

Chapter 1: Introduction



Introduction

The research reported in this thesis by journal-article format was undertaken to investigate whether a virtual world was an authentic and effective teaching and learning tool for students studying for their education qualifications. The research was conducted at the University of New England (UNE) in regional Australia over a period of four years. The perceptions of 523 undergraduate and postgraduate students who were learning in a virtual world were explored using three action research cycles. The topic “virtual worlds”, in particular understanding how student learning experiences can be enhanced in highly interactive environments, was motivated by the researcher’s own experience of learning through a more traditional correspondence approach to distance education common in the 1980s. Since then, new technologies have altered the distance learner experience. The researcher’s curiosity, as she embedded the use of virtual worlds into her own teaching practice, led to an investigation to understand the impact of using such technology on student learning outcomes. This investigation, she believed, would also be of use to others who similarly seek to understand the affordances of virtual worlds in their own teaching practice.

This thesis by journal-article format is presented through a series of eleven peer-reviewed publications. All have been published. The presentation of the research through publications was selected for a number of reasons. The researcher has been consistent in using action research methodology, collecting data and presenting results in recognised peer-reviewed publications since 2009. The publications build on each other and demonstrate a body of work in an emerging area of research. Exposing the research to peer-review enabled the researcher to seek input into the research being pursued by the emerging virtual worlds research community. This was invaluable for informing future research.

This thesis is arranged as an introductory chapter, eleven publications and a concluding chapter. The introductory chapter is divided into several sections. First, the background introduces the thesis and then the research approach through two phases are discussed. Second, the research aims and objectives are provided, followed by the conceptual framework, research questions, methodology, data collection and analysis techniques. Third is an overview of the research phases as they relate to each publication, an overview of the publications and an introduction to the publications explaining their inter-relationships. Finally, the impact of the research and concluding remarks are provided. The word images at the beginning of each section of the thesis depict the words contained therein.

Background

The researcher began exploring the affordances of virtual worlds as a means to engage students in their learning. Virtual worlds provided the opportunity to engage learners in activities that could be viewed as authentic and in an almost “real” setting. Distance learners do not often meet their peers and lecturers (educators) in face-to-face meetings and a virtual world provided the means to do this, virtually. Among the many virtual worlds available, Second Life was selected as a suitable platform because it provided free access to register as a basic user. It was not necessary for students to purchase subscriptions to participate in learning activities. In Second Life subscriptions can be purchased but are only required if you wish create content on your own land. Furthermore, many educators in higher educational institutions were using Second Life both as basic users and as paying residents so it was a logical choice from amongst the possible virtual spaces. The proprietor of Second Life, Linden Labs, provided educational institutions with a 50% discount on the purchase cost of space (land). An additional incentive for the researcher to purchase space for educational purposes in Second Life as opposed to other virtual worlds that did not offer these discounts. Land was purchased enabling the researcher to build a suitable space for students to learn.

In 2007, the researcher’s avatar, Jass Easterman, was created. The researcher herself learned how to build objects and spaces within Second Life for the purpose of creating a student learning space, which was called “Education Online Headquarters”. This initial space has been in use for several years. However, due to the growth in the numbers of students wishing to explore Second Life as a teaching and learning space, more space needed to be purchased. In 2009, a consortium of three higher education institutions, UNE, Curtin University and the Australian Catholic University, created “Australis 4 Learning”. The consortium approach was essential so that resources could be pooled. This resulted in a much larger virtual space that could be used for many purposes, some of which are presented in this thesis. “Australis 4 Learning” contains classrooms, a library, a staffroom, play equipment and other interactive resources to create an authentic school learning environment for future teacher educators. It was created as a collaborative open space, meaning that others in the consortium could use the resources if they desired and the Australian and New Zealand Virtual Worlds Working Group (VWWG), which had over 190 members at the end of 2012, also opted to meet there monthly.

Research Approach Overview

This research had two phases, the initial phase to provide the context of the study (Phase 1) and the second phase for the main research study (Phase 2). These two phases are now described.

Phase 1 was exploratory and situated around the problematising of student learning within a virtual world. A desire to understand the problems and arising assumptions resulted in preliminary investigations. Phase 1 included pilot studies of the research that would be undertaken in Phase 2. Specifically, Phase 1 had a focus on exploring virtual world activities undertaken in the education sector with the students. These investigations place Phase 2 in context.

Phase 2 consisted of three cycles of action research investigating the efficacy of a virtual world as a teaching and learning tool and these cycles were undertaken between July 2008 and November 2011. Over this period, a total of 3,576 students, the potential participants of the research, were enrolled in either Information and Communication Technology (ICT) or Learning and Teaching education units (subjects). These seven units ran once per year over the four years of this research with one unit taught twice per year. Each unit consisted of approximately 150 hours of study time and ran for one semester of thirteen weeks duration. Of the 3,576 students, 523 either volunteered or were required to participate in the learning activities that were the focus of this research.

Learning activities in the virtual world for off-campus students were different from on-campus activities. Off-campus students voluntarily participated in weekly learning activities facilitated by the educator that were conducted inworld (in Second Life), in their own homes, of an evening. These learning activities included discussions, excursions, tours, guest lecturers, role-play activities, web quests, basic building and scripting skills. On-campus students participated in a compulsory orientation session and a role play activity led by the educator in a computer laboratory in timetabled workshops (either de Bono's (1985) Six Thinking Hats discussed in Publications 8, 9 and 11 or VirtualPREX – virtual professional experience – discussed in Publications 10 and 11).

As it was not possible to ensure the students' computer hardware capabilities and Internet availability, only voluntary participation was offered to off-campus students. Voluntary participation was also offered to on-campus students however they chose not to participate. Voluntary learning activities conducted in Second Life were combined classes of students from across all seven units (undergraduate and postgraduate) and who were all enrolled in off-campus mode. The learning outcomes of the units were aligned with the learning activities

and assessment tasks at the various undergraduate or postgraduate levels. Students studying at the different levels had different assessment tasks to undertake. However, by doing their virtual world learning activities, this led students to perform better on virtual world assessment tasks, regardless of the level of enrolment. Each unit had several assessment task options to choose from. One choice was set around learning and teaching in a virtual world and students could choose to complete this assessment task if they participated in learning activities within the virtual world.

On-campus first year students enrolled in an ICT education unit were required to participate in virtual world learning activities as part of their timetabled unit content. In other words, it was a compulsory activity. These activities provided them with knowledge of teaching and learning in a virtual world. Sufficient computer and Internet connection could be assured through the use of the university computer laboratories. Students did not have to participate in the research, but were required to participate in the activities. Students were advised of this prior to the learning activity. As with off-campus students, learning activities were aligned with unit outcomes and assessment tasks.

An action research methodology as outlined by Kemmis and McTaggart (1988) was undertaken. Several studies covering impact on learning, engagement and immersion in authentic learning activities commenced through three cycles of data collection and analysis. Both qualitative and quantitative data were collected. The findings of the three action cycles are reported in this thesis, hereinafter referred to as a “portfolio” of publications and consist of published peer-reviewed journal article, book chapters and conference proceedings.

Research Aims and Objectives

The research aimed to investigate three areas:

- Impact on learning;
- Engagement with learning; and
- Immersion in authentic learning activities.

These were the basis of the studies that occurred over three cycles.

What impacts on student learning is very difficult to gauge. As Williams and Williams (2011) pointed out, “motivation is probably the most important factor that educators can target in order to improve learning” (p. 1); furthermore, it “is an essential element that is necessary for quality education” (p. 2). There are several factors that contribute to student motivation –

learning should be timely and relevant to life, choice should be offered, learning should be flexible, students should be encouraged and engaged in their work and learning activities should cater for different learning styles (Williams & Williams, 2011). If students are motivated to learn, this could have an impact on their learning. This thesis explores this notion.

It appears engagement and motivation are connected when the learning environment and learning activities are considered meaningful (Kearsley & Shneiderman, 1998, p. 20). Furthermore, there is evidence that suggests when this is the case, students engage more in learning activities involving "... cognitive processes such as creating, problem-solving, reasoning, decision-making, and evaluation" (Kearsley & Shneiderman, 1999, para. 3). This thesis explores engagement from three perspectives: student's feelings, observations of students learning and performance, and the perceptions and beliefs of the students.

Immersion in authentic learning activities has been an important aspect of the learning approach that the researcher has undertaken. The research reported in this portfolio provides evidence to suggest that students prefer the virtual world activities to mirror the "kind of activities people do in the real world" (Herrington & Kervin, 2007, p. 223). In authentic learning activities, students find and solve problems with the "complexity and uncertainty of the real world" (Herrington, 2006, p. 3). Two different authentic learning activities (de Bono's (1985) Six Thinking Hats and VirtualPREX) were conducted in the virtual world to immerse students in their learning.

The key objective of the research was to explore student perceptions of their learning when participating in learning activities within a virtual world and whether these learning activities led to improvements in learning outcomes.

Conceptual Framework

Building upon knowledge acquired from the literature review in each of the publications in this portfolio, but most importantly from Publication 3, a conceptual framework was developed. As adults were the focus of the research, Andragogy principles, the foundations of adult learning, were explored to ensure there was a framework to inform the use of virtual worlds with adult learners. Andragogy principles used in this research were:

- Adults need to know why they need to learn something;
- Adults need to learn experientially;
- Adults approach learning as problem solving; and

- Adults learn best when the topic is of immediate value (Knowles, 1984, p. 12).

