UNDERGRADUATE STUDENT SELF-EFFICACY AND PERCEPTIONS OF VIRTUAL WORLD LEARNING EXPERIENCE

By

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ABSTRACT

LORRAINE MAY STANTON. Undergraduate student self-efficacy and perceptions of virtual world learning experience. (Under the direction of DR. CHUANG WANG)

Virtual worlds are innovative teaching and learning methods that can provide immersive, and engaging learning experiences (Lu, 2010). Though they have potential benefits, students sometimes experience a steep learning curve and discomfort with the technology (Warburton, 2009). This study explored how students in two American Studies classes using Second Life rated their own levels of virtual world self-efficacy at early and late stages of using it, the factors they felt influenced their self-efficacy, their attitudes and perceptions about its learning value, and the way that students with different degrees of change in self-efficacy viewed its learning value. The study was supported with literature about self-efficacy, and some of the ways it has influenced online teaching and learning. The research questions were explored quantitatively and qualitatively. Quantitative data came from a survey developed for measuring self-efficacy at early and late stages of use. Qualitative data came mainly from interviews with a smaller group of students about the development of their virtual world skills and their perceptions of its learning value. While self-efficacy generally increased in the survey population, interviewees experienced both internal and external barriers and enabling factors contributing to self-efficacy development. Resources and support, as well as increased immersiveness, contributed to positive self-efficacy. Some data supported the idea that increased self-efficacy helped promote positive learning perceptions. However, the more social learning activities were the ones that promoted strongest perceptions of learning value for students.

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CHAPTER 1: INTRODUCTION

A virtual world is a fairly recent development in online technology, and even more recent for teaching and learning. Virtual worlds are computer-based programs which allow users to interact with others in the form of "avatars" (visual representations of themselves). The avatars can be made to move about in a simulated 3-dimensional virtual environment, which can look familiar, such as a modern city, or something more fantastical such as an alien planet or prehistoric ocean floor. In a virtual world, avatars can usually be customized to suit the users' taste, ranging from a normal human that looks similar to themselves, to an animal or even robot. People can use their avatars to communicate using text, gestures, and voice. Users can also interact with virtual content, which can be visually customized and scripted to move or change based on user input, though the degree of customization and interactivity sometimes takes considerable technical know-how to create. For example, a person can engage in jousting in a re-creation of a medieval village, go inside a 3-D rendering of a classic painting, or space walk in simulated zero gravity. Essentially, the capability exists to immerse the user in a customizable, highly-detailed interactive scenario which is only limited by imagination and the technical skills to create it.

Because of their unique capabilities, there is growing interest in the use of virtual worlds in education, evidenced by a stronger presence of virtual world related sessions in educational conferences, a growing body of literature on the subject, and an increasingly

vocal presence of educators actively incorporating virtual worlds in teaching. Though some work explores educational benefits, comparatively little research has been published about how the use of virtual worlds impacts student perception*s* of teaching and learning. In addition, there is a steep learning curve that has been acknowledged in the use of virtual worlds, sometimes causing barriers to its use (Warburton, 2009).

The virtual world used most frequently in higher education is Second Life (SL), which has strong educator presence and is free to use. Second Life, run by a company called Linden Lab, has approximately 49 million registered users, with an average concurrency of about 40,300 users online, per the SL grid metrics page (Shepherd, 2017). Second Life is also one of the few virtual worlds that allow user-created content; in fact the entire accessible virtual geographic space in Second Life is created by thousands of users who are considered its "residents". Because of its customizability, educational land discount, and free cost of access to general users, SL is widely used in education, with over 150 institutions worldwide registered in the SL Educational Directory (Linden Lab, Inc., 2017). Though user accounts (i.e. avatars) are free, the cost of virtual land and maintenance can be high, even though there is a half-price educational discount to verified institutions (Linden Lab, Inc., 2017). Virtual real estate in SL is sold by the island (equal to 65,536 square meters), though a single island can be sub-divided and smaller parcels can be rented out by owners. Each virtual island is housed on one server, which is a physical computer maintained by Linden Lab. Depending on the size of land purchased or rented, virtual real estate can cost colleges and universities several hundred to a few thousand dollars per year, per the current Second Life educational land pricing of 500.00 per island and 150.00 per month maintenance fee (Linden Lab, Inc., 2017). This

cost is still not as high as many other online methods such as learning management systems, which may cost universities *hundreds of thousands* of dollars in licensing, hosting, setup, support, maintenance, staffing, and administration. (Anand, T. (2014).

To sum, though there are many potential benefits to using Second Life for educational purposes, comparably little research has been published on student perceptions of its use, or its impact on teaching and learning. Since a virtual world such as Second Life has the potential to be a cost-effective alternative to face-to-face learning, exploration of its viability and effective implementation is worthwhile. In the next section, potential benefits and barriers will be explored as they relate to the underlying theoretical framework guiding the study.

Theoretical Framework

Virtual worlds have been shown to be cost-effective environments for learning (Warburton and Perez-Garcia, 2009; Swan & O'Donnell, 2009), allowing for engagement and immersion (Twining, 2009), the creation of customized simulations which can support educational role-play (Beidatsch & Broomhall, 2010; Gao, Noh & Kohler, 2009) and a controlled environment in which instructors can observe and evaluate students (Jeffries, 2006). Though there are technical, immersive, and social benefits for using Second Life in education (Warburton, 2009), barriers exist as well, including student discomfort with virtual world technology, as well as a high degree of technical support required (Kerriemuir, 2010). These factors can cause frustrations and anxiety, negatively impacting student experience (Sanchez, 2009).

Self-efficacy is a personal belief in one's capability to perform a given task (Bandura, 1977) and is widely regarded as a powerful determinant of human behavior

(Maddox, 2009). When it comes to online learning, self-efficacy is an important part of student satisfaction, as well as perceptions of e-learning's usefulness and effectiveness (Liaw, 2007). Though some research has examined the development of real world self-efficacy as a result of participating in virtual world activities (e.g. Andrade et al., 2012; Keelhaul, 2007) there are few which have examined self-efficacy specific to learning in a virtual world, or its relationship to student perceptions of the virtual world's learning value.

An exploratory pilot study was initially conducted by Stanton (2010) to refine teaching methods, trainings, and learning activities for an American Studies course that used Second Life. Comments from 25 participants on an end-of-semester questionnaire indicated that the interface difficulties, uncertainties, and related user challenges could cause distractions and frustrations for some users, negatively impacting their perceptions of potential teaching benefits. Based on technical help requests, student feedback, and observations during trainings and activities, some students in the pilot program appeared to gain more skill and comfort in using Second Life than others. In addition, on the end-of-semester questionnaire, a wide variety of attitudes toward the virtual world was reported, with some being favorable, some mixed, and some un-favorable toward its use for learning. When asked about the learning value of Second Life for American Studies, some students stated that Second Life helped reinforce course content, increased engagement, or helped them get into the role of the decade, while others stated that it was a waste of time, was too difficult to be worthwhile, or that they preferred other learning methods (Stanton, 2010). Though the pilot was not meant to initially study self-efficacy

in using the virtual world or its relation to Second Life's perceived learning value, it aided in the development of the research ideas for this study.

Though few studies exist regarding student self-efficacy in using a virtual world for learning, a study by Hearrington (2010) suggested that self-efficacy relates to learning efficiency in a virtual world, and that (in accordance with self-efficacy theory), the increased usage of a virtual world increases the amount of self-efficacy the user experiences. The same study found that *general* computer self-efficacy was not clearly related to self-efficacy in the use of a virtual world, but that scaffolding the learner through training, feedback and peer support could enhance self-efficacy (Hearrington, 2010). A related quantitative study showed that computer self-efficacy can positively affect perceived ease of use of Second life, and in turn, perceived ease of use will positively affect perceived usefulness of Second Life, leading to behavioral intent to use Second Life (Shen & Eder, 2009). However, the study did not focus on how self-efficacy impacted student perceptions of a virtual world's teaching and learning value.

Bandura (1994) described how self-efficacy develops in four ways: 1) mastery experience, 2) social (or vicarious) modeling, 3) social persuasion, and 4) physiological (autonomic) response. It has been shown that mastery experience has the strongest impact on self-efficacy, but both social modeling and persuasion are also significant (Antoine, 2011). Anxiety is the most common physiological response, and has a negative impact on computer self-efficacy in learners (Saade & Kira, 2009). Bandura suggested measuring self-efficacy with a custom, domain-specific scale, ideally developed as a result of a pilot study (Bandura, 1997). However other researchers have noticed a lack of qualitative studies of self-efficacy in e-learning use, and have noted that a qualitative or mixed study

would illuminate the topic more effectively and comprehensively (Tsai, Chuang, Liang, & Tsai, 2011).

In a pilot study by Stanton (2010), students reported that they felt poorly skilled at using Second Life, and that this negatively impacted their course experience. Therefore, the theory of self-efficacy appeared to be a worthwhile model to use as a base for exploring student perceptions of the use and impact of using a virtual world for learning. In light of a small available population of learners using Second Life and the very specific ways in which they are using Second Life, it would be valuable and informative to focus primarily on qualitative data, so that the voices of the individuals could be clearly heard in regard to their perceptions and how they attribute their formation. This is also in line with the suggestions of Tsai et al. (2011) calling for more qualitative research focusing on e-learning self-efficacy.

Purpose Statement

If we as educators believe that it is important to be concerned about student self-efficacy in using promising yet potentially challenging new teaching methods, and that we should also seek to understand whether students feel their learning experience is worthwhile, it is logical to study student perceptions of learning in a virtual world and how they may relate to perceived self-efficacy in their use. If increased self-efficacy in using an innovative tool can help reduce barriers and improve student perceptions of its teaching and learning value, then this can improve the overall enjoyment of teaching and learning for our students and help justify further research and aid in the development of best practices. In addition, results can aid instructors and instructional designers in developing more effective and engaging virtual world activities, trainings, and support

methods. Unfortunately, as of this writing, there is not much literature examining the role that self-efficacy in using virtual worlds may play in student perceptions of its teaching and learning value. The purpose of the study being proposed is to understand the role and the development of self-efficacy in students using a virtual world for learning. To achieve this, we asked the following research questions:

1. How do students rate their own levels of self-efficacy in skills needed to use a virtual world for learning, after initial exposure and later after repeated use?

2. What factors do students believe influence their self-efficacy?

3. What are the student attitudes and perceptions toward the learning value of using the virtual world?

4. How do students with different degrees of change in self-efficacy describe their attitudes and perceptions toward the learning value of the virtual world?

Self-efficacy in using Second Life for learning was measured quantitatively toward the beginning and again toward the end of the semester with a self-efficacy survey, which was used for descriptive purposes as well as interview selection criteria. A subset of survey participants was selected in order to interview a diverse group, who differed from each other both demographically and in level of self-efficacy. In several previous semesters of running the American Studies pilot, students differed widely in attitudes and skill acquisition regarding Second Life; therefore, expectations were that differing responses will be represented in the quantitative data. Qualitative data was then collected from purposefully selected interview participants to generate thick descriptions of student perceptions, which was then used to develop themes, draw inferences, and help guide future research.

Delimitations and Limitations

Delimitations

The sample pool from which participants were selected was comprised of approximately 75 to 85 undergraduate students in two American Studies courses; 1) American Studies: The 1950s, and 2) American Studies: The 1930s. Students in American Studies are typically from religious studies, psychology, political science, history, or similar disciplines. The American Studies participants were somewhat different from the general university population in that they tended to have more non-traditional members (students over the age of 25), and also tended to have more females than the general student population. Therefore, this factor may limit generalizability outside of this population. In addition, the fact that these students are from particular majors may make the results hard to generalize to students from different majors, who may have different skills or other influencing experiences.

In informal polls of previous classes, a large percent said they had played some online multiplayer role-playing games which are in some ways similar to virtual worlds. However, though previous gaming experience was found to be influential to students in this study, this data was not formally collected from the group via the survey, though it could have provided useful insight. We also did not expect Second Life experience, though one of the interviewees ended up having had this experience in a previous class.

The American Studies courses were chosen for the study, since they are two of only a handful of courses using Second Life which were available to the researcher. The courses also employed other teaching methods besides Second Life, including a learning management system (Moodle). The impact of these other teaching methods was not

studied, though it could have been influential to the students. Grades were also not utilized for data, since it was not considered relevant to this study, as we were studying self-efficacy perception and not the influence of virtual world learning on grades.

Due to the fact that the 1950s course was offered primarily face-to-face with online components, while the 1930s course was fully online, the training methods were different in the two classes. Students in the 1950s class had over an hour of training person, while students in the 1930s class had to self-train using videos and other resources, which necessitated a quiz to ensure training success. This is one reason the results were described separately for the two classes, since one of the major means of developing self-efficacy (training) was different based on the feasible means of training these two groups. The researcher could directly observe training response in the 1950s class, but could not in the 1930s, since it was fully online. This may have influenced results for the class that was less observable by the researcher.

Students in these two classes experienced custom-designed learning activities to reinforce their learning goals in the 1930s and 1950s classes. Since each of these learning activities were very specific to these groups of students, and since their topics were very specific to these two classes, it is difficult to generalize results outside of these groups, although there may be some commonalities in certain Second Life mechanics with other classes. Also, similar students using these kinds of activities could possibly experience similar results.

Support was provided to all participants as equally as possibly by the researcher, who also functioned as the trainer and the instructional designer for the course. Because the researcher was essentially a participant in the course, it made it ideal as a means of

getting closer to the students and to the topic, but the researcher's familiarity also possibly influenced the students in their actions. For example, it was noted that several of the interviewees had received in-depth support from the researcher, possibly contributing to their willingness to be interviewed.

A self-efficacy survey, administered early and late in the semester, was used to collect demographics and to assess self-reported changes in self-efficacy in participants, assisting in the deliberative selection of a diverse and smaller group of in-depth interview subjects with varying ages, backgrounds, and differences in self-efficacy. This survey was specifically developed to measure the exact skills the students needed to utilize while they were using Second Life for their learning activities. This survey is very specific to these students and would not be useful outside of this population, though it could be looked to for ideas for developing a similar survey for different virtual world activities.

The study, being primarily qualitative, did not employ hypothesis testing, manipulation of variables, randomized sampling, or use of comparison groups receiving differing intervention methods. The interest of the researcher was the deep exploration of student perceptions about self-efficacy in virtual world learning, in order to gain insight and to ultimately develop ideas for best practices and future research. Other studies could potentially be developed to study this topic in a more empirical way, but it was not the researcher's intent with this particular study.

Limitations

Being an exploratory study, the results of the study are meant to guide future research and provide insight into how this group of students perceived the aspects of the course being studied. Other student groups of differing backgrounds may or may not

perceive the types of questions being studied in a similar manner. In addition, the students in this sample were subjected to specific training and teaching methods, and learned in a virtual simulation that was set up specifically for their course. There are infinitely different ways to use virtual worlds, depending on the teaching needs for each individual course and the way that the instructor has decided to implement the technology. Therefore, students using virtual worlds for learning could use markedly different virtual environments and learning activities in their respective courses, resulting in different learning experiences and skills required to complete them. However, since the steep learning curve of using virtual worlds is very challenging for most students in general (Stanton, 2010; Warburton, 2009), there is high likelihood that the *general* challenges this group of students experienced in using virtual worlds could be similar to other groups of college students.

In addition, since the student virtual world training for this group was designed with self-efficacy in mind, and was refined over several semesters based on student feedback, the beginnings of an idea for a set of standards of "best practices" in student training could begin to be forged with knowledge gained from this study. Detailed qualitative information about student perceptions of the training was sought, so that there could be a better understanding of how the training related to self-efficacy and student perception of their learning experience in the virtual world. Though specifics of this study populations' perceptions of the training and support will be limited just to this group, themes can be developed which can help guide future empirical studies regarding student training and support for using virtual worlds in teaching and learning. As a result, insights gained from this study could be used to ultimately work toward a set of best practices for

student training and support for use of virtual worlds, improving the quality of teaching and learning in this unique and engaging medium.

<center>Assumptions</center>

Assumptions of the study included the following:

1. Participants would engage in the virtual world trainings and learning activities for the course per the requirements of the instructor, and thus would have had roughly the same exposure to the trainings, tools and activities being used.

2. Participants would follow directions provided to them per the training materials, learning activities and assignments they performed within the virtual world. Access to the virtual world would be tracked by avatar name according to the capabilities of the software.

3. Participants would have access to technology either at home or at the university that meets the virtual world technical specifications sufficiently, in order to allow participation in the virtual world activities. Technology specifications supporting the virtual world were confirmed at the university where the course was located.

4. Participants would have no known disabilities which may have negatively affected their ability to use the virtual world as prescribed by the teaching and learning requirements of the course. Should a person with disabilities have been encountered, attempts would be made to provide accommodations and also seek to understand their perceptions of the use of the virtual world, since this could be informative.

5. The virtual world training materials would efficiently cover the processes required to become familiar with the use of the virtual world per course needs (such as

access, navigation, etc.). The training had already been pilot-tested and refined on an ongoing basis over three years and several semesters of use with previous groups, based on student and faculty feedback. Students not being directly observed in training would receive a quiz to confirm assimilation of information from training materials.

6. Participants would enter the study with typical computer skills per their age and educational level, such as basic internet use, word processing, and keyboard and mouse skill. According to a previous pilot (Stanton, 2010) students were not expected to have prior knowledge and skill in the use of the Second Life virtual world. Therefore, subjects would be unlikely to come in with a high degree of self-efficacy in SL. Should users with prior experience occur, it would be considered informative and worthy of exploration.

7. Every effort would be made by the instructor and trainer so that the learning activities taking place in the virtual world were designed to effectively reinforce the learning objectives of the course. Activities would support instructional objectives by providing means to practice or access related information.

8. In accordance with Bandura's theory of self-efficacy (1994), time spent in training, practicing, and performing activities using *any* tool will tend to help build skill and self-efficacy in that tool. Thus, this was expected to be true of using virtual worlds (as it would for any other skill), though different persons would be expected to acquire different degrees of self-efficacy at different rates depending on things such as internal states and personal characteristics (Bandura, 1997).

9. The training provided would be in line with what is known about the development of self-efficacy, so as to sufficiently provide learning methods that reinforce self-efficacy, such as demonstration, practice, social modeling, and constructive feedback (Bandura, 1997). The instructional designer would demonstrate key skills (such as access) and also provide a variety of efficacy-enhancing methods in the training, such as self-testing and peer support. Technical anxieties would attempt to be alleviated with timely support.

10. Virtual world support would be provided to students on an as-needed basis by the trainer should participants have supplemental questions or problems in using the system. Participants would avail themselves of this support when needed (and would be made aware of this expectation in advance). Support questions would be deemed pertinent to the study and would be documented.

11. No unexpected *major* changes to the virtual world software or to the planned course activities would occur during the study, though faculty might slightly modify (e.g. add, tweak or switch) learning activities unexpectedly based on course or student needs. Unexpected outages or minor updates or changes either to the software or the course activities would be dealt with by additional training or support as needed, and would be documented.

12. Participants would answer the interview and survey questions honestly and to the best of their ability.

Definitions

Several key terms are regularly referred to in this study and are central to this research. Operational definitions are as follows:

Asynchronous: An event or interaction that occurs in one's own time and not concurrently with others, for example an asynchronous discussion on a discussion board in which people post their comments at different times.

Avatar: A three-dimensional virtual representation of an individual that can be made to move and interact within a virtual world.

Distance Learning: Learning that is conducted primarily online.

e-Learning: Any learning that is engaged in online over a computer network. Synonym of *online learning*.

Immersive: Immersive learning brings a student into a visual simulation of another time, place, scenario, or situation, to promote the feeling of first-hand experience.

Interactive: A computer-based program that responds to user activity and can be explored, manipulated, or engaged with.

Online: Connected by computer or mobile device to the internet via a network.

Online learning: Any learning that is engaged in online via a computer network. Synonym of *e-learning*.

Second Life (SL): A popular social virtual world run by Linden Lab, Inc., that offers free avatars and has a population of active users in the hundreds of thousands internationally. This virtual world was the tool of choice for this study due to offering free avatars and allowing users to customize content, avatar appearance and virtual spaces.

Self-Efficacy: Per Bandura (1977, 1997) the belief in one's own ability to successfully perform a skill or task in order to produce desired results based upon the assessment of his/her capabilities/skills.

Simulation: A computer-based, virtual representation of a real-world place or scenario that represents that scenario visually, e.g. a certain time period in history.

Synchronous: An event or interaction that occurs at the same time or concurrently.

Perceived Ease of Use (PEOU): The degree to which a person believes a technology will be free from effort.

Perceived Teaching and Learning Value: The degree to which the learner perceives that a learning activity, method, or intervention enhances learning (Artino, 2009).

Perceived Usefulness (PU): The degree to which a person thinks that a technology will be helpful.

Role-play: A method of pretending to be a different person (such as from a different group or time), for purposes of learning about or empathizing with that person.

Technology Acceptance Model (TAM): A model by Davis (1985) which illustrates the roles of PU and PEOU in technology acceptance and ultimate technology use.

Technology Acceptance Model 3 (TAM 3): An update to the original TAM by Venkatesh and Bala (n.d.) which adds the roles of self-efficacy, anxiety, playfulness, and other constructs which can impact PEOU and PU.

Three-Dimensional (3-D): Possessing length, width, and depth, such as the world we live in. A virtual 3-D world has the appearance of having three dimensions so that a user has a sense they are moving about in within those dimensions. Second Life, the virtual world under study, is three-dimensional in nature, allowing users to feel immersed within the learning environment.

Virtual: Created or carried out by means of a computer network.

Virtual Reality (VR): A virtual environment that creates a high degree of immersion by allowing a user to have a fully 3-dimensional experience, visually and physically, with aid of a headset and other specialized equipment.

Virtual World (VW): Also known as multi-user virtual environment. A virtual world is a persistent, online, three-dimensional, graphical representation of space, in which multiple persons can freely move about and interact in the form of avatars.

<div align="center">Summary</div>

Virtual worlds are innovative teaching and learning methods which can provide unique, immersive, and engaging learning experiences in ways that conventional online teaching and learning methods such as learning management systems cannot (Lu, 2010). Though they have potential benefits, problems have been associated with their use, such as a steep learning curve and discomfort with the technology (Warburton, 2009). Increased student self-efficacy in using a virtual world for learning may help improve students' overall perceptions of the teaching and learning experience, potentially leading to increased overall course satisfaction and success (Artino, 2009). Therefore, it is valuable to study the impact of student self-efficacy in using a virtual world for learning, and explore how it may impact student perceptions of the teaching and learning value of that experience.

The following chapter summarizes current knowledge relating to the study from supporting literature on the topic of student self-efficacy and how it might relate to learning in a virtual world. The literature will be arranged thematically according benefits and barriers of using a virtual world for learning, self-efficacy in relationship to

perceptions of online learning, related literature about the technology acceptance model, and a summary of knowledge including any gaps in the current literature.

The third chapter includes the methodology employed to assess student self-efficacy in the virtual world in light of the training, support, and learning activities they will be exposed to. Details of the specific educational interventions are described, as well as interview protocol relating to self-efficacy and student perceptions of teaching and learning. Lastly, the analysis procedure is described, including methods used for quantitatively and qualitatively analyzing the data, and searching for themes generated. Chapter four of the dissertation describes results of the study, with themes generated and findings clearly described. Themes were used to draw inferred relationships between self-efficacy and student perceptions, which can be used to justify later empirical studies. The conclusions of the researcher, including impact and recommended future studies, are discussed in the fifth and final dissertation chapter.

CHAPTER 2: LITERATURE REVIEW

In reviewing related literature from journals, books, dissertation studies and other print and electronic resources, it was deemed important to first justify the use of a virtual world for educational purposes. As a result of a previous pilot study (Stanton, 2010), students said that they found using a virtual world enjoyable, engaging, and often helpful at reinforcing class concepts, but also that the virtual world was challenging to learn or that they sometimes did not feel very skilled in its use. The lack of feeling skilled at using the virtual world sometimes negatively impacted students' overall views of its usefulness in class (Stanton, 2010). Therefore, self-efficacy, which is a person's perception of their skills in performing a task, is the primary foundational theory of the study. Since there are few studies specifically about self-efficacy in virtual worlds, studies pertaining to academic as well as computer-based or online learning self-efficacy have been included, along with literature on how to foster its development. Lastly, during the literature review on self-efficacy in online learning, it became clear that the closely related technology acceptance model, which describes the role of self-efficacy and other variables leading to technology acceptance, was very common in the literature; hence it has been included as a valuable source of constructs relating to students' self-efficacy, technology perceptions and ultimate use.

This literature review focuses on several areas that have been shown to be of importance as a result of reviewing studies pertaining to self-efficacy in students using

virtual worlds for learning. The main sections of this review are as follows: 1) the use of virtual worlds for teaching and learning, including teaching benefits, use of educational simulations, and teaching barriers, 2) the importance of self-efficacy in learning, including a description of general academic self-efficacy, self-efficacy in online learning (e-learning), and self-efficacy relating to virtual worlds, and 3) developing and assessing self-efficacy, including Bandura's (1997) four sources of self-efficacy, ways that educators can use the four sources to help promote student self-efficacy, and ways to assess self-efficacy in learners.

Use of Virtual Worlds for Teaching and Learning

The following section covers some of the teaching benefits and uses of virtual worlds in education, while also noting the teaching barriers that may mitigate the known benefits.

Teaching Benefits of Virtual Worlds

There are several teaching benefits identified in the literature regarding the use of virtual worlds which make them valuable to study as a viable format for delivering learning. These include the opportunity for rich interactivity, ability to provide visualization of concepts, ability to show objects in context, cost-effectiveness in providing re-creations of simulations that are otherwise not possible, ability to be immersed in an activity or scenario virtually, socially, and visually, a virtual space for socialization with others which may help distance students, and the ability to provide customized content (Warburton and Perez-Garcia, 2009). Virtual worlds can be highly engaging and immersive, potentially providing a source of motivation for learning (Twining, 2009). Students are reported to enjoy the process of developing and

customizing their avatars, and enjoy the sense of creativity offered by the use of the

virtual world (Sanchez, 2009). Other known benefits include the ability to interact with a

broad international community, engage in 21st century technology that may prepare

students for future business opportunities, allow both students and instructors to create

and share content, and provide instructors with the ability to control levels of access (Lu,

2010).

There is also information to show that virtual worlds can provide effective

learning. Recently, Merchant, Goetz, Cifuentes, Keeney-Kennicutt, and Davis (2014)

looked at 69 empirical studies relating to the effectiveness of virtual reality-based

instruction, and found that there were statistically significant learning outcomes

according to the measures used in most of them. More recently, Loke (2015) performed a

meta-analysis of studies about education in virtual worlds, and found that four different

learning mechanisms could take place in virtual worlds that produced real-word learning

benefits; reflection, verbal interactions, mental operations, and vicarious experiences.

Loke's work suggested that learning activities should be designed to foster these four

learning mechanisms, if a real-world learning impact is desired (2015). Overall, there is

good support for the idea that virtual worlds can provide active, engaging, customizable,

immersive, and effective learning experiences.

Use of Virtual World Simulations in Education

One of the more unique capacities of a virtual world is its ability to provide an

immersive learning *simulation* – i.e. an artificial model of a real-world scenario that can

be used for learning purposes in lieu of access to the real-world version. Due to their

visual nature, support has been found for virtual simulations being able to help learners

visualize complex concepts more effectively, cost-effectively, and engagingly (Swan & O'Donnell, 2009). A virtual simulation can be a practical environment for facilitating historical role-play, which has been shown to increase student empathy and understanding of the persons and era being studied (Beidatsch & Broomhall, 2010). Simulations can also help an instructor observe and assess students in a controlled, safe environment (Jeffries, 2006).

Second Life (SL) is a well-known virtual world in which users can build any type of simulation, either by purchasing components made from other users, or (if skilled enough) using SL's internal building system to make their own content, thus making this environment customizable and generalizable to almost any discipline (Kluge & Riley, 2008). Types of educational simulations in Second Life include a simulated unsafe house where gerontology students learn about elder safety (Andrade, Cifuentes, Mintzer, Roos, Anam & Ruiz, 2012), a clinical laboratory in which nursing students practice decision-making (McCallum, Ness, & Price, 2011), and a simulated Middle East allowing people to explore traditional architecture and natural geography of the region (Dittmer, 2010).

Even though virtual worlds can offer engaging and immersive simulations, the custom development of an effective learning environment – complete with appropriate learning activities - is no simple task. Based on their synthesis of extant literature, a team of researchers identified four important considerations in the use of virtual worlds for teaching; 1) matching the learning activities with the learner and the required outcome, 2) consideration of learning models and support strategies in the design of activities, 3) consideration of the level of fidelity and interactivity of the learning experience, and 4) consideration of physical and virtual learning space (De Freitas, Rebolledo-Mendez,

Liarokapis, Magoulas, & Poulovassilis, 2010). Given these parameters, it can be inferred that the effective design of the actual virtual learning space, strong learner support, and clear relevance of learning activities to learning material are key factors in virtual learning simulation development.

A virtual simulation can provide simple *visual* representation of a time and place; however, it can also serve as a virtual space for *social* learning - particularly for students separated by distance. Second Life has been shown to facilitate not only experiential learning but also *social presence* - an increased sense of being personally present in a social situation together with other people (Jarmon, Traphagan, Mayrath, & Trivedi, 2009). One college distance archaeology course implemented learning activities in a virtual simulation of a Pakistani village, and qualitatively explored student reactions (Edirisingha, Nie, Pluciennik, & Young, 2009). The study found that students enjoyed the sense of immediacy and social presence of being in an immersive environment with their peers, but that it was critical to have a well-trained instructional technologist present to help design an effective learning space and also support students in the virtual learning activities (Edirisingha et al., 2009).

In addition to being able to provide an immersive visual simulation and social gathering space, virtual worlds can also allow students themselves to take the appearance of different personas, enabling various types of educational role-play. Educational role-play is defined by Van Mentz (1983) as a learning activity which puts the student into the role of pretending to be someone else by acting out their feelings and actions, so as to gain a deeper understanding of the person or people being studied. Educational role-play has been used to help students gain cultural competence, provided that the role-play is

related back to theoretical concepts being taught, that guidelines are set, and that the role-play is used to facilitate constructive analysis (Shearer & Davidhizar, 2003). Level of immersion or engagement in role-play is often fostered by asking the students to embody their characters through costumes, gestures, and words, which helps the students collaboratively co-create an interactive story and allows them to actively use concepts they are learning about (Gjedde, L., 2013). Through conscious social reflection, online role-play simulations can be used to scaffold student learning about complex concepts, provided that there is an ideal "flow" – an absence of either boredom or anxiety that can allow active engagement without stress (Russell & Shepherd, 2010). Gao, Noh, and Kohler (2009) found that educational role-play was as effective in a virtual world as it was in a face-to-face environment for reinforcing concepts, but there was an added benefit to the virtual world in that it allowed introverts to feel less pressure than they would in person.

Second Life role-play in particular has been effectively used in Latin-American studies, in order to reinforce historical concepts about the Cuban Revolution (Wakefield, Warren, Rankin, Mills, & Gratch, 2012). Participants reported that learning via SL role-play was facilitated through design, inquiry, communication, discourse, dramaturgical self-expression, position-taking, freedom to help shape events, reflection, enjoyment, collaboration, and technical support (Wakefield et. al., 2012). In light of these and other studies previously mentioned (De Freitas et al., 2010; Edirisingha et al., 2009), there is good support for the idea that promoting role-play within a virtual simulation can be an effective teaching method, provided that the simulation is developed effectively, the

learning activities actively reinforce learning objectives, and that learners are engaged and supported sufficiently.

Teaching Barriers of Virtual Worlds

Although there appears to be many potential benefits of virtual worlds which can be enhanced by making effective teaching choices and providing learner support, many barriers also exist. Problems identifying personally with one's avatar, a feeling of being outside of one's comfort zone, and a high degree of technical support required can all work together to pose challenges in the implementation of a virtual learning environment (Warburton, 2009; Kerriemuir, 2010). In addition, the steep learning curve, difficulty mastering the interface, high technical requirements, and sometimes inaccurate pre-conceived notions about virtual worlds can negatively impact student experience (Sanchez, 2009). After implementing an immersive mentoring scenario in a virtual world, DeFreitas and colleagues (2010) found several negative reactions from college students, including the fact that some did not relate easily to others in avatar form, and some experienced frustration with technical glitches or the challenging user interface. Barriers identified included the need for significant training and student support, concerns about accessibility and usability, and the importance of setting learner expectations clearly from the start (DeFreitas et al., 2010). Some research shows that with effort, training, presence of enabling resources, and a strong level of support by key academics, higher education institutions can overcome these barriers (Kerriemuir, 2010).

Other factors may help cause or mitigate barriers. For example, cognitive load, or the amount of stress caused by the perceived difficulty of learning a new skill, can inhibit positive learning experiences in a virtual world if the perceived difficulty is not balanced

by the perceived benefits (Hearrington, 2010). Therefore, helping students understand the benefits of participating in the virtual world activities may help overcome some of the barriers associated with the virtual world. In addition, the sense of creativity and enjoyment is sometimes strong enough to outweigh the barriers experienced (Sanchez, 2009). However, if the high levels of academic support are missing, learning is not facilitated or supported effectively, and the right resources are not provided at the right time, it is possible that students may not perceive the use of the virtual world as effective and meaningful from a teaching and learning standpoint (Keskitalo, Pyykkö & Ruokamo, 2011).

Summary of Virtual Worlds for Learning

Virtual worlds have been shown to be immersive and cost-effective environments to provide social learning and customized content (Warburton and Perez-Garcia, 2009; Swan & O'Donnell, 2009). Virtual worlds can be highly engaging and immersive (Twining, 2009) as well as a place to enjoy creativity (Sanchez, 2009). Virtual worlds may allow instructors to create and share content, and provide them with the ability to control levels of access (Lu, 2010). Simulations can be developed in the Second Life virtual world which allow for visual representation of times and places (Kluge & Riley, 2008) environments for educational role-play (Beidatsch & Broomhall, 2010) and spaces for observation and assessment (Jeffries, 2006). Barriers to using virtual worlds for education include some users' discomfort with the technology and the high degree of technical support needed (Warburton, 2009; Kerriemuir, 2010). The steep learning curve and technical requirements can negatively impact student experience (Sanchez, 2009) and cause frustrations with technical glitches (DeFreitas et al., 2010). Balancing perceived

difficulty with perceived benefits (Hearrington, 2010), and providing effective and timely support and resources (Keskitalo et al., 2011) can help mitigate these barriers, allowing students to have a more meaningful educational experience in the virtual world.

<div align="center">Importance of Self-Efficacy in Learning</div>

The role of-self-efficacy has been explored in the general academic setting, the online learning community, and to a lesser degree in virtual world teaching and learning. The following section explores what has been done in the past, and then summarizes the importance of self-efficacy in education.

Self-Efficacy in the General Academic Setting

Self-efficacy, a term originally developed by Albert Bandura as a component of his social cognitive theory (1977), is defined as the belief to successfully perform a task in order to produce desired results based upon self-assessment of one's ability. Self-efficacy is a *belief* rather than an *actuality* - in other words, self-efficacy is an individual's perception of what he or she *can* do, and is not necessarily indicative of what he or she *will* do, though it can strongly influence what a person will *choose* to do (Bandura, 2009). Since it was first described by Bandura in 1977, self-efficacy has become a component of thousands of research articles which have supported its importance in the learning process, and helped it gain wide acceptance as a powerful determinant of human behavior (Maddux, 2009).

Self-efficacy relates to every kind of skill or task that a person can engage in, and one's perception of being able to succeed at that task plays a critical role in their psychological adjustment and self-guided behavior change strategies (Maddux, 2009). In education, self-efficacy is important on several levels. During childhood and adolescence,

self-efficacy relates to students' cognitive development, learning motivation, social self-comparison, achievement, and views about their own skills and self-worth (Bandura, 1994). In high school, higher academic self-efficacy has been shown to lead to increased development of mastery goals, strategy development, autonomy, and perceived instrumentality, all of which directly impact student achievement (Greene, Miller, Crowson, Duke, & Akey, 2004).

As adulthood emerges and students enter college and later into the work force, self-efficacy is a major component of adult aspirations, competency development, and sense of being able to attain success, not only academically but at work and in other aspects of adult life (Bandura, 1994). In first year college students, academic self-efficacy has been shown to relate to optimism, academic performance, adjustment to the demands of college life, and to be a powerful predictor of student achievement (Chemers, Hu & Garcia, 2001). Students that are academically self-efficacious are more likely to optimistically view academic rigors as a positive and achievable challenge, while students with low academic self-efficacy are more likely to see it as a threat (Chemers et. al., 2001). For all college students and for minority students in particular, academic self-efficacy has been shown to be a direct predictor of persistence, school performance, interpersonal interactions, GPA, and ability to balance academic versus other life demands (Zajacova, Lynch, & Espenshade, 2005).

Self-efficacy has known causal factors which can be nurtured and supported by instructors and college administrators (Bandura, 1986). Helping new college students learn how to successfully navigate college demands by training them in skills such as time management, help-seeking and goal setting can help increase student self-efficacy

and retention, and allow them to continue on to higher educational goals and achievement (Kitsanas, Winsler, & Huie, 2008). Similarly, orientation programs that have focused on the development of professional self-efficacy have been shown to help students be better able to deal with academic demands and eventually career demands upon entering the workplace (Freudenberg, Cameron, & Brimble, 2011). Therefore, the promotion of academic self-efficacy is something that can benefit students during their studies and after completion.

Self-Efficacy in Online (e-) Learning

College students will engage in many types of tasks in their academic studies. These academic tasks may involve reading, writing, test-taking, studying, computer use, library use, and more. General academic self-efficacy encompasses all aspects of navigating the demands of college work, including managing time, working in groups, communicating effectively, and using learning resources (such as computers); therefore, increased self-efficacy in these skills can relate to better coping mechanisms as well as student retention (Devonport & Lane, 2006). Some studies explore specific types of self-efficacy based on specific tasks the student is performing. Computer self-efficacy (CSE) pertains to a person's perception that they can perform well using a computer for a variety of tasks (Compeau & Higgins, 1995). However, online or e-learning self-efficacy comprises one's beliefs about computer skills as well as other academic skills needed for completing online coursework, thus being a different construct that does not necessarily correlate with *general* computer self-efficacy (Kim, 2005). The next sections examine various issues relating to online learning self-efficacy.

Self-Efficacy in Online Courses

An individual's belief in his or her ability to engage in online learning is sometimes termed *online course self-efficacy* (OCSE) (Randall 2001), though this term may not always be appropriate, since e-learning may occur in a partially *or* fully online course. The idea that engaging in online learning is a combination of academic proficiency and computer proficiency has been reinforced by Buche, Davis and Vician (2012) who found that individuals with lower overall academic proficiency tended to perform more poorly in e-learning situations.

An inherent characteristic of online learning is that some or all classwork and interaction is completed in physical isolation from classmates, using only the software for connection. One study found that online student performance was moderated by the transactional distance that students often feel when interacting online, the effects of computer anxiety, and self-efficacy in the specific software used for the course (Hauser, Paul, & Bradley, 2012). Computer anxiety is still a common factor in e-learning which can result in negative emotional states, frustrations, and reduced performance; however self-efficacy can be an important mediating factor in alleviating anxiety in e-learners (Saade & Kira, 2009). Anxiety over computer use for online learning is especially common in people who are less experienced in taking online courses (Kim, 2005). Other internal traits may impact online learning self-efficacy. For example, Yukselturk and Bulut (2007) noted that self-efficacy in online learning relates to self-regulation, goal orientation, and time management, all of which are particularly important for online learners.

Some studies have examined student self-efficacy in specific tools or tasks encountered in online learning. Tsai and Tsai (2003) found that behavioral, procedural, and metacognitive internet self-efficacy were all important factor for performing online scholarly research, since students not only need to perform searches, but also need to select, organize, and analyze what they retrieve. Liaw (2003) analyzed students using a learning management system or LMS (in this case Blackboard), and found that perceived self-efficacy in its use was most positively related to student satisfaction with e-learning, as well as perceptions of the LMS's usefulness and effectiveness. The types of self-efficacy measured involved navigating the Blackboard system, using it to interact with the instructor and peers, accessing multimedia such as audio and video, and using the system to find information (Liaw, 2007).

A related theory to self-efficacy, the technology acceptance model (TAM) (Davis, 1985), frequently comes up when researching self-efficacy in online learning. The most current version, the TAM 3, reinforces the theory of self-efficacy by showing it as an anchoring variable along with computer anxiety, external control, and computer playfulness, which all can lead to perceived usefulness and perceived ease of use, in turn leading to actual technology use (Venkatesh & Bala, n.d.). The TAM 3 describes how self-efficacy leads to positive perceptions of a technology and to its ultimate adoption. The role of self-efficacy in the TAM 3 support the idea of studying self-efficacy as it relates to learning technologies, since it shows that self-efficacy develops and interacts with other constructs in a technology's ultimate acceptance, perceived value, and successful use.

Gender and Online Learning Self-Efficacy

The role of gender may impact online learning adoption, perceptions, and self-efficacy, but researchers disagree as to how. Venkatesh and Morris (2000) explored the roles of gender in TAM literature, finding that males tended to feel that perceived usefulness (PU) was more important in technology acceptance, while females found that perceived ease of use (PEOU) was more influential. Similarly, Ong and Lai (2006) found that self-efficacy was lower in women than men for online learning, that PU was more important for men, and that PEOU was more important for women when it came to intention to use e-learning (Ong & Lai, 2006). In contrast, a more recent study by Al-Azawei and Lundvqvist (2015) did *not* find gender differences in online learners with regard to PU, PEOU and Perceived Satisfaction (PS) in online learning, noting that cultural differences may also play a part in studies that have found gender differences. Additionally, Goulao (2014) studied online learner self-efficacy, and noted that while self-efficacy impacts performance, there was no statistically significant difference in self-efficacy based on gender.

In another exploration of gender differences in online learners, Yukselturk and Bulut (2009) found that test anxiety was a significant predictor in variance of female online learning achievement, while self-efficacy and task value were stronger predictors of variance in achievement for males; otherwise there were no significant differences in gender for online learning success. Other factors may also impact genders differently in their perceptions of online learning. Rovai and Baker (2005) found female students to enjoy the social aspects of online learning more than males. This is consistent with female tendencies to use online social networks more than males (Duggan, 2013). On a related note, Tsai and Tsai (2010) found that female online learners were more socially

oriented, while male online learners were more exploration oriented. Some of these variables could potentially favor genders differently in online learning self-efficacy, depending on which aspects of online learning are being studied. However, studies regarding gender differences in self-efficacy in online learning between males and females had mixed results.

Other Factors in Online Learning Self-Efficacy

Several other variables may impact e-learning self-efficacy. One study noted that self-efficacy in online learners may differ depending on the motivation they have for taking an online class, with students choosing it because they believe it will be enjoyable displaying higher e-learning self-efficacy and better performance than students simply taking it because it was available (Wang & Newlin, 2002). Another study reported that there is often a mismatch between students' perceived self-efficacy and actual skills in computer use, with students most often overestimating their skills in more frequently used applications, and underestimating their skills in the applications they have used the least (Guy & Lownes-Jackson, 2010). Overall, the above studies show that a wide variety of factors inherent to online learning – some academic, some software-related, some experiential, and some internal – may all interact in various ways to impact e-learning self-efficacy.

Self-Efficacy and Virtual World Learning

Few studies have specifically examined the role of self-efficacy in using virtual worlds as a teaching method, either upon student satisfaction with the course, or student perception of virtual worlds as a useful or effective learning method. There have been studies that examined using a virtual world as a means to develop self-efficacy in other

skills beyond the virtual world; for example using a virtual world for science learning to support general scientific self-efficacy (Ketelhut, 2007), using a virtual world for language learning to support self-efficacy in language skills (Henderson, Huang, Grant & Henderson, 2012), or using a virtual world simulation to develop gerontology student self-efficacy in identifying real home hazards (Andrade et al., 2012). Merchant and colleagues examined how the relationship between self-efficacy, usability and spatial orientation in a virtual world could impact chemistry instruction and test performance (Merchant, Goetz, Keeney-Kennicutt, Kwok, Cifuentes & Davis, 2012). Venkatesh & Windeler (2012) examined how self-efficacy and other factors in using a virtual world related to positive virtual team interaction.

More recently, deNoyelles, Hornik and Johnson (2014) found that there were three types of self-efficacy in an accounting students using Second Life for coursework; Virtual World Environment Self Efficacy (self-efficacy at using the actual SL environment), Learning Domain Self Efficacy (self-efficacy in accounting skills), and a combined self-efficacy where both types interacted when applying accounting concepts to learning objects. Both types of self-efficacies were needed to produce success at complex learning tasks in Second Life, and the combined self-efficacy was also correlated with exam success. Their findings suggested that self-efficacy is multi-dimensional and not a single construct, and that the different types of self-efficacy should be considered and addressed when designing or teaching courses in virtual worlds (deNoyelles, Hornik, & Johnson, 2014).

There have been few studies on virtual world learning and gender, but a study on virtual cardio-pulmonary resuscitation (CPR) training in medical students was found that

there was a higher mental strain among female students learning CPR in this manner (Creutzfeldt, Hedman, Medin, Heinrichs, & Felländer-Tsai, 2010). Additionally, there were differences in CPR self-efficacy between males and female before CPR training, but not afterward (Creutzfeltd et al., 2010). Overall, the impact that gender may have upon self-efficacy in virtual world learning was not clear from extant literature, nor was a relationship predicted for the purposes of this study

Summary of the Importance of Self-Efficacy in Learning

Self-efficacy is a personal belief in one's capability to perform a given task (Bandura, 1977) and is widely regarded as a powerful determinant of human behavior (Maddox, 2009). In the grade school and middle school years, self-efficacy relates to a student's cognitive development, motivation, and sense of self-worth (Bandura, 1994). In high school, self-efficacy is involved in development of mastery goals, sense of autonomy, and ultimately in student achievement (Greene et al., 2004). In college, self-efficacy helps students deal with the rigors of academic life, and allows students to view difficult situations optimistically (Chemers et. al., 2001).

When it comes to online learning, self-efficacy is important part of student satisfaction as well as perceptions of e-learning's usefulness and effectiveness (Liaw, 2007). A variety of factors such as computer anxiety (Saade & Kira, 2009) self-regulation (Yukselturk & Bulut, 2007), motivation for engaging in e-learning (Wang & Newlin, 2002), and experience with the specific software (Guy & Lownes-Jackson, 2010) can all impact e-learning self-efficacy. Meanwhile, studies on gender's impact on e-learning have been inconclusive (Goulao, 2014).

Though a few studies have examined the development of real world self-efficacy as a result of participating in virtual world activities (e.g. Andrade et al., 2012; Ketelhut, 2007) there are few which have examined the development of self-efficacy in using a virtual world and its relationship to student perceptions of using a virtual world for learning. However, deNoyelles and colleagues (2014) found that environmental self-efficacy and learning domain self-efficacy needed to interact to promote learning success in a virtual world. Since studies have shown that virtual worlds can serve as an immersive and engaging medium for learning (e.g. Sanchez, 2009; Twining, 2009), the development and impact of student virtual world self-efficacy is a worthwhile topic of study.

<center>Development and Assessment of Self-Efficacy</center>

The following section describes the sources of self-efficacy and how educators can use this knowledge to foster its development. It continues with a description of some of the ways in which self-efficacy has been assessed in learners in the past, and concludes with suggestions for additional areas of research in self-efficacy development.

Four Sources of Self-efficacy

According to Bandura (1994), self-efficacy is developed in four major ways:

1. Mastery Experience: Having performed a task successfully in the past (a "mastery experience") is the most effective way to develop self-efficacy. Previous failures however will have an opposite effect on self-efficacy. The greater the number of mastery experiences, the greater the self-efficacy in performing a task. The old saying "Nothing succeeds like success" would be considered accurate according to the concept of mastery experience.

2. Social Modeling: Seeing similar peers being able to perform a task successfully is a very good way to gain self-efficacy, since a person will tend to think "If they can do it, so can I". To be effective, the people role-modeling the task need to be viewed by the people attempting the task as being similar to themselves, with similar background, opportunity, exposure, or training.

3. Social Persuasion: Being told by someone else that one can succeed at a task is another way of developing self-efficacy, since it can increase motivation and desire to try harder. Coaching, feedback, and training can serve as forms of social persuasion. Conversely, being persuaded that one *cannot* perform a task will have a negative impact on self-efficacy. Ultimately, being told what one can or cannot perform is not as persuasive as actual performance.

4. Physiological Response: A person's autonomic response to a psychological situation (e.g. heart rate, respiration, blood pressure) can have positive or negative impact on self-efficacy, based on how the person interprets his or her own bodily response. If they interpret their response as distress, they may refrain from attempting a task again, but if they interpret it as exhilaration or excitement, they may be more likely to try again.

Using the Four Sources to Develop Self-Efficacy in Students

In order to best facilitate the development of self-efficacy in students, instructors and support staff can draw from Bandura's (1994) four sources of self-efficacy to help reinforce it. In a dissertation that examined the relationship between the four sources of self-efficacy and actual computer use in students, it was found that that mastery experience, vicarious experience (i.e. social modeling), and social persuasion were the most significant predictors of ultimate technology use, with mastery being the strongest

(Antoine, 2011). Physiological response was most closely related to computer anxiety (a negative predictor of computer use), with the most common source of anxiety being the fear of making mistakes. The researcher suggested that building in opportunities to practice and succeed in an atmosphere of support and positive verbal reinforcement were critical in gaining mastery, while seeing others succeed through live modeling could help promote vicarious experience. Additionally, addressing any commonly anticipated issues before they arose (e.g. ensuring access to adequate technology and support, addressing inflated fears of negative consequences of mistakes) could help ease the negative impact of computer anxiety (Antoine, 2011).

Mastery experience is a major factor in self-efficacy, but there is evidence to show that the *type* of mastery experience must be essentially the same as the target behavior to be effective, as was found by Kim (2005). The researcher studied mastery experiences in online students, and found that *general* computer or internet experience was not a predictor of *online course* self-efficacy, but that previous experience in online courses was a predictor of online course self-efficacy. This implies that computer training for students new to online courses should focus directly on giving mastery experiences in the specific online technologies and methods that will be used in the coursework (Kim, 2005).

Though it is important to nurture mastery, other sources of self-efficacy should not be neglected. One study evaluated its university's computer intervention curriculum (CIC), in its ability to help build online learning self-efficacy in new students (Fletcher, 2005). Results showed that the CIC over-relied on mastery experience, assumed students regulated their own physiological states, and did not leverage other possible sources of

self-efficacy. The author suggested that the CIC should incorporate more vicarious

experience as well as social persuasion in order to be a more rounded program which

addresses other sources of self-efficacy, since females (particularly non-traditional or

adult learners) responded better to verbal persuasion, and were more impacted by

physiological states (Fletcher, 2005). Anxiety, the primary physiological state that can

hinder self-efficacy, can be ameliorated in adult learners by 1) orienting them to features

and benefits of the learning environment, 2) creating a nurturing atmosphere that

acknowledges anxiety but reassures students they are safe, and 3) providing dedicated

support to learners (Sivakumaran & Lux, 2011).

Assessing Self-Efficacy in Virtual Worlds for Learning

Studies have shown that self-efficacy must be application-specific in order to

serve as a predictor of continued use (e.g. Agarwal et al., 2000; Yi & Wang, 2003). Since

self-efficacy in a given skill is very specific to those domains relating to that skill,

assessments should also be specific (Bandura, 1997). Bandura has noted "there is no all-

purpose measure of perceived self-efficacy" (2009, p. 307). He went on to say that

"perceived efficacy should be measured against levels of task demands that represent

gradations of challenges or impediments to successful performance" (Bandura, 2009, p.

311). Bandura suggested performing a task analysis of the different challenges

encountered in mastering the greater task at hand, preferably in a pilot, and having the

subjects mark the degree to which they feel capable of performing each behavior in a

Likert scale (2009). In the case of this proposed study, pilot research has suggested that

the different challenges involved in the greater task of using a virtual world for e-learning

might include such things as software installation, access, or navigation in the virtual

world (Stanton, 2010; Stanton, 2013).

As is the case with any other construct, there are other methods beside

quantitative measures to explore self-efficacy. Tsai and colleagues (2011) performed an

extensive review of 46 studies pertaining to self-efficacy in online learning, and found

that most of the studies were quantitative. They suggested that for more complete

understanding, qualitative assessment methods such as interviews or observations should

be employed, and that instructors' perceptions should also be included (Tsai et al., 2011).

Keeping scale items domain-specific and looking at quantitative scores in light of

qualitative data can serve as triangulation and help ensure that the scale will have greater

validity and predictive relevance (Pajares & Schunk, 2001). By administering the scale

earlier and later in the intervention, change over time can be assessed in light of the

qualitative data.

As described by Venkatesh & Bala (n.d.), the process of technology acceptance is

complex, involving self-efficacy and other related constructs. Given the many possible

factors that are deeply mixed within it, it is likely that a person's perception of self-

efficacy in using a technology is as unique as that person is, modified by internal and

external influences which can have either positive or negative impact. It is helpful to have

a specific scale pertaining to each domain of the type of self-efficacy being studied

(Bandura, 1997) particularly if growth in self-efficacy over time is being explored.

However, it makes sense to further examine individual experiences, self-efficacy, and

self-perceptions of using a *specific* technology for learning, by asking the learners about

what *they* feel impacted their own self-efficacy, and exploring how this affected their

individual learning experiences. By focusing on a deeper, qualitative level of exploration into students' personal experiences in developing self-efficacy, it may be possible to find practical ways to help e-learners feel more efficacious, to increase the perceived value of their learning experience, and ultimately, to use the technology successfully to help complete their education.

Summary of Developing and Assessing Self-Efficacy

According to Bandura (1994), self-efficacy is developed in four major ways: 1) mastery experience (having performed a task successfully in the past), 2) social modeling (seeing peers being able to perform a task successfully), 3) social persuasion (being told by someone else that one can succeed at a task) and 4) physiological response (a person's autonomic response to a psychological situation). Having a mastery experience is the strongest positive reinforcement of self-efficacy in performing that skill (Antoine, 2011) but the mastery experience must be in essentially the same kind of behavior as the target behavior (Kim, 2005). In addition, the other three sources of self-efficacy should be addressed, since they may help female or non-traditional students (Fletcher, 2005).

Since anxiety (a physiological state) has been shown to negatively impact the development of computer-related self-efficacy, it should be prevented through training, reassurance, and support (Sivakumaran & Lux, 2011). Assessments and measures of self-efficacy should be based on domain-specific task analysis, preferably learned through a pilot (Bandura, 2009). It has been suggested that due to its current lack, a qualitative or mixed method study would result in a more complete understanding of online learner self-efficacy (Tsai et al., 2011). Since there is also a scarcity of self-efficacy studies pertaining to virtual worlds, it is reasonable to propose that qualitative or mixed methods

of assessment may help provide a richer picture of students' perceived self-efficacy in using a virtual world for learning.

Summary of Literature Review

Virtual worlds are 3-dimensional computer-based programs which allow users to interact with others in the form of "avatars" (visual representations of themselves). Virtual worlds have been shown to be immersive and cost-effective environments for learning (Warburton and Perez-Garcia, 2009; Swan & O'Donnell, 2009), allowing for engagement and immersion (Twining, 2009), customized simulations for educational role-play (Beidatsch & Broomhall, 2010) and an area for student observation and assessment (Jeffries, 2006). Barriers to educational use include student discomfort and a high degree of technical support needed (Warburton, 2009; Kerriemuir, 2010), which can negatively impact student experience (Sanchez, 2009). Providing effective and timely support, training, and resources (Keskitalo et al., 2011) can help mitigate these barriers.

Self-efficacy is a personal belief in one's capability to perform a given task (Bandura, 1977) and is widely regarded as a powerful determinant of human behavior (Maddox, 2009). When it comes to online learning, self-efficacy is important part of student satisfaction as well as perceptions of e-learning's usefulness and effectiveness (Liaw, 2007). Though some research has examined the development of real world self-efficacy as a result of participating in virtual world activities (e.g. Andrade et al., 2012; Ketelhut, 2007), there are few which have examined student virtual world self-efficacy and its relationship to student perceptions of the virtual world's learning value as a teaching method.

According to Bandura (1994), self-efficacy develops in four ways 1) mastery experience (performing a task successfully), 2) social modeling (seeing peers perform successfully), 3) social persuasion (being told that one can succeed) and 4) physiological response (physical response to psychological situations). In computer use, mastery experience is the strongest positive reinforcement of self-efficacy in performing a skill, but social modeling and persuasion are also significant (Antoine, 2011). Anxiety is the most common physiological response which impedes computer self-efficacy in learners (Saade & Kira, 2009). Self-efficacy can be measured with a custom, domain-specific scale which should initially be developed as a result of a pilot study (Bandura, 1997). To be most complete, an assessment of self-efficacy in learners should contain qualitative data such as interviews and observations of the students as well as their instructor, however this type of research is lacking (Tsai et al., 2011).

Qualitative information exploring themes in light of Bandura's four methods of self-efficacy development would help shed light on how learners feel they develop self-efficacy, but there is a lack of research in self-efficacy development as it pertains to virtual worlds for learning. Some researchers have suggested methods to promote Bandura's four means of developing self-efficacy in e-learners, including offering opportunities for mastery experience, promoting vicarious or social modeling, providing a positive atmosphere with adequate, timely support, and reassuring students they are safe (Sivakumaran & Lux, 2011). Designing an instructional scenario which promotes or supports all four of Bandura's means of developing self-efficacy, and asking participants how these various forms of self-efficacy support impacted their development of self-efficacy, would be an ideal, naturalistic environment for such qualitative exploration.

CHAPTER 3: METHODOLOGY

The purpose of the study was to understand the role and the development of self-efficacy in students using a virtual world for learning. This chapter outlines the theoretical framework leading to the research questions and methods used in this study. It goes on to discuss the methods used to select and develop the virtual world simulation and learning activities for the American Studies courses, which led to the pilot study and ultimately the study at hand. This chapter then outlines the methods, research questions, participants and setting, procedures, design, and data analyses used in the study. A summary will follow briefly reviewing all that was discussed.

Selection of Research Methods and Questions

Primary Focus of the Study

The main focus of this study was student self-efficacy in using the virtual world Second Life for engaging in learning experiences. Bandura (1994) has outlined four main sources of self-efficacy (mastery experience, modeling, social persuasion, and physiological response). Therefore, different methods of training and support were employed to help address these four sources (e.g. Antoine, 2011; Sivakumaran & Lux, 2011) with the intention of helping promote the development of student self-efficacy in using the virtual world for class.

The ultimate role of fostering the development of self-efficacy is to facilitate success at a given skill (Bandura, 1982); in this case using the technology successfully for learning. A related research question asked in this study pertained to student

perceptions of Second life's learning value, or whether they deemed it useful to learning about or reinforcing course content. Self-efficacy has been shown to impact perceived ease of use (PEOU), perceived usefulness (PU) and ultimate usage behavior of a technology, according to the technology acceptance model or TAM 3 (Venkatesh & Bala, n.d.). This supports the idea that it is worthwhile to study the impact of self-efficacy upon perceived learning value of technologies used in learning.

Rationale of Research Method Selection

Tsai and colleagues (2011) analyzed 46 studies about self-efficacy in online learning. Finding that most were primarily quantitative, they suggested that qualitative assessment methods would help expand upon existing knowledge (Tsai et al., 2011). This study followed a quan-QUAL design, focusing on an exploration of beliefs, attitudes and perceptions in students using a virtual world for learning. A quan-QUAL design is a mixed-method study design that examines some quantitative data, but prioritizes and focuses more intensely on an in-depth collection of qualitative data (Morse, 1991). The purpose of using a mixed method in this study was so the quantitative data could help describe, identify, rank, categorize, or show change over time, while the qualitative data could help triangulate, expand upon, interpret the phenomena being studied, and provide in-depth descriptions of the subjects' beliefs, attitudes, and perceptions (Greene, Caracelli & Graham, 1989).

In this study, student self-efficacy, and student attitudes and perceptions about learning experiences in a virtual world were explored quantitatively and qualitatively. Self-efficacy is a phenomenon that changes with increased experience (Bandura, 1982). In order to see how self-efficacy may change over time, and to see to what specific

aspects of self-efficacy change, quantitative data will be collected at early and late stages of experience in using the virtual world. Qualitative questions were solicited to gain deeper understanding about how students feel about using the virtual world for learning. The quantitative data served as a measure of self-reported self-efficacy on skills needed to use the virtual world. It also contained demographic information, to help facilitate the selection of a diverse group for in-depth interview.

Since virtual world education is an emergent field and not well studied, the use of exploratory, qualitative methods helped develop a better base of understanding from which to help guide future research. The qualitative information helped triangulate, expand upon, and explain student measures of self-efficacy, but also helped serve as an additional validity-checking measure of the quantitative self-efficacy scale (Pajares and Schunk, 2001). For example, it was expected that students would verbally describe feeling skilled in using virtual worlds if they rated themselves as having high self-efficacy, or vice-versa.

Purpose of the Self-Efficacy Scale

No directional or null hypotheses were presented in this study. According to Bandura (1977), we expected that self-efficacy would increase as a result of repeated exposure and practice with any tool, whether it is using a technology or any other new skill a person can learn. In addition, Hearrington (2010) has shown that self-efficacy in using a virtual world will increase as usage increases. As was predicted by experiences with students from previous semesters, the population being studied (American Studies students of Spring 2012) were new to Second Life, but received in-depth training, tutorials, support, and repeated activities in Second Life. Since the growth of self-efficacy

with repeated exposure to any skill has been verified in other studies too numerous to list ever since Bandura's seminal work in 1977, we realized we would no add any new information to the knowledge base by attempting to prove that self-efficacy does indeed increase with repeated practice and use of a virtual world. However, in case there was no change in self-efficacy, or even a reverse trend in one or more participants, we would consider it informative and seek to explore it further. Regardless of the degree or the directionality of quantitative findings, we intended to use the quantitative self-efficacy reports in conjunction with qualitative student perceptions of using the virtual world for learning, in order to gain deeper understanding of the implications of self-efficacy in the learning process.

Impact of Pilot Study on Expectations

In a pilot study of Second Life teaching methods in American Studies (Stanton, 2010), a wide variety of student attitudes and skill levels regarding Second Life was displayed by participants, as obtained by questionnaires, support data and direct observation. Though almost all students were initially new to the system, some students becoming more visibly skilled than others, with increased usage tending to promote visible skill increase. Additionally, some students expressed favorable views toward using SL for learning, while others were un-favorable about its use. Some students even had mixed assessments of favorability, finding certain aspects of SL worthwhile, yet disliking other aspects (Stanton, 2010).

Due to these previous mixed perceptions, we expected self-efficacy to change in the weeks of becoming familiar with using the virtual world, but were not certain that perceptions about its learning value would follow accordingly. For example, it was

conceivable that some students may find their learning experience was richer or more worthwhile as self-efficacy increased, while others may have had high self-efficacy all along, yet find SL more useful for recreation rather than for learning. We did not wish to make predictions about perceptions and instead wanted to see what arose naturally from the data. Therefore, we specifically focused on the comments students made regarding perceptions of their learning experiences, and reviewed them in light of any perceived differences in self-efficacy between the beginning and end of a semester of using the virtual world.

Research Questions

Learning to use the Second Life system is more challenging for students than other online learning methods (e.g. Sanchez, 2009; Stanton, 2010; Warburton, 2009). However, a wide variety of resources were made available to the students to help nurture their self-efficacy. We anticipated there would be students that displayed a great deal of change in their self-efficacy, or only a small amount of change, or who attributed different processes to the change (whether it was self-guided exploration, training, practice, video tutorials, or support from peers). We expected there would be different sources that students felt promoted or impeded the development of their self-efficacy, leading to differing results in their views. Thus, there were in-depth questions to explore various factors contributing to changes in self-efficacy, in order to see which factors the students focused on, and how they felt about the overall learning experience in light of their self-efficacy. The research questions were as follows:

1. How do students rate their own levels of self-efficacy in skills needed to use a virtual world for learning, after initial exposure and later after repeated use?

2. What factors do students believe influence their self-efficacy?

3. What are the student attitudes and perceptions toward the learning value of using the virtual world?

4. How do students with different degrees of change in self-efficacy describe their attitudes and perceptions toward the learning value of the virtual world?

Research question #1 was addressed with a self-efficacy survey administered early and late in the semester, and results were compared over time. Questions #2, #3 and #4 were explored through thematic analysis of qualitative interview responses, by asking students directly about their perceptions in these areas, as well as through other qualitative data (such as discussion boards) in which students volunteered related information. Quantitative survey information was referenced when appropriate, to help triangulate and explain themes that were identified in qualitative data.

Background of the Use of Second Life with American Studies

Importance of Background Information

It is important to explain the background of the study, in order to justify the rationale for incorporating Second Life as a teaching method in the American Studies courses. This section also helps describe the development of the learning activities, trainings, and simulations the American Studies students used, and how they were chosen and created. The development of the American Studies courses that used Second Life can be considered to be part of the methodology of this study, since the researcher/instructional designer analyzed and purposefully developed the virtual simulations and learning activities used in the study in conjunction with the instructors of the courses. The

development and use of these learning simulations and activities ultimately led to the current research study being described.

Selection of Second Life by Initial Instructor

Prior to use with the two courses being studied, Second Life was first used with a previous American Studies instructor. In early spring 2009, the initial instructor who taught the American Studies 1950s course attended a Second Life workshop, which the researcher had led while employed at the university's Center for Teaching and Learning. In the workshop, the role-playing and experiential learning capabilities of the Second Life program were discussed and demonstrated by the researcher. As a result of the workshop, the instructor began formulating ideas for some specific teaching activities to take place using the Second Life virtual world, in order for her students to virtually "experience" the 1950s as residents in a small 1950s town. The instructor asked the researcher for assistance in the instructional design of the course to incorporate Second Life activities. The researcher approached the task by analyzing the instructor's needs and interests, and seeking ways to address them with Second Life.

The instructor's vision was clear regarding the type of virtual environment she wanted her students to experience. It consisted of the re-creation in Second Life of a complete 1950s small town (i.e. a virtual simulation), where students could experience some aspect of the popular culture of the 1950s. The students would use the simulation for synchronous and asynchronous activities designed to reinforce classroom learning about popular culture of the 1950s (e.g. music, architecture, art, dance, and film) while role-playing how people in the 1950s might react to these cultural components. The corresponding role-playing activities would support class discussions of the motivations,

interests, lifestyle, leisure activities and concerns of people living in the 1950s. Students would be evaluated by observation, participation, and reflections in the form of threaded discussions and essays.

Training and Support

Having previously trained and assisted other professors and students in Second Life, the researcher had a clear idea of training needs for basic utilization of the Second Life system by students. An SL training session was modified from a pre-existing introductory SL training the researcher had already developed for instructors. Agenda items for the face to face student training focused on basic Second Life account creation, access, navigation, communication, appearance modification, finding the 1950s simulation, and acquiring and locating objects in one's inventory. Staff in one of the college labs agreed to equip specific labs for the initial training and for Second Life learning activities. Students would be notified that if Second Life would not run on their home system, they were required to come to the SL-enabled campus lab. The researcher agreed to provide any technical support needed, provided the student first checked the guides and tutorials the researcher created for common questions.

Developing the Simulation

The instructional needs and goals expressed by the instructor included exposing the students to specific 1950s popular music, art, architecture, clothing, and film, so that they would be able to recognize, identify, and discuss these works. Since the researcher already had experience creating content in the Second Life system, it was apparent that all of the items requested by the instructor (including a movie theatre, art gallery, town, cars, clothing, rock and roll café) were either able to be created directly, loaned from

colleagues using Second Life, or purchased from other creators in Second Life for free or for a minimal fee. The researcher was responsible for the overall simulation design and pulling together of separate elements in accordance with ideas expressed by the instructor. A close educational associate from another institution offered the virtual space which could be utilized for the simulation.

Over the course of the summer of 2009, prior to the course's implementation that fall, a virtual 1950s town was developed with all the areas the instructor wanted to utilize, including the theatre, art gallery, clothing stores, and rock and roll café. Initial training and learning activities were finalized, which consisted of 5 separate Second Life sessions as follows:

Session 1: Introductory In-Person Workshop: Basic User Interface

Session 2: Asynchronous group activities and a theatre activity

Session 3: Synchronous virtual class (at home or from lab) - Music and Art of the 1950s.

Session 4: Asynchronous "hunt" to view items from within the simulation for discussion.

Session 5: Synchronous role-play at a virtual dance, exploring music and etiquette.

A series of online and printable videos and PDF guides were created to reinforce these learning activities, and dates were planned for their implementation.

Implementation and Assessment

Due to careful planning, the use of Second Life during Fall 2009 ran fairly smoothly for students, with the usual anticipated problems and technical questions being

addressed promptly by the researcher. The researcher led the training, and then assisted at

later synchronous events to help facilitate smooth operations and address concerns as

they arose. Email questions about Second Life were passed to the researcher to address

on an ad hoc basis.

After the semester's activities were completed, the researcher (in cooperation with

the instructor) asked the students questions about the effectiveness of training,

perceptions about the simulation itself, and the perceived educational value of the Second

Life activities. The main goals of the questionnaire were to improve the simulation and

activities as needed, or even potentially discontinue the use of SL if there was not enough

perceived educational benefit. The students were invited to complete the survey with the

understanding that it would help improve the SL training and course components for

future classes. The paper survey was administered in person to 25 student volunteers, and

included short answer boxes for students to describe responses to the following prompts:

1. Overall impression of training session for using SL: helpful/least helpful aspects.

2. Overall impression of simulation including most preferred/least preferred aspects.

3. Did the Second Life learning activities help reinforce course objectives? Explain.

4. Overall impression of technical aspects of using Second Life.

5. Please summarize your overall impressions of using Second Life for this course.

6. What would you like to see changed or added to the 1950s simulation to make it

   better?

7. Would you like to use Second Life for recreation and/or future courses? Explain.

Though this brief paper-based survey was originally simply for course

improvement, on hindsight it appeared to contain useful information that could

potentially improve the knowledge base for virtual world instruction and training. Therefore, in 2010, the campus's institutional review board approved a request to retrospectively study and publish information gained from the archival end of semester survey. The data was analyzed for emergent themes.

Overwhelming evidence showed that most students found the SL program very difficult to use, particularly for the relatively few times that it was used (Stanton, 2010). The consensus was that not enough time was given in SL to feel secure in its use, and thus to optimally enjoy its learning benefits. However, most students found SL engaging, enjoyed the feeling of being "in the 1950s" that the program afforded, and found it valuable in learning. A strong preference was also expressed for more social activities and less self-guided, asynchronous viewing of content. Students made other suggestions for improvements, such as including sporting and other 1950s-style group experiences (Stanton, 2010). The instructor found the results worthwhile in justifying the continuation of SL for later classes. Student feedback was used to improve activities, including the addition of more social activities such as group sporting events.

After examining the data, it became apparent that there was beneficial information to be gained from such a study, and that future studies could be designed from a more comprehensive, thoughtful, and forward-looking standpoint rather than looking retrospectively at archival data. As a result, the study of the initial 1950s class is considered a pilot study to the current study at hand, since it helped develop and improve the overall instructional processes, research methods, and theories employed by the current study.

Moving Forward with New Instructors

By 2011, the initial 1950s instructor had retired, and two more instructors began using Second Life in their American Studies classes. The next 1950s instructor had the benefit of hindsight from the previous 1950s instructor, so that she and the researcher could improve the use of SL in the 1950s course based on the initial survey and subsequent feedback. Based on the first group's request for more social activities and sports, a sporting event (boxing) was added to the activities, as well as a "Beat generation" (counter-culture of the 1950s) synchronous role-play event. It was expected that these changes would address the first 1950s group's concerns that SL was not used enough for the efforts needed to learn the program. Since the boxing was considered important to the 1950s students, Figure 1 shows what the simulated boxing looked like.

Figure 1: Simulated Boxing in the 1950s Town

The American Studies: The 1930s instructor also opted to use Second Life for her class, using similar elements from the 1950s course (a virtual town, clothing, theatre, art museum, and shops), while bringing in her own learning goals to the program, focusing similarly on art, music, literature, movies, and media of the times. A similar design process was used to create an accurate 1930s simulation. Figure 2, below, shows the downtown area of the 1930s simulation, with some of the shops, period buildings, and cars in the background.

Figure 2: A View of the 1930s Simulation

An important difference between the courses included the fact that while the 1950s course was both in person and online, the 1930s course was fully online, creating challenges for training and support. It was decided that the training would be given

asynchronously via video tutorials and required tasks for students to complete within SL, with a quiz administered to ensure understanding. Several learning activities were planned, including some asynchronous video and audio access, a photographic exhibit, a hobo role-play activity, and another small-group role-play discussion in 1930s character, centered around a 1930s speakeasy (illegal bar during alcohol prohibition times). Like the 1950s students, the 1930s students were asked to reflect upon their SL learning experiences in discussion forums and reflective short essays. Support was also provided by the researcher as needed. After some successful experiences in Second Life, both instructors agreed to have their classes studied for the purposes of this research, and plans were put in place to survey and interview student volunteers from the Spring 2012 semesters for purposes of this study.

<div align="center">Participants and Setting</div>

Participants

The target audience for the study was comprised of approximately 75 to 85 undergraduate students in two American Studies courses: The 1930s and The 1950s, in the Spring 2012 semester. Due to students dropping and adding the course, enrollment varied in the semester being studied, with 36 students remaining in the 1930s class and 42 in the 1950s class by the end of the semester. The courses were estimated to have demographics roughly similar in proportion to the larger 2012 UNC Charlotte student population, with the larger student population being approximately equal in terms of gender and roughly 62% Caucasian, 17% African-American, 6% Hispanic, and the remaining Asian, Pacific Islander, Native American or other (Forbes, 2012). Though

detailed demographics were not known for all the students in both classes, consenting participant demographics were collected and will be described in the results section.

The two American Studies (AMST) courses explored the art, economics, history, politics, music, literature, media, and other cultural aspects of the 1930s and 1950s, respectively. Arrangements were made with the instructors for the solicitation of study participants from their students. All students in the two courses were invited to participate in the surveys, since the use of Second Life was a part of the regular teaching method for all the students in the courses. Expected online survey participation rate was approximately 32%, according to Watt, Simpson, McKillop, and Nunn (2002). Based on an attempt to gain a diverse interview group, survey results were examined for varying levels of self-efficacy and differing demographic backgrounds according to age, ethnicity, and gender. Based on these varying survey results, a representative sub-group of interview participants were deliberatively selected from the survey respondents to provide more in-depth interviews, add rich detail to the findings, and to more deeply explore student perceptions.

Since American Studies is a minor, instructors reported that the students are typically from many different majors, but are usually from religious studies, psychology, political science, history, or similar disciplines. The researcher for this study is a participant as well, having served as the instructional designer and Second Life trainer/support person for the courses for several semesters, including during this study. This gave the researcher an ideal place from which to gain confidence of the students and receive detailed information about their perceptions. Due to having worked with the two American Studies courses (and several other courses) in Second Life for several

semesters, the researcher had gained considerable experience in helping facilitate the use of SL for teaching and learning. The Second Life learning activities, simulations and support methods for American Studies had already been improved over several semesters, per earlier student and instructor feedback (Stanton, 2010).

Based upon experiences with several previous groups, the Spring 2012 American Studies students were comparably cooperative and able to follow directions properly, with few extra prompts required. They demonstrated typical technical skills for undergraduates, including keyboarding, using the mouse, doing word processing, and performing internet searches. However, the interface of the Second Life system (being new to most students according to informal polls), usually takes some familiarization based upon its specific attributes. According to contemporary data on social media (Pew Research, 2013), most adults (66% of all internet users and 87% of individuals aged 18-29) regularly used social media such as Facebook and Twitter, and were therefore aware of how to communicate via social media. Communication skills are useful in the Second Life environment, which also uses instant messaging.

For the study, we assumed at least basic computer, keyboard, and mouse skills, as would be used by any undergraduate during the normal course of taking classes at the University. The American Studies students were therefore familiar with computer basics such as "right and left clicking" of the mouse, using keyboard arrow keys, opening and closing windows or boxes in a computer program, selecting from a menu, and using an internet link (URL). None of the participants exhibited any confusion during the study relating to these basic computer skills.

Using peer support for scaffolding and modeling is in line with the social aspects of Bandura's (1977) self-efficacy theory, and was therefore encouraged. When polled in person at a 1950s class SL training session, none of the students at the session expressed previous experience with Second Life. However, several students said they had used multiplayer games such as World of Warcraft, which has some similar avatar mechanics and tends to facilitate fast adaptation to Second Life. Students with gaming experience or who expressed early comfort in using the virtual world were encouraged to assist other students in the training session, as well to help respond to questions on the SL help forums placed in both courses' class websites. During the interview process, we later discovered that one of the 1930s interviewees had experienced Second Life in an earlier semester, with a different American Studies class. The impact of this experience was found to be influential for that person (as will be discussed in Chapter 4).

Due to past experiences as well as the literature review, we expected some students to be initially apprehensive about using SL. To help alleviate discomfort, all reasonable efforts at providing ongoing assistance and prompt support were offered throughout the semester. Student requests for assistance were considered significant enough to be reported and inquired about during in-depth interview. Any subjects referencing either prior gaming or Second Life experience as a factor in their self-efficacy for the American Studies SL activities were also deemed informative.

Additional assumptions included the expectation of English proficiency on the part of international students in class; at least sufficiently proficient to complete class assignments. It was also assumed that there would be no known disabilities amongst the target population that would require special assistance or accommodation. However, if

disabilities were present in the participants, every effort would be made to accommodate them by working in conjunction with Disabilities Services as needed. Many types of disabilities can be accommodated in the Second life environment, and some disabilities are not restrictive in that environment. Should a person with disabilities have been encountered, he or she would have been solicited for an interview, since the information gained from interviewing that person would have been very informative to how students with different abilities develop self-efficacy in virtual worlds. Regarding other participant demographics; some literature (e.g. Venkatesh et al., 2003) had mentioned age or gender as being potentially influencing variables in technology acceptance, though none have made a case for ethnicity. We did not particularly expect gender, age or ethnicity to be influential in the development of Second Life self-efficacy; however, male and female participants as well as different ethnicities and age groups were sought for interviews, to help ensure the test sample contained a variety of persons with diverse backgrounds.

Setting

The activities being focused on for this study occurred primarily in the virtual world Second Life. The 1930s course was a fully online course, though the students were essentially on-campus students who came physically to campus for other courses (giving them access to labs and support on campus). The 1950s course was a blended course of mostly traditional lectures supplemented by online activities. Both courses also had assignments (such as discussion forums) in Moodle, an online course management system. The Second Life activities were similar for each class, and were only a minor portion of class activities. Attempts were made to get an equal number of students from

each class for an interview, to see if any differences arose as a result of one course being blended and the other being fully online.

During the semester, there were several learning activities which took place in simulated 1930s and 1950s towns in Second life. Prior to the learning activities, several training resources were provided to the students in the form of online tutorials and guides. The 1950s course had benefit of in-person training in an on-campus lab, since the instructor allowed this to be scheduled into the course. The trainer (also the researcher) was able to directly observe the 1950s students completing the in-person training. In lieu of in-person training, the 1930s students were required to watch training videos and take a subsequent quiz in order to ensure they had taken the asynchronous training. Since the researcher could not physically observe whether the 1930s students logged in to Second Life to perform activities requested in the online training, attendance was taken virtually for the 1930s students with the aid of scripted devices which register avatar presence at the 1930s location.

Training topics for both the 1950s in-person and 1930s asynchronous training covered the same skills needed for engaging in the courses, from creating one's avatar to navigating the virtual world. The training materials had already been developed, tested, and refined based on student feedback over several semesters. Self-paced online and electronic tutorials remained available for all students in both courses for the semester. Technical support was provided on an as-needed basic to all students in both courses. In addition, the students in each course were able to request meetings with the trainer for more in-depth support, either virtually in Second Life or in-person in a lab on campus. Any utilization of support was considered informative and something to be explored

further in the in-person interviews. Any self-reports of student experiences as a result of taking online versus in person training was considered informative as well.

After the initial training, the students had a series of several activities in the 1930s or 1950s simulation during specific weeks of the course. These learning activities, which were developed and refined over several semesters based on student and instructor feedback, consisted of explorations and multimedia access, as well as social role-playing with other students in the character of a person from that decade. Students were encouraged to do some Second Life activities in groups of 2 or 3, to help facilitate a social experience and encourage scaffolding in accordance with Bandura's 1977 self-efficacy theory. Each instructor employed similar yet slightly different learning activities, and as a result, differing responses to the various learning activities were considered informative and worthy of reporting. Each SL activity usually had an associated discussion, writing or other assignment associated with it, conducted in Moodle. The students were aware that the instructional designer (the researcher) had access to Moodle information such as discussion boards. Many of the discussion topics involved perceptions of the SL learning activities; therefore, the information collected in Moodle was considered informative and was solicited for additional qualitative information to help triangulate other data.

Learning Activities

The SL learning activities common to both courses were as follows:

1. Entering the virtual world and obtaining and putting on the 1930s or 1950s clothing provided.

2. Exploring different areas of the simulation.

3. Entering the art museum and viewing art or photographs of the decade.

4. Entering the movie theatre and viewing film clips of the decade.

5. Entering the nightclub and socializing and dancing with other students, while acting in the role of a person of that decade (with period clothing and customary lingo).

Some activities differed based on the needs of the course, requests of the instructor, or differences in the era. For example, the 1950s students had social activities related to beatnik poetry, rock and roll culture, and boxing, while the 1930s students had learning activities related to radio programs, films, comic books, and gangster culture of the era. The 1950s students had some scheduled in-class opportunities to complete some of the learning activities synchronously as a class in the computer lab, with the option to log in from home. Use of a computer lab for 1950s class activities depended on the instructor allotting class time for this purpose and the SL-enabled lab to be available. The 1930s students were assumed to complete SL learning activities primarily from home, though they were able to come to the SL-enabled lab on campus to work on activities asynchronously as needed. There were more social, synchronous SL activities in the blended 1950s class, and there were more asynchronous, self-guided SL activities in the fully online 1930s class. Any differences in perceptions between students in the fully online and blended courses resulting from differences in format or learning activities were considered informative from an inquiry standpoint.

It should be noted that similarities and differences that existed between the courses were not limited to differences in how Second Life was utilized, or the fact that one course was online while one was traditional with online components. Other

differences, such as different decades being explored with very different events and subject matter, different instructors with distinct personalities, and differences in learning activities outside of SL occurred in both classes. It is not possible to separate out all the ways in which these other factors may have impacted student perceptions of the learning value of SL. However, none of the students seemed unclear during the interview phase that the subject matter was the Second Life component of the course, and the survey questions were plainly worded as relating to Second Life skills. Nonetheless, Table 1 below summarizes some of the key similarities and differences to keep in mind, as they may have consciously or even sub-consciously influenced student perceptions.

Table 1

Differences and Similarities between American Studies Courses

	1950s	1930s
Class Format	Traditional, enhanced with online components	Fully online, though not distance education (students are local)
SL Training	In-person	Fully online
Computer Access	Mainly in campus lab	Mainly at home
SL Support	In-person or online	In-person or online
Course Topic	1950s art, culture, and events	1930s art, culture, and events
SL Learning Activities	Mostly social, synchronous, with 4 major social activities	Mostly individual, