement and enrich teaching and learning activities, however, it is essential to include clearly defined learning outcomes to avoid off task behaviour (Cycle 1).

> Virtual Learning in this new digital age can offer students so much opportunity to experience different ways of learning and engagement. I believe teachers hardest task is keeping students focused on learning and not being side tracked (Cycle 1).

In response to the feedback about being on task, the structure of the tutorial in the subsequent Cycles was altered. In Cycle 2 the pre-service teachers were offered a number of virtual world options to explore including; Second Life, JokaydiaGRID and the Department of Education OpenSim - PLANE. As such the feedback about not being on task in tutorials and being concerned that their students would not be on task were not present in the Cycle 2 reflections. In Cycle 3 the students were instructed in the process of navigating and utilising virtual worlds in the OpenSim of JokaydiaGRID. The University space in JokaydiaGRID included work wholly created by primary school children.

Students in Cycle 3 started to consider that the level of engagement with the virtual world would in fact keep the students on-task as is evident in the comment that "I can see how powerful a tool it would be to motivate the students to stay on task" (Cycle 3).

Another student in Cycle 3 articulated that the virtual world was a space that the teacher could control and scaffold, unlike previous comments that stated the contrary as a concern. They said:

> The use of virtual and game based learning allows teachers to introduce a controlled learning environment, where the parameters of the task are clear and specific, therefore allowing students to focus more directly on individual learning and development of critical thinking skills (Cycle 3).

Other concerns that the students had were that either they or their student might become addicted to the virtual world due to the highly engaging nature of the environment. They typically related addiction to their own experience as these comments reveal:

> A lot of people can get so immersed in video games, such as WoW [World of Warcraft], that they lose touch with reality for days on end. I know some people that will spend an entire weekend playing, and not even shower or leave the house (Cycle 1).

> Given that I once caught my daughter feeding money into a game that would let her create flowers, I can just see an irate parent asking me what I was doing encouraging something that could be so addictive (Cycle 3).

Engagement was generally considered a positive affordance of virtual worlds but the loss of time due to engagement was generally viewed as a negative. They felt that they could have been doing more productive activities with their time. As in the comment that "I sat in our tutorial thinking that all I was doing was wasting time,

when I could have been researching for our next assignment?!" (Cycle 1). The following comment illustrates the concern that engagement per se may not be enough: "My main concern would be to ensure that the purpose of the task is closely evaluated and that students are meeting the required outcomes, not just being actively engaged" (Cycle 1).

The Meta-Language of Engagement

As the participants were all students training to be teachers, the educational meta-language that they were being instructed in throughout their studies was prominent in the blog posts. An analysis of the frequency of particular words in the data gave the following results: metacognition (n = 21), imagination (n = 47), higher-order-thinking (n = 39), problem solving (n = 62), creativity (n = 77), communicating (n = 99), collaborating (n = 81), interacting (n = 217), engaging (n = 291) and creating (n = 345). Creating was the most frequently used term with engaging the second most used. The students' response to virtual worlds highlighted the connection that the students perceived between creating, engagement and virtual worlds. The following comments provide a sample of the way in which the students use the term 'engaging'.

> This is so much more engaging than reading a text, watching a movie, or listening to a boring teacher out the front of the classroom, and provides the venue for students to create their own lived experiences in the past (Cycle 3).
>
> As teachers we worry that our pedagogical practices aren't engaging, and are we really placing knowledge within our students' heads. Through implementing a VLE environment, we are creating a variety of engaging pedagogical practices, that further develop their learning (Cycle 3).
>
> Overall, I think game-based learning and learning through virtual worlds is one of the most promising ways to learn in the future. It accommodates to students in a sense that it increases engagement because the way of learning is extremely attractive to young minds and is not as traditional. This factor alone will make learning more enjoyable for students. Keeping this in mind, if students are engaged in the way they are learning, then it is likely that they will be more engaged in the content at hand (Cycle 2).
>
> I think there is a lot of potential for this technology to be used widely in schools to facilitate student learning and engagement in a way that has not been previously possible (Cycle 3).

Conclusion

The comments made by students studying to become secondary school teachers revealed that virtual worlds have the potential to engage students to think about the possibilities for virtual worlds in their future classrooms. The students' perception of the level of engagement that their future students would have was a highly

motivating and influential factor in their own determination to pursue the use of virtual worlds. The students also made strong connections between perceived levels of engagement and the creative aspects of virtual worlds. Engagement from the university students further increased as students started to use virtual worlds in the authentic context of the primary school classroom. The action research cycles undertaken in this study assisted in the design and implementation of the virtual world activities and content. Being able to change the emphasise on particular virtual worlds helped to focus the students on what the virtual worlds could do rather than what barriers they might present.

From this longitudinal study we believe that virtual worlds, while still in their infancy in education, do have the capacity to engage both university and K-12 students. Furthermore, the types of engagement are varied and do not fit easily within existing categories or descriptors of engagement. This research has found that the initial and at times superficial perception by students that the 'entertainment features' or 'seductive details' will engage their future students has the capacity to motivate the university student to investigate the potential for higher level cognitive engagement. The barriers that may be preventing the student from engaging with virtual worlds can be overcome by continual redesigns that respond to the students' concerns. By increasing the students' knowledge about virtual worlds in both their capacity to use the ICT and to design meaningful learning experiences for their future students a higher level of engagement will emerge.

Whilst the findings from this research are derived from data collected from pre-service teachers, they tentatively could be applied to educators in general. The phases of realisation outlined in this chapter (pre-realisation, realisation, replication and reimagining) could usefully be transferred to understanding the level of readiness and/or preparedness for educators more broadly to incorporate the use of virtual worlds in their teaching practice. This research has shown that by providing best practice exemplars and alternative virtual worlds (which may not be stigmatised in the same way as Second Life, for example), the barriers to implementation are reduced. Such actions could easily be transferred to other education settings to promote the use of virtual worlds in education contexts more broadly.

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