Two learning theories consistent with andragogy principles, as demonstrated by Knowles (1984), were identified as appropriate for framing adult learning in a virtual world. These were the constructivism and transformative learning theories. The foundation principles of constructivism are that the learner constructs new ideas or concepts based on current or past knowledge (Bruner, 1986). Transformative learning is the process of reflection and action (Cranton, 1992). Connectivism, although contested as an emerging learning theory, was also explored to see whether it was a viable learning theory to underpin student learning. Connectivism is based on the learner's ability to find and increase knowledge by connecting with current and past information through the use digital educational practices (Siemens, 2004). When a topic is of immediate value and the adult learner knows why they need to learn, they tend to learn by experimentation and problem solving and will reflect and act based on their current or past knowledge. Transformative and constructivist learning theories frame andragogy principles of learning.

Research Questions

The initial research question that informed Phase 1 arose from speculating on why students appeared to be more engaged in their learning activities in Second Life than in other learning activities. The initial investigations indicated that there appeared to be an impact on student performance on their assessment tasks. The researcher wanted to know, for example: Was increased engagement within authentic learning activities in a virtual world resulting in improved grades? Were the activities so immersive and engaging for students that they had an impact on student perceptions of their learning? Were learning activities in the virtual world authentic and like face-to-face learning activities?

In Phase 2, six research questions emerged from the investigations of Phase 1 for fuller investigation and were explored through three action cycles. The research questions of Phase 2 follow.

Action research cycle impact on learning

- Q1.1 How does learning in a virtual world impact on student learning outcomes?
- Q1.2 What are student perceptions of their learning in a virtual world?

Action research cycle engagement with learning

- Q2.1 How are students engaged with their learning in a virtual world?
- Q2.2 What are student perceptions of their engagement with learning in a virtual world?

Action research cycle immersion in authentic learning activities

- Q3.1 How does immersion in authentic learning activities impact on student learning?
- Q3.2 What are student perceptions of their learning when immersed in authentic learning activities in a virtual world?

Methodology

In order to understand the researcher's own teaching practice and the impact of decisions made by the researcher when designing learning experiences, the action research methodology and the framework as outlined by Kemmis and McTaggart (1988) was used (Figure 1.1). The three cycles of action research were developed between 2008 and 2011. Each of the action research cycles planned the research by identifying the students who could be the potential participants, obtaining Ethics approval and timetabling the learning activities, acted upon the research by conducting specific learning activities, observed the research, which is discussed in more detail in the publications and reflected on the research, which led to planning for the next cycle. Action research was the chosen methodology because it was deemed the most appropriate way to understand student perceptions of their learning in virtual worlds.

Action research was first conceptualised by Lewin in 1952 and further developed by Kolb (1984). Zuber-Skerritt (1993, p. 47) defined action research as "collaborative, critical (and self-critical) enquiry by reflective practitioners who are accountable and make results of their enquiry public". Fundamentally, action research involves collaboration and critical dialogue between the researcher and those being researched and sets out to alter a situation (Smith & Lovat, 2006). It is the "process of change aimed at the improvement of an individual's, or group's, own practice" (Smith & Lovat, 2006, p. 212). The process is usually undertaken because a practitioner desires to improve his or her own practice, to understand the reasons and basis for such practice in a more critical manner and the context in which it takes place.

Following Kemmis and McTaggart's (1988) process, a series of cycles of action research were undertaken. The components of each cycle are as follows:

- A plan must be developed (Plan);
- The plan must be implemented (Implement/Act);
- Observations of the effects in the context in which it occurs must take place (Observe);
- Continuously reflect on the effects as a basis for further planning, subsequent critically informed action through a succession of cycles (Reflect).

Kemmis and McTaggart's action research spiral is illustrated in Figure 1.1(a) and Figure 1.1(b) demonstrates how action research, based on this spiral, was undertaken in this research. According to Zuber-Skerritt (1993, p. 48), "the aim of action research is for the participants to learn, to develop their performance, to improve their practice and to change those existing conditions and organisational constraints which impede practical improvements". Hence the three cycles discussed in this portfolio have different research questions that build on each other. Burns (1994) stated that action research is the "application of fact finding to practical problem solving in a social situation" (p. 293) which involves "collaboration of researchers and others to improve the quality of action within the social situation" (p. 303). This research began with an initial researcher progressively incorporating more "educator" researchers as it moved through the action cycles which allowed for a deeper understanding of the impact of "educator" decisions on student learning outcomes. The additional "educator" researchers were using virtual worlds in their own practices as a teaching and learning tool and/or to undertake their own institutional research. They consisted of either experts in education or teaching in virtual worlds, or a combination of both. These additional researchers were all involved with the researcher through funding grants and therefore working together to achieve specific grant outcomes. All these researchers contributed to survey instrument design and one researcher assisted in analysing data in one part of the research.

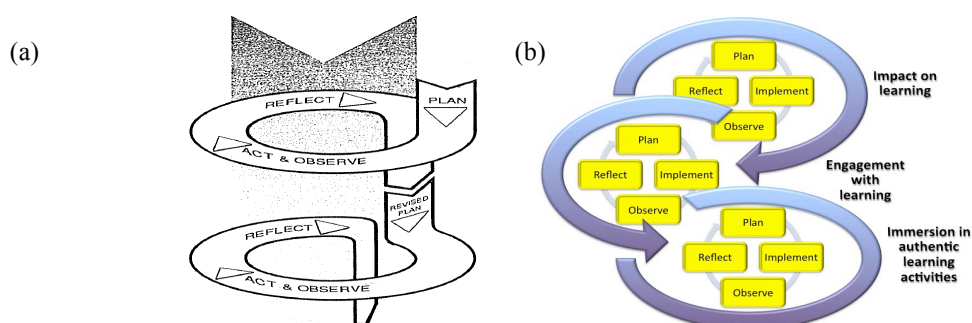


Figure 1.1: (a) Kemmis and McTaggart (1988, p. 11) Action research spiral, (b) Action research spiral undertaken in this research

Action research can be messy, complex and often difficult to report. As depicted in Figure 1.2, the action research cycles outlined in this portfolio have been built on over a four-year period. The increasing thickness of the lines demonstrates when new “educator” collaborators joined the action research process.

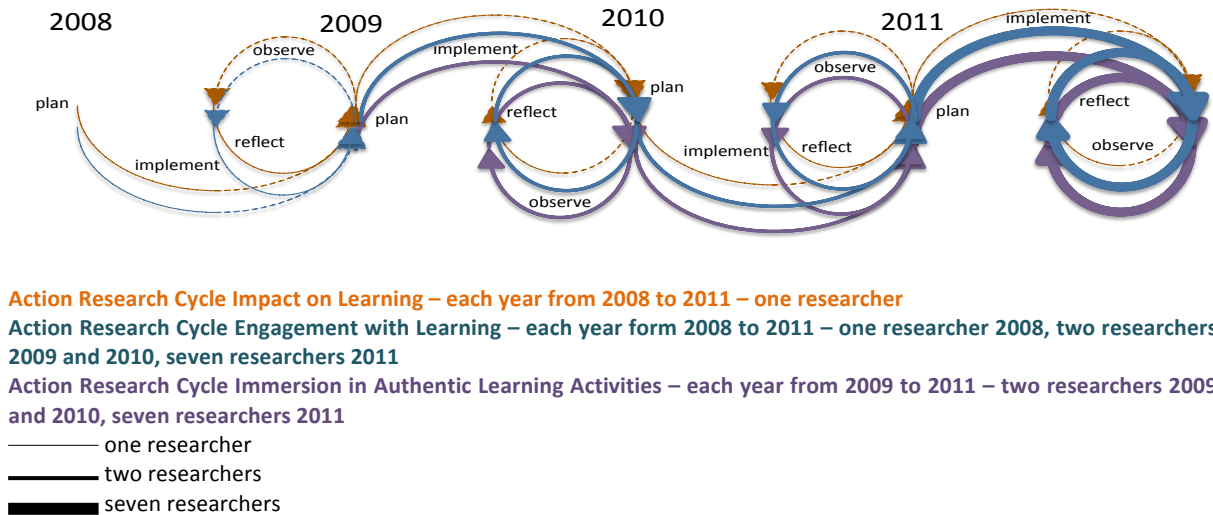


Figure 1.2: Action research spiral over four years of research, 2008 to 2011

As noted earlier, two types of students were invited to participate in the study: students who voluntarily participated in virtual world activities (off-campus students) and students who were required to participate in virtual world activities as a component of their undergraduate studies (on-campus students). On-campus students voluntarily participated in the research but were required to undertake the virtual world activity as part of their unit requirements. For each action research cycle, qualitative data, supported by quantitative data, were collected so that data were gathered from multiple sources. Analysis occurred during the reflection on each cycle and then the planning began for the next action research cycle.

There are two major strengths to the methodology discussed in this portfolio. Firstly, the number of students available to participate in the research expanded over the years. This was because the researcher had access to more units of study and a unit that was originally only offered to on-campus students became available to off-campus students. The second strength of the methodology was the gradual inclusion of more “educator” researchers over the four years. This brought different knowledge, expertise and perspectives, which provided insight into other methods of data collection and analysis.

An important principle of the action research approach is the incorporation of additional researchers. In 2008, only one researcher began the exploration of the efficacy of a virtual world as a teaching and learning tool. In 2009 another researcher joined to undertake further

action research exploring student immersion in an authentic learning activity (de Bono's (1985) Six Thinking Hats). In 2010, five researchers joined the two researchers to undertake a further research project exploring virtual worlds as a teaching and learning tool through a new authentic learning activity (VirtualPREX).

A criticism of action research is that the researcher has to continuously plan, implement, observe and reflect on the research before embarking on the next phase. While every attempt was made to follow the action research methodology, on occasions some of the research cycles overlapped. For example, Cycle 1 (impact on learning) and Cycle 2 (engagement with learning) were undertaken consecutively over the four years of the research. Cycle 3 (immersion in authentic learning activities) was undertaken from 2009 onwards overlapping Cycle 1 and Cycle 2 as demonstrated in Figure 1.2.

There was one limitation of the methodology that revolved around consistent survey questions being asked across the four years due to the fact that this research involved several researchers over this period. Although many researchers assisted in the action research, this caused a limitation to using this methodology, resulting in inconsistent data collection due to different surveys. See, for example, Appendices 1–5, the surveys used across the four years. Surveys 1 and 2 were used in 2009 with the pilot study. Survey 3 was used in 2010 with a new researcher with an expansion and development of the pilot study. Survey 4 was used in 2010 and 2011 for de Bono's (1985) Six Thinking Hats role play activity and Survey 5 was used in 2011 for the VirtualPREX role play activity. Consistent data collection processes could have strengthened the research. In keeping with action research techniques, more researchers were brought into the research, however, their recruitment revolved around receiving grant funding to undertake the research. This meant survey questions had to be based on the grant criteria. Even though the same techniques for teaching were used, different survey questions were asked due to the focus of grant applications. They did not always line up with previous survey questions. Cycle 3 included an extra researcher, Yvonne Masters, exploring role play comparisons between virtual world workshops and real-life workshops and was undertaken after the receipt of a small school grant (de Bono's (1985) Six Thinking Hats). Cycle 3 also included VirtualPREX role play activities due to the receipt of an OLT (Office of Teaching and Learning) grant to explore innovative assessment using a 3D virtual world with pre-service teachers and involved seven researchers (VirtualPREX). The inclusion of more researchers both strengthened (discussed in the concluding chapter) and limited the research, as outlined above with the survey questions not being aligned. The impact was that

when analysing data from the students across the four years of research some of the data collected was not comparable. For example, some demographic questions or new questions were asked that were not part of the data set in previous research.

Data Collection

Evidence for action research is provided through a variety of data sources such as documentation, records, observations (direct and self) and physical artefacts (Yin, 1994). Multiple sources of evidence collected result in triangulation of data to provide “converging lines of enquiry, improving the reliability and validity of the data and findings” (Burns, 1994, p. 321). There were four main sources of data for the research reported in this portfolio: recording online inworld text conversations; observing students in workshops; recording student participation in learning activities such as the length of time they stayed inworld and the amount of text written; and the completion of surveys by students who had undertaken learning activities in a virtual world.

Recording of online inworld text was only collected from off-campus students. As these students were located across Australia and around the world, the conversations were similar to a face-to-face discussion. That is, they spoke freely in their virtual world activities. On-campus students only learnt how to use the virtual world in an orientation activity and participation in a role play activity, therefore, their conversations were not recorded as they did not undertake inworld conversational discussions. On-campus students did not have the need to get to know the other students in the virtual world activity as they knew them in real life and were sitting with them in a computer laboratory. If an on-campus student wanted to know something, they would speak out loud in real life so that all participating would benefit from the answer to their query.

Observations, participation in learning activities, completion of surveys and further details of methods relevant to each action research cycle are detailed within the publications.

Ethics

All research must take into consideration any ethical issues that may arise as a consequence of the research and how these may be overcome. An overview of who is participating in the research is also required. Discussed in this section are ethical issues that were overcome and who the participants for the research were.

Ethics applications were sought prior to each cycle because the research dealt with people and their views, and it was difficult to predict the data methods that would be used in each successive cycle without completing the previous cycle(s). All students participating in the research were volunteers preventing ethical issues which is consistent with Babbie's (2007) recommendations. The issue of a dependant relationship between student and educator was overcome by analysing data after the completion of the semester when students had already received their assessment grades.

Students were enrolled at UNE in one of seven ICT or Teaching and Learning education units. These units were: EDIT413 Social Computing Tools: Blogs, Wikis and Beyond; EDIT424 ICT in Education; EDIT124 ICT Across the Curriculum; EDIT521 Principles and Practices of eLearning; EDIT518 Issues in Learning with ICT; EDLT115 Learners and Learning; and EDLT116 Learners and Teaching. Students were studying either off-campus or on-campus in one of the units. They were able to achieve some of their unit learning outcomes from their virtual world learning activity. Participation and recruitment were undertaken in one of two ways:

- Off-campus students – voluntary participation in workshops involving virtual worlds as part of their learning. This could not be made compulsory because there was no guarantee the student's computer hardware or Internet connection would support the use of the virtual world. Participation in the research was voluntary. Students were recruited via the Learning Management System (LMS), outlining the participation requirements and virtues of using a virtual world as a teaching and learning tool. The LMS was the student's portal to all their study materials.
- On-campus students – compulsory participation in workshops involving virtual worlds was a planned aspect of their learning activities. However, participation in the research by completing surveys was voluntary. Students were recruited through the compulsory attendance at scheduled workshops.

The number of students participating in the action cycles increased over the years because of the inclusion of one large first year unit being offered to off-campus students for the first time in 2010 which more than doubled the number of students enrolled in that unit. The number of units offering virtual world activities also increased due to a more professional approach to explaining the rationale for learning activities to be held in a virtual world.

All students who consented to participate in the research agreed to the recording of inworld text conversations, observations, screen shots and inworld video (machinima) being undertaken. To get a sense of the inworld learning activities these can be viewed on the researcher's website: <http://www.virtualclassrooms.info>.

A total of 3,576 students were enrolled in the units used for this research. Table 1.1 indicates the year and total number of students enrolled in each unit. In 2008 there were two units used in the research and in 2009 there were three units. This increased to seven units in 2010 and decreased to six units in 2011 when one unit was removed from the teaching pool. The numbers in parentheses () are the number of students who voluntarily participated in virtual world learning activities (off-campus students). The numbers in brackets [] are the number of students who were required to participate (on-campus students).

Table 1.1: Number of students enrolled in each unit – 2008 to 2011

	2008	2009	2010	2011	Total
Unit 1	21 (2)	13 (2)	17 (3)	56 (7)	107
Unit 2	443 (10)	337 (16)	665 (25)	252 (12)	1697
Unit 3			241 (24) [91]	337 (50) [113]	578
Unit 4			18 (5)	48 (6)	66
Unit 5			17 (5)	33 (3)	50
Unit 6			352 (18)	232 (32)	584
Unit 7		80 [80]	414 (19)		494
Total each year	464	430	1724	958	3,576

Table 1.2: Number of students who attended Second Life learning activities – 2008 to 2011

	2008	2009	2010	2011	Total
Attended voluntary virtual world learning activities	n=12	n=18	n=99	n=110	n=239
% against total number of students enrolled (3,576)	2.6%	4.2%	5.7%	11.5%	6.7%
Attended compulsory virtual world learning activities	n=0	n=80	n=91	n=113	n=284
% against total number of students enrolled (3,576)	0.0%	18.6%	5.3%	11.8%	7.9%
Total attended virtual world learning activities	n=12	n=98	n=190	n=223	n=523

The breakdown of numbers of voluntary compared to compulsory participation in the virtual world activities is shown in Table 1.2. There were a total of 239 students (6.7% of the total of enrolled students over the four years) in the research who chose to participate in the learning

activity in Second Life (off-campus students) and a further 284 (7.9% of the total of enrolled students over the four years) that were required to participate in learning activities conducted in computer laboratories on campus as part of their unit requirements (on-campus students), resulting in 523 students in total who participated in virtual world activities.

Analysis Techniques

The portfolio of publications outline how the analysis was undertaken for each cycle as this varied depending on the research question, data collection method, types of participation (voluntary or compulsory) and the researchers involved. The tools used for analysing the quantitative and qualitative data included Leximancer, Survey Monkey, Qualtrics, Microsoft Excel and manual coding analysis.

Survey data of both off-campus and on-campus students were analysed through the survey software of Survey Monkey and Qualtrics. Both provided basic statistical analysis of mean, minimum, maximum and standard deviation of data. Data was further analysed through Microsoft Excel and specific analysis software found on the Internet to provide Chi Square and T-Tests (see <http://www.uccs.edu/~lbecker/>).

Qualitative data was gathered from recording off-campus student inworld conversations that resulted in 52,000 lines of inworld text over the four years within the three cycles. This text was a combination of sentences and paragraphs. Qualitative data was also gathered through open-ended survey questions to both off-campus and on-campus students and observations were made of on-campus student's participation in workshops and feedback via emails from off-campus students. Recording on-campus student's reflections of their virtual world learning activity after workshops also provided qualitative data.

Text analysis of themes from the inworld text conversations were undertaken through Leximancer and also manual coding was completed by the researcher to ensure consistency with themes arising out of the Leximancer analysis. By using Leximancer software, the automation enabled more rapid and frequent analysis, and reanalysis, of text (Smith & Humphreys, 2006). Through manual coding, the researcher found new themes different from those identified in the Leximancer analysis, namely, student perceptions of, and engagement in, their learning. The Leximancer software identified 10 themes and the researcher an additional two – with a total of 12 themes: feelings, beliefs, communication, anonymity, learning, distance, interaction, collaboration, technology, time, distractions and other. On-campus inworld conversations were not analysed as these students only undertook orientation

and role play learning activities. They did not voice their opinion of their learning through inworld text conversation but through surveys or verbally in workshops.

Potential conflicts between being the researcher, the “teacher”, and the interpreter of the results (see Wong, 1995), were considered by the researcher. The interpretation of the results through the thematic analysis was undertaken by drawing on student perceptions. This reduced the possibility of biases occurring as the perception statements are what the students stated, not what the researcher interpreted. The words from the students were then classified into the appropriate themes. Unlike Wong’s (1995) teaching, the virtual world activities were teaching students how to use the virtual world and incorporate such an environment into their own teaching materials, rather than teach students specifics in relation to the discipline of focus in the unit in which they were enrolled.

Quantitative data was gathered through the completion of surveys by students, recording the number of pages written in virtual world conversations of off-campus students, recording the participation rate of off-campus students (such as how often they attended and how long they stayed for virtual world learning activities), and recording of all student results from the unit in which virtual worlds learning activities were offered.

Overview of Research Phases

The eleven publications total 67,616 words and are ordered to introduce the context of the research (Phase 1 – Chapter 2) and demonstrate the three action research cycles employed over four years (Phase 2 – Chapters 3, 4 and 5). Each of the publications in the portfolio report research that has followed the Kemmis and McTaggart’s (1988) model and the components of the action cycles: planning of the research (as an individual or with a team), implementation of the research, observation of the research and results (through analysis of findings), reflecting on the research and then planning the next research. The publications relating to the two phases are now discussed.

Phase 1: Context (Publications 1 to 3)

Consistent with action research principles, initial stages required the researcher to explore a problem. As explained earlier, the researcher problematised learning in a virtual world and the initial investigations of Phase 1 provided a context and background to the major research of Phase 2. Phase 1 introduces the research through three publications which provided context, background and exploration of adult learning theories. These are drawn upon as the

foundation of the research conducted in the three cycles of Phase 2. **Publication 1** and **Publication 2** discussed the context and background of the research whilst **Publication 3** explored adult learning theories relevant to this research. Next, the three action research cycles of Phase 2 and the publications that relate to them are discussed.

Phase 2: Action research cycle impact on learning (Publications 4 and 5)

Q1.1 How does learning in a virtual world impact on student learning outcomes?

Q1.2 What are student perceptions of their learning in a virtual world?

This research was planned early in 2008 when the researcher implemented, observed and reflected on the results of the data collection and analysis, and planned further research. This action research cycle was conducted each year from 2008 to 2011. Over the four-year period an analysis of student grades was undertaken to understand whether learning in a virtual world would impact on student learning outcomes. A comparison was made between students who chose to study using a virtual world (voluntary participation) and those who chose not to, including compulsory participation. Drawing upon a selection of different variables, including age, study mode and whether they were undergraduate or postgraduate students, the impact of learning in a virtual world on student grades was explored. Students completed post-semester surveys. The impacts on student learning outcomes were reported in **Publication 4** and **Publication 5**.

Phase 2: Action research cycle engagement with learning (Publications 6 and 7)

Q2.1 How are students engaged with their learning in a virtual world?

Q2.2 What are student perceptions of their engagement with learning in a virtual world?

This research was planned early in 2008, the researcher implemented and then observed and reflected on the results of the data collection and analysis, and planned later research. This action research cycle was conducted each year from 2008 to 2011. From 2008 to 2011 off-campus students who undertook their learning in the virtual world of Second Life (voluntary participation) had their inworld conversations recorded and all students, off-campus and on-campus, were requested to complete an end of semester survey. On-campus students were observed during their virtual world learning activities. At the end of virtual world activities, students were asked to reflect on their learning. These reflections were recorded through text chat for off-campus students and, for on-campus students, the researcher took notes of the

discussions at the end of the activity and observed student participation and reactions. Students participated in the virtual world either voluntarily or as a compulsory activity, depending on their enrolment. Student engagement was measured in all learning activities from three perspectives; affective, behavioural and cognitive as outlined by Jimerson, Campos and Greif (2003) and Russell, Ainley and Frydenberg (2005). Student engagement and perception were explored fully in **Publication 6** and **Publication 7**.

Phase 2: Action research cycle immersion in authentic learning activities (Publications 8 to 11)

- Q3.1 How does immersion in authentic learning activities impact on student learning?
- Q3.2 What are student perceptions of their learning when immersed in authentic learning activities in a virtual world?

Role play exercises were deemed authentic learning activities as they replicated activities that could be undertaken in the real world. Students undertook two unique authentic learning activities. These authentic learning activities are now outlined in more detail.

Authentic learning activity 1: Role play exercises were conducted in the virtual world initially by the principal researcher and author of this portfolio and a lecturer in Teaching and Learning to measure the authenticity of teaching and learning in a virtual world. The researchers wanted to discover whether a virtual world could immerse students in a learning activity that was reasonably authentic. A comparison was made of student learning between virtual and face-to-face learning activities. In 2009 a compulsory de Bono's (1985) Six Thinking Hats role play activity was conducted with on-campus first year pre-service teachers. The students undertook role play activities in real life and then in the virtual world of Second Life. At the completion of each role play learning activity, students completed a survey. In 2010, the learning activity was conducted again with the new cohort of first year pre-service teachers. Off-campus students undertook the virtual world component of the role play activity from 2009. These students undertook the tasks voluntarily. The results of student perceptions of their role play activities conducted in real life and Second Life were compared and presented in **Publication 8** and **Publication 9**. Authentic learning activity 1 was planned early in 2009, the researchers implemented and then observed and reflected on the results of the data collection and analysis, and planned later research. This action research cycle was conducted in 2009 and 2010.

Authentic learning activity 2: This activity was planned late in 2010. The researchers implemented, observed and reflected on the results of the data collection and analysis and then planned later research. This action research cycle was conducted in 2011. On-campus students participated in compulsory role play workshops and off-campus students participated in a voluntary capacity. These activities were conducted as part of an OLT grant with the researcher as the Project Leader (VirtualPREX). Virtual professional experience role plays as a means to engage students in authentic learning were explored through **Publication 10**. Five more researchers were brought in to join the original two researchers to conduct further action research. Finally, **Publication 11** presented a comparison of the two authentic learning activities after reflection on the activities outlined in Publications 8 to 10.

Overview of the Publications

The publications presented in this portfolio are linked to the three action research cycles and their corresponding research questions as noted earlier. To demonstrate this clearly, Figure 1.3 represents the three cycles by using Kemmis and McTaggart’s (1988) action research diagram. It also demonstrates how the portfolio is ordered. In the sections following are tables that summarise each of the publications (Tables 1.3 to 1.6), number of participants, research question, intervention used, evaluation, methods, analysis and findings.

Each publication included in this portfolio across Phase 1 and Phase 2 are now detailed for ease of navigation of the portfolio. Phase 1 included Publications 1 to 3, Phase 2, through three action research cycles, included Publications 4 to 11.

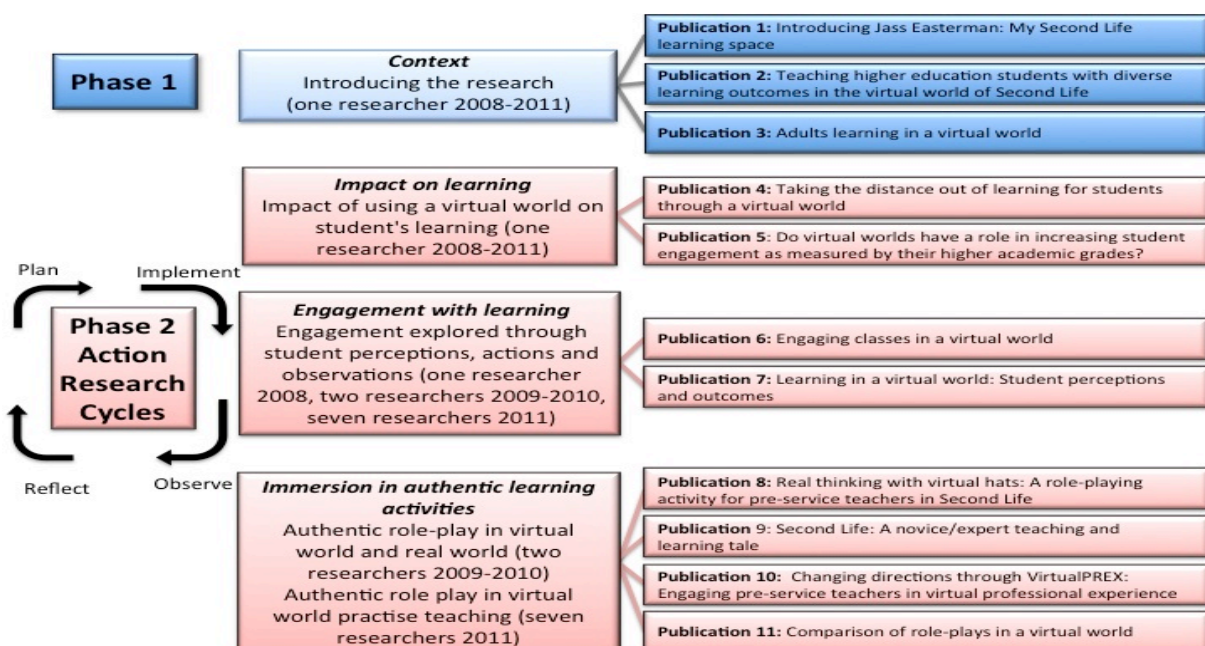


Figure 1.3: Action research spiral diagram of two phases linked to the portfolio publications

Introducing the Publications

Phase 1: Context (one researcher) 2008 to 2011

Phase 1 is represented by three publications (Figure 1.4). **Publication 1** introduced the researcher's avatar and the context for the study, setting the scene for the research that was to come. It was written eighteen months into the research and discussed results of a pilot study that informed the main research to occur over the next four years. Research questions were refined and the survey tool updated. **Publication 2**, written two years later, demonstrated the context of the research as it explains further refinements and highlighted gaps for exploration such as the need to understand adult pedagogy. **Publication 3** was an overview of adult learning theories and how they relate to learning in a virtual world. This publication outlines the selection of adult learning theories used throughout this research when teaching adults in a virtual world.

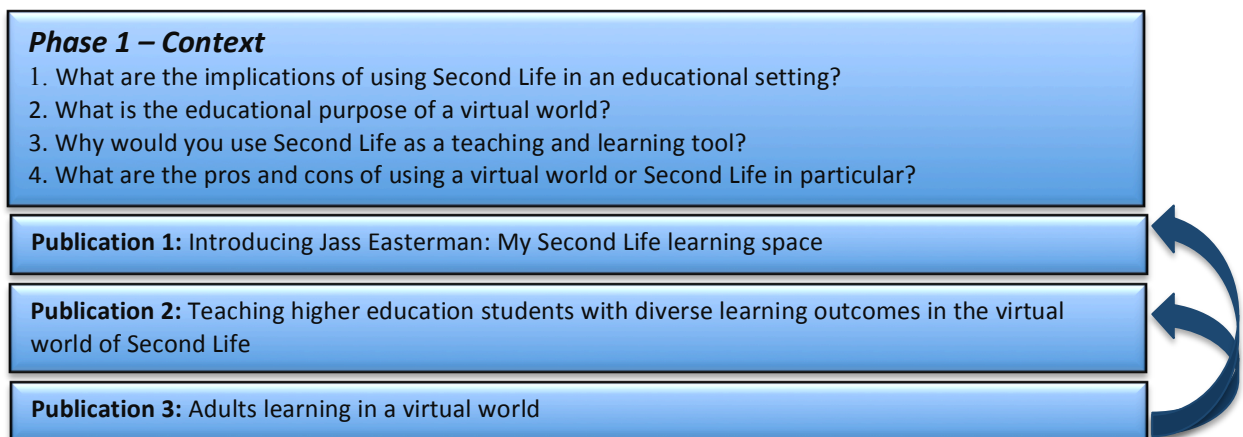


Figure 1.4: Phase 1: Context, background and adult learning theories of the research and publications relating to each question

Table 1.3 presents a brief overview of the three publications including the reference, abstract and description of participants. A context for the research is now provided.

Table 1.3: Overview of publications 1 to 3

Publication 1 (peer-reviewed paper in conference proceedings)

Gregory, S., & Tynan, B. (2009). Introducing Jass Easterman: My Second Life learning space. In R. J. Atkinson & C. McBeath (Eds.), *Same Places, Different Spaces. Proceedings ascilite Auckland 2009* (pp. 377–386). Auckland, New Zealand: The University of Auckland, Auckland University of Technology, and ascilite. <http://www.ascilite.org.au/conferences/auckland09/procs/gregory.pdf>

Citations (21) – Google Scholar

Abstract

Virtual worlds are an emerging technology being used by an increasing number of educational institutions around the world. It is a technology, environment, medium, learning (or elearning) and teaching tool (i.e., a shared social space). A pilot study was conducted in Second Life with postgraduate education students to ascertain student perceptions of learning in a virtual world. Results and methodology of this study will be discussed and the implications and impact for students learning in a virtual world from the perspective of the student will be explored. A number of themes have emerged from the study. There have been a variety of studies undertaken on virtual worlds with very little on their implications for the academic who is teaching in this environment. The implications of these findings will be the foundation for future research.

Participants

12 off-campus students enrolled in 2008 in one of two ICT education (see Appendices A and B – surveys for quantitative and qualitative data collection).

Publication 2 (peer-reviewed book chapter)

Gregory, S. (2011). Teaching higher education students with diverse learning outcomes in the virtual world of Second Life. In R. Hinrichs & C. Wankel (Eds.), *Transforming virtual world learning, cutting-edge technologies in higher education* (Vol. 4, pp. 333–362). Teynampet, India: Emerald Group Publishing Limited.

Citation (1) – Google Scholar

Abstract

This chapter explores how Jass Easterman (the researcher’s avatar name) teaches education students concurrently, both pre-service teachers and postgraduate, in Second Life. It discusses how a virtual world can be a valuable teaching and learning tool for the whole group even though they have a variety of overall goals and learning outcomes. Jass brings distant university students located around the world studying at the one institution together to liaise with each other in Second Life. She has created an innovative tutorial model where students go on virtual tours, visit other educational institutions, attend guest lectures, undertake role play activities, and go on Web quests and learn basic building and scripting skills, all from their own homes. Adult learning theories and communities of practice, in a virtual world, underpin all activities. Why Second Life was chosen for these students and what the students say about this type of learning are discussed in this chapter. The value of this tutorial model will be explored and reflected upon and conclusions made of its efficacy.

Participants

239 off-campus students enrolled from 2008 to 2011 in one of seven ICT or Teaching and Learning education units undertaking virtual world learning activities on a voluntary basis (see Appendix D – survey for quantitative and qualitative data collection).

Publication 3 (peer-reviewed paper in conference proceedings)

Gregory, S. (2012). Adults learning in a virtual world. In P. Newhouse & J. Pagram (Eds.), *The Australian Computers in Education Conference 2012: Refereed Conference Proceedings*. Perth, Australia: ECAWA and ACCE

<http://acec2012.acce.edu.au/sites/acec2012.acce.edu.au/files/proposal/205/Adult Learning in a Virtual World GREGORY.pdf>

Abstract

Learning theories have been around for more than a century, however, the theories of how adults learn are relatively new, having only been developed in the past 50 years. These theories are all based around learning in a face-to-face environment or online in digital environments using Web 2.0 (i.e., social computing) tools. This paper explores current and emerging theories of how adults learn in a virtual world. These theories are examined to propose a framework of how adults learn in a virtual world, i.e., a computer-generated world that is inhabited by individual avatars (persona) to interact with the environment and people (other avatars) as a learning space. At present, there does not appear to be a specific theory developed to explain how adults learn in virtual worlds. This paper will explore which adult learning theories, if any, underpin adult learning in a virtual world.

Participants

All students from 2008 to 2011 in up to seven ICT or Teaching and Learning education units undertaking virtual world components for their study.

Phase 2: Action research cycle impact on learning (one researcher) 2008 to 2011.

Phase 2, action research cycle impact on learning, is described by two publications.

Publication 4 provided an overview of various comparisons of students who undertook their learning in the virtual world in a voluntary capacity compared to those who chose not to (this includes those who were required to participate). Comparisons are made from various aspects, i.e., off-campus/on-campus, age, postgraduate/undergraduate, time spent in virtual world learning activities, communication tool used and student grades. **Publication 5** complemented Publication 4 by exploring a grade comparison of off-campus/on-campus results further over the four years of research and discusses the impact of student learning in a virtual world. Figure 1.5 represents two publications relating to the impact of student learning and their perceptions.

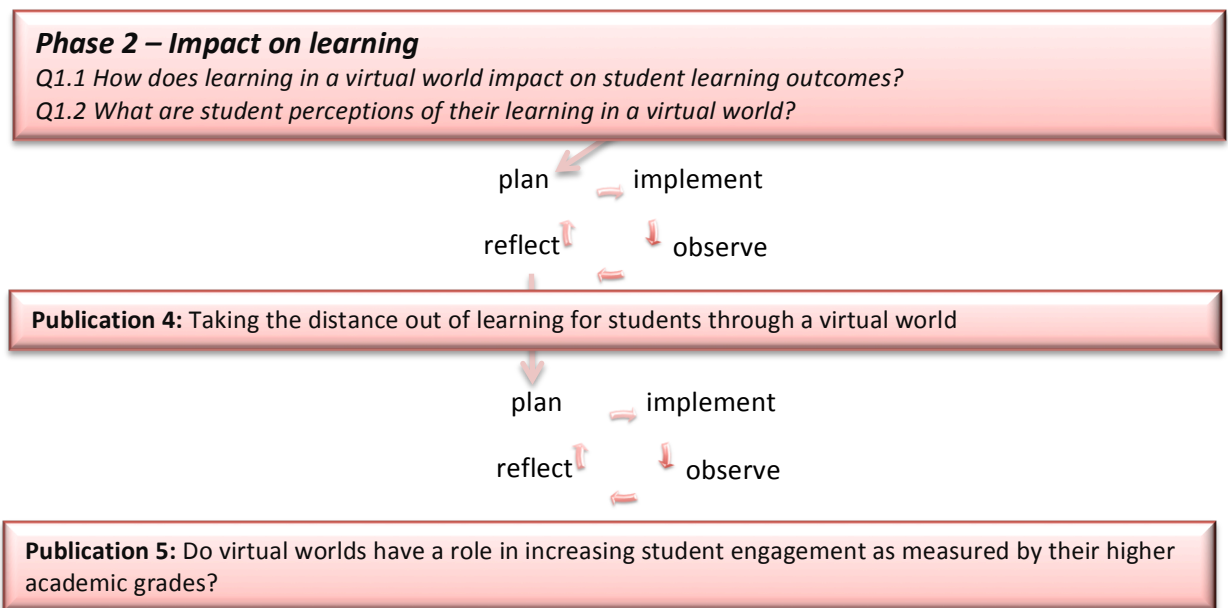


Figure 1.5: Phase 2: Action research cycle impact on learning, student perceptions and publications relating to each question through action research

Table 1.4 provides an overview of the impact on learning action research cycle through the two publications presented. Included are the reference of the publication, abstract, number of participants in the research, research question, action and method used to answer the question, reflections that took place throughout the research, analysis techniques and the findings.

Table 1.4: Overview of publications 4 and 5

Publication 4 (peer-reviewed book chapter)

Gregory, S. (2013). Taking the distance out of learning for students through a virtual world. In A. Hebbel-Seeger, T. Reiners, & D. Schäffer (Eds.), *Synthetic worlds: Emerging technologies in education and economics* (Vol. 33, pp. 193–217). New York, NY: Springer Business Information Systems.

Abstract

With everyone's busy schedules, more and more people are opting to study via distance education as off-campus students. This enables them to continue working and keep involved in their community and family activities without relocating. What does distance education mean to students? Traditionally it was receiving materials via the post, completing assignments, posting them back for marking and then doing an exam at the end of the semester. Nowadays, distance learning encompasses a variety of online tools received via a Learning Management System that houses them. Students now participate in discussion boards, chat rooms, blogs and group work in wikis. They listen to podcasts and view videos or presentations of the course materials. However, students are still feeling the isolation of studying by themselves. Students do not want to have to participate in residential schools but they do want to get to know fellow students and their educator. Students who have opted to undertake their studies using the virtual world of *Second Life* have found many of their concerns disappear. They are able to participate from any location world wide, from their own home, but, at the same time, get a sense of "being there". Students feel it is like face-to-face lectures and have become good friends with their peers. Off-campus students now have the opportunity to undertake their studies "virtually on-campus" without physically attending. *Second Life* enables distance students to study synchronously or asynchronously whilst gaining the benefits that on-campus students experience without changing their lifestyles to do so. Studying through a virtual world takes the distance out of their learning.

Participants	2,618 students enrolled from 2008 to 2010 in one of seven ICT or Teaching and Learning education units.
Question or issue	How does learning in a virtual world impact on student learning outcomes and what are student perceptions of their learning in a virtual world?
Action	Students undertook their learning activities in a virtual world on a voluntary or compulsory basis. 16 ways in which to use virtual worlds in the classroom (Ryan, 2008) was used to examine student learning.
Methods used	Quantitative: Pre- and post-semester surveys, student grades, time spent inworld, observations, age, mode of study, undergraduate vs postgraduate. Qualitative: Surveys, inworld conversations recorded and student perceptions gathered through feedback (see Appendix C surveys).
Reflection on Methods used	This research was valuable in that the plan was implemented, observations undertaken and reflections analysed for the planning of the next iteration of the cycle. This cycle was repeated over three years.
Analysis techniques	Excel, Leximancer, manual coding of themes; measurement of engagement – observations, survey analysis.
Findings	Those students who chose to use a virtual world as a teaching and learning tool had significantly higher grades than those who chose not to. They were also engaged in their learning. The impact on their learning was significant.

Publication 5 (peer-reviewed paper in conference proceedings)

Gregory, S., & Gregory, B. (2011). Do virtual worlds have a role in increasing student engagement as measured by their higher academic grades? In M. Docherty & M. Hitchcock (Eds.), *CreateWorld 2011 Proceedings* (pp. 40–50). Brisbane, Australia: Griffith University.
http://auc.edu.au/media/cw11/CreateWorld_2011_Proceedings.pdf

Abstract

Student engagement has become an increasing focus for higher education institutions in the market driven

environment. Improved student engagement leads to improved student performance and this also results in higher levels of student retention. Student engagement has often been more challenging for off-campus students but improvements in technology and communications have opened up new possibilities for student engagement. Virtual worlds appear to provide a venue for students to engage with academics, other students and the material they need to master. This article examines the impact of the virtual world *Second Life* on student engagement as measured by the higher academic results for students participating in learning via *Second Life* activities.

Participants	3,236 students enrolled from 2008 to 2011 in an ICT or Teaching and Learning education unit that had a virtual world component to their assessment task.
Question or issue	How does learning in a virtual world impact on student learning outcomes and what are student perceptions of their learning in a virtual world?
Action	This longitudinal research was undertaken over the four years through planning, implementation, observations and analysis. Student perceptions of their learning and a comparison of grades were undertaken.
Methods used	Quantitative: Pre- and post-semester surveys, analysis of grades. Qualitative: Surveys, inworld conversations recorded, student perceptions gathered through feedback (see Appendices A and B surveys).
Reflection on Methods used	The methods used enabled the researcher to identify trends in the comparison of data and themes in student perceptions of their learning.
Analysis techniques	Excel, Leximancer, manual coding techniques.
Findings	Those students who chose to use a virtual world as a teaching and learning tool had significantly higher grades than those who chose not to. They were also engaged in their learning.

Phase 2: Action research cycle engagement with learning (two researchers) – 2008 to 2011

Phase 2, action research cycle engagement with learning, is described by two publications.

Publication 6 introduced engagement of student learning in a virtual world. This publication explored engagement using various methods such as the examination of inworld text, observations, actions, method of study and age to ascertain effective, behavioural and cognitive engagement and student perceptions of their learning. **Publication 7** provided an overview of engagement by students with their learning in the virtual world. It also explored engagement from various themes that emerge out of students' perceptions of their learning. Figure 1.6 represents two publications that relate to student engagement and perceptions of their learning in the virtual world.

Table 1.5 provides an overview of the engagement with learning action research cycle through the two publications presented. Included are the reference of the publication, abstract, number of participants in the research, research question, action and method used to answer the question, reflections that took place throughout the research, analysis techniques and the findings.

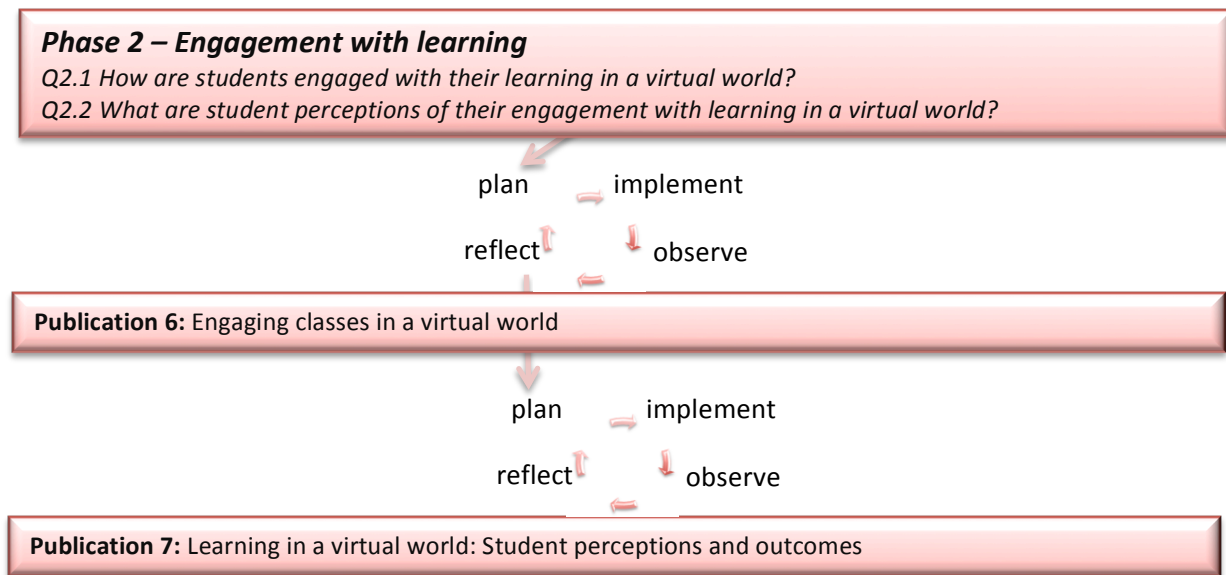


Figure 1.6: Phase 2: Action research cycle engagement, and publications relating to each question through action research

Table 1.5: Overview of publications 6 and 7

Publication 6 (peer-reviewed book chapter)

Gregory, S. (2013). Engaging classes in a virtual world. In K. Bredl & W. Bösche (Eds.), *Serious games and virtual worlds in education, professional development, and healthcare*. (pp. 126-144). Hershey, PA: IGI Global.

Abstract

Virtual worlds, such as Second Life, are multi-user, interactive computer simulated environments created for users to inhabit and interact via avatars, which are graphical representations of a person that can be personalised and used in the virtual world. In this study, 239 education students chose to attend weekly sessions in Second Life from 2008 to 2011. It is internationally claimed that virtual worlds are engaging for distance education students. Engagement is the combination of student's feelings, observable actions or performance and perceptions and beliefs. This mixed-methods study sought to investigate whether virtual worlds were engaging. These sessions catered for the diverse group of students. Students' recorded conversations and a survey provide data from which the initial findings and discussion found that the virtual world, in this case, Second Life, is an engaging environment that encourages collaboration amongst the students. These findings indicate the need for further research in using a virtual world as an educational resource.

Participants	239 students from 2008 to 2011 enrolled in up to five ICT or Teaching and Learning education units using a virtual world on a voluntary basis.
Question or issue	How are students engaged with their learning in a virtual world and what are student perceptions of their engagement with learning in a virtual world?
Action	The researcher implemented various methods of action research to gather data. Planning began from before students entered the virtual world. The learning for students was implemented during 2008 and each year after observations, reflection and further planning was undertaken.
Methods used	Quantitative: Surveys. Qualitative: Surveys (see Appendix C), inworld conversations recorded, observation of student's learning (on-campus), observation of participation discussion groups, reflection.
Reflection on Methods used	As triangulation of data collection was extensive, the methods used were adequate for identifying student perceptions of their engagement whilst learning in a virtual world, but they also enabled the researcher to observe this engagement from several different angles.
Analysis	Excel, Leximancer, manual coding techniques.

techniques

Findings The findings were that students were engaged in their learning when exploring affective, behavioural and/or cognitive engagement.

Publication 7 (peer-reviewed book chapter)

Gregory, S. (2012). Learning in a virtual world: Student perceptions and outcomes. In K. Moyle & G. Winjnards (Eds.), *Student reactions to learning with technologies: Perceptions and outcomes* (Vol. 1, pp. 91–116). Hershey, PA: IGI Global.

Abstract

During the past four years over 500 university students have explored the educational potential and value of learning in the virtual world of Second Life™. This research examined from the perspectives of on and off-campus students, their experiences of learning in this virtual world, through activities underpinned by adult learning theories. A compilation of student reactions to their learning in Second Life™ was collected through three pilot studies, and this chapter examines in particular, the students' perceptions of engagement, immersion, communication, interaction, collaboration and distractions, of learning virtually. The positives and negatives of learning in Second Life™ from the points of view of the students, are discussed. Students who participated in this study were drawn from a variety of groups who were studying different Units: on-campus students were required to participate in the virtual world educational activities; and the off-campus students, took part voluntarily. This research demonstrates that the students were highly engaged in their virtual learning, as voiced through their perceptions and reactions.

Participants	523 students from 2008 to 2011 enrolled in one of up to seven ICT or Teaching and Learning education units who participated in their learning in a virtual world.
Question or issue	How are students engaged with their learning in a virtual world and what are student perceptions of their engagement with learning in a virtual world?
Action	Inworld activities were explored through multiple modes of gathering student perceptions and measuring their engagement of their learning.
Methods used	Quantitative: Surveys. Qualitative: Surveys (see Appendix C), inworld conversations recorded, observation of students' learning (on-campus), observation of participation and text, discussion groups, reflection. Student perceptions of their affective, behavioural and cognitive engagement were explored.
Reflection on Methods used	As many themes were explored of student perceptions of their learning in the virtual world and their engagement in their learning, the action research methods used were successful.
Analysis techniques	Excel, Leximancer, manual coding techniques.
Findings	The themes that emerged from student perceptions were communication, anonymity, distance, interaction, collaboration, learning, technologies, technical issues and distractions. There were positive perceptions on students' learning in a virtual world with technological issues being the main negative theme emerging.

Phase 2: Action research cycle immersion in authentic learning activities (2 researchers) – 2009 to 2010, (7 researchers) 2010–2011

Phase 2, action research cycle immersion in authentic learning activities, is described by four publications. The authentic learning activities that are described in Publications 8 to 11 are role play activities. These are described more fully in the individual publications. **Publication 8** explored de Bono's (1985) Six Thinking Hats role play in a virtual world compared to role

play in real life. It also examined student engagement in the role play activities and their perceptions of their learning. **Publication 9** provided an overview of de Bono's Six Thinking Hats role play in the virtual world from the educator's point of view. **Publication 10** provided an overview of professional experience role play activities including student engagement and perceptions of their learning in the virtual world (VirtualPREX). **Publication 11** compared the two types of role plays used in student learning activities and examined student engagement and perceptions of the role play. De Bono's Six Thinking Hats and VirtualPREX role plays are compared (i.e., Publication 8 and Publication 10). Figure 1.7 represents four publications that demonstrate authentic learning through role plays and student perceptions of their learning.

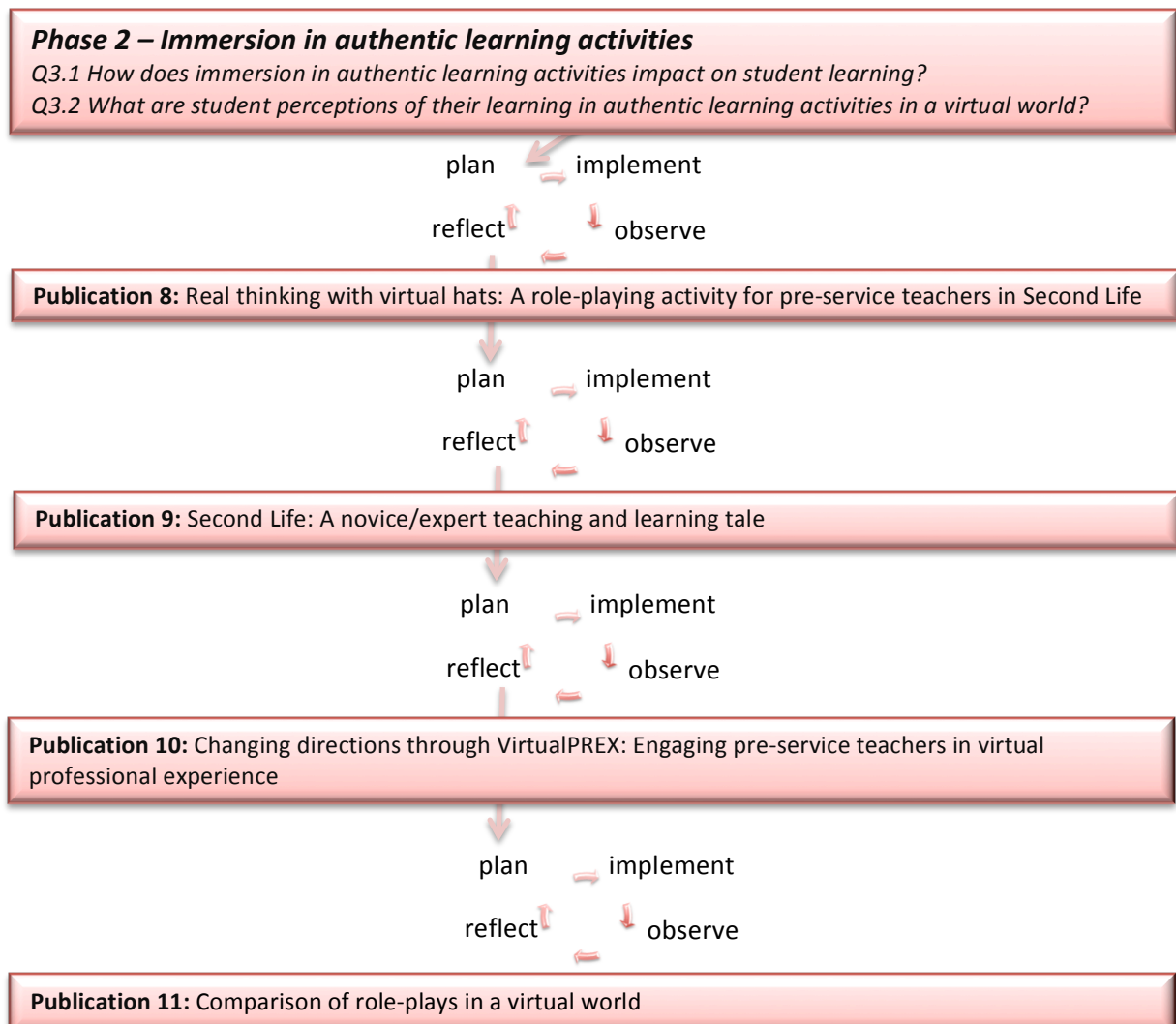


Figure 1.7: Phase 2: Action research cycle authentic learning and publications relating to each question through action research

Table 1.6 provides an overview of the immersion in authentic learning activities action research cycle through the four publications presented. Included are the reference of the publication, abstract, number of participants in the research, research question, action and method used to answer the question, reflections that took place throughout the research, analysis techniques and the findings.

Table 1.6: Overview of publications 8 to 11

Publication 8 (peer-reviewed journal article)

Gregory, S., & Masters, Y. (2012). Real thinking with virtual hats: A role-play activity for pre-service teachers in Second Life. *Australasian Journal of Educational Technology, Virtual worlds in tertiary education: An Australasian perspective*, 28(3), 420–440.

Citations (3) – Google Scholar

Abstract

Role-plays in a virtual world hold tremendous potential for higher education because they allow synchronous, immersive participation by students located across the globe. They also have the added advantage of allowing students to adopt roles and carry out tasks that are not possible in the real world. In this article, a project that involved pre-service teachers carrying out role-plays based on de Bono's Six Thinking Hats framework is presented. A pilot study was carried out over two years with on-campus students, who performed the role-plays both in a real-life, physical setting and within the virtual world of Second Life. The activity has since been extended to off-campus students exclusively using Second Life. The researchers report selected quantitative and qualitative survey data from the pilot study that provide insight into students' perceptions of this style of learning, and discuss the challenges that were encountered and how they were overcome. The future of virtual world-based role-playing as a strategy for teaching and learning is discussed, with a focus on its application to distance education contexts.

Participants	96 on-campus students 2009 and 2010 enrolled in first year ICT or Teaching and Learning education units.
Question or issue	How does immersion in authentic learning activities impact on student learning and what are student perceptions of their learning in authentic learning activities in a virtual world?
Action	De Bono's (1985) Six Thinking Hats role plays in the virtual world and real life – a comparison.
Methods used	Quantitative: Post role-play surveys. Qualitative: Surveys, (see Appendix C), observations, recording of text. Student perceptions of their learning activities in the real world and the virtual world were compared.
Reflection on Methods used	This action research cycle spanned over two years to compare role plays with students who were studying from different modes. Planning for each began at least six months prior to the implementation. After implementing the strategy, observations were made and reflected upon to develop improved strategies for the following iteration of the role play.
Analysis techniques	Excel, Survey Monkey, Qualtrics, Leximancer, manual coding techniques.
Findings	Overall, students were immersed and engaged in their authentic learning activity in both real world and Second Life. Student feedback enabled the sessions to be better scaffolded for the next iteration of the activities.

Publication 9 (peer-reviewed book chapter)

Masters, Y., & Gregory, S. (2013). Second Life: A novice/expert teaching and learning tale. In B. Tynan, J. Willems, & R. James (Eds.), *Outlooks and opportunities in blended and distance learning* (pp. 204–218). Hershey, PA: Information Science (an imprint of IGI Global).

Abstract

An increasing number of educational institutions are trialling the use of virtual worlds as teaching and learning environments, particularly for distance education students. In 2009 the researchers began a research project to explore the efficacy of one such virtual world, Second Life, as a viable adjunct to other online learning experiences. However, it was recognised that most academics had no experience of teaching in a virtual world. An integral aspect of our research was to examine whether a novice user of Second Life could quickly learn to teach effectively with this tool. The teaching experience is outlined from two points of view: the novice and the expert. The emergent themes are discussed and conclusions are made regarding the efficacy of Second Life as a teaching and learning environment for distance education students and the level of support that might be needed to assist other novices to teach in-world.

Participants	Two educators and 96 on-campus students 2009 and 2010 enrolled in first year ICT or Teaching and Learning education units.
Question or issue	How does immersion in authentic learning activities impact on student learning and what are student perceptions of their learning in authentic learning activities in a virtual world?
Action	De Bono's (1985) Six Thinking Hats role plays in the virtual world and real life – a comparison and discussion of the learning activities from the researcher's perspectives.
Methods used	Quantitative: Surveys (see Appendix D). Qualitative: Observations, discussions, reflections on teaching and learning.
Reflection on Methods used	This action research cycle spanned over two years to compare role-plays with students who were studying from different modes. Planning for each began at least six months prior to the implementation. After implementing the strategy, observations were made and reflected upon to come up with improved strategies for the following iteration of the role play. This publication is solely on the reflection of the role plays from the two researchers point of view.
Analysis techniques	Excel, Survey Monkey, Qualtrics, Leximancer, manual coding techniques.
Findings	Activities in the virtual world needed to be fully scaffolded, and students required their prior learning to be reinforced, to be able to fully participate.

Publication 10 (peer-reviewed paper in conference proceedings)

Gregory, S., Dalgarno, B., Campbell, M., Reiners, T., Knox, V., & Masters, Y. (2011). Changing directions through VirtualPREX: Engaging pre-service teachers in virtual professional experience. In G. Williams, P. Statham, N. Brown, & B. Cleland (Eds.), *Changing Demands, Changing Directions. Proceedings ascilite Hobart 2011* (pp. 491-501). Hobart, Australia: The University of Tasmania and ascilite. <http://www.leishman-associates.com.au/ascilite2011/downloads/papers/GregoryS-full.pdf>

Citations (10) – Google Scholar

Abstract

Many pre-service teachers currently undertake their professional experience with insufficient knowledge and confidence to handle unexpected teaching situations. VirtualPREX explores the experiences of 72 pre-service teachers who undertook a teaching role-play in a virtual world. The researchers discuss this opportunity for pre-service teachers to utilise new methods and avenues in a virtual world to both supplement their learning and undertake preparation for practical experience. Participation by pre-service teachers in role-play enables them to test and develop a better range of professional skills and acquire confidence in, and more realistic awareness of, their skills before being placed in real-life classrooms. Presented in this paper are the findings from a pilot of this study and pre-service teacher reactions to the role-play activity including whether they felt that it was helpful in preparing them for their upcoming professional experience placement.

Participants	72 on-campus students in 2011, participating in a compulsory virtual world workshop learning activity enrolled in ICT education units and eight off-campus students participating in a voluntary capacity.
Question or issue	How does immersion in authentic learning activities impact on student learning and what are student perceptions of their learning in authentic learning activities in a virtual world?
Action	Virtual professional experience role play activities – known as VirtualPREX.

Methods used	Quantitative: Post role play surveys. Qualitative: Surveys (see Appendix E), observations.
Reflection on Methods used	This action research cycle began six months prior to the implementation. After implementing, observations were made and reflected upon to provide improved strategies for the next iteration of the role play the following year.
Analysis techniques	Excel, Qualtrics.
Findings	Student perceptions of their learning were mostly positive with off-campus students providing more positive reflections on the authentic learning activity than on-campus students. It was found that students were immersed in the learning activities. Several students suggested that they would use this method of learning in the future.

Publication 11 (peer-reviewed book chapter)

Gregory, S., & Masters, Y. (2012). Comparison of role-plays in a virtual world. In P. Jerry, Y. Masters, & N. Tavares-Jones (Eds.), *Utopia and a garden party: Experiential learning in virtual worlds, At the interface: Cutting edge research* (pp. 45–56). Oxford, UK: Inter-Disciplinary Press. <https://www.interdisciplinarypress.net/online-store/ebooks/diversity-and-recognition/utopia-and-a-garden-party>

Abstract

Gregory and Masters have been exploring the affordances of teaching in a virtual world since 2008, having taught more than 650 students between them. They have explored a variety of teaching strategies for use in Second Life and the students, from the University of New England, have always provided their perceptions of their learning either after an activity or at the end of their learning. Within this paper is a comparison of two research projects, undertaken in 2009/2010 and 2011/2012, examining the use of role-playing in a virtual world. The researchers present their findings from the data reporting student perceptions of their role-play experiences. The role-plays reported in this paper were first conducted in Second Life with on-campus students prior to extending the teaching to off-campus students. This was to ensure that the learning experiences were appropriate and would work effectively when real-time trouble-shooting could be used. Both quantitative and qualitative data support the findings reported here. It can be concluded that role-play in a virtual world provides an authentic learning experience for students, particularly if they are not provided with the opportunity of experiencing this technique in a face-to-face setting.

Participants	248 on-campus students enrolled from 2009 to 2011 participating in role-play virtual world learning activities. This included 96 students participating in the de Bono (1985) role-plays and 152 students in the VirtualPREX role plays. These students were enrolled in either ICT or Teaching and Learning education units.
Question or issue	How does immersion in authentic learning activities impact on student learning and what are student perceptions of their learning in authentic learning activities in a virtual world?
Action	A comparison of de Bono's (1985) Six Thinking Hats role-plays and VirtualPREX role-play activities.
Methods used	Quantitative: Post role play surveys. Qualitative: Surveys (see Appendix E), observations.
Reflection on Methods used	This action research cycle spanned over three years to compare different role plays undertaken in the virtual world. Planning for each began six months prior to the implementation. After implementing the strategy, observations were made and reflected upon to develop improved strategies for the following iteration of the role play.
Analysis techniques	Excel, Qualtrics, Online Chi Square and T-Test analysis website (see http://www.uccs.edu/~lbecker/).
Findings	Both authentic learning activities were immersive for the students and provided them with new ways of thinking about learning and teaching. They participated in the activities and reflected well on their learning providing feedback on ways to enhance the activities. Students also discussed how they might transfer their learning from virtual world activities to real-world activities.

Impact of the Research

This research explored different cohorts of student's perceptions of their learning in a virtual world and their immersion, engagement and participation in authentic learning activities. The different action research studies explored student perceptions of their learning comparing different modes, but most significantly, off-campus (voluntary participation) and on-campus (required/compulsory participation). There are several significant impacts of this research, however, the most significant impact of this research has been on the students themselves as follows:

- Off-campus students could see the benefit of learning and teaching in a virtual world because it had a direct impact on their style of learning;
- Off-campus students were able to participate in activities in an immersive and engaging manner where it would typically only be through tools provided in a learning management system;
- Students find learning in a virtual world immersive, engaging and almost like being in a face-to-face learning situation;
- Students who chose to use a virtual world as a learning tool had significantly higher grades than those students who chose not to or were required to participate;
- Off-campus students found the experiences were authentic and that they were provided opportunities to participate where they would not normally be able due to distance, time and money; and
- The results of a comparison between on-campus students and those students who chose not to participate in virtual world learning activities were not significant.

Summary

The introductory chapter to this thesis by journal-article began with a brief summary of the research phases, aims, methodology, approaches taken in the research and analysis techniques. A summary of the rationale and background of the study was provided to place the research in context. An explanation of the methodology, the participants, the recruitment process and data collection approaches followed. A justification of the structure of the portfolio was provided in detail. Finally, several impact statements complement findings within the publications and are also discussed in more detail in the concluding chapter. Following are the eleven publications that are the basis of this portfolio, concluding statements, references and appendices, which include surveys and a glossary of terms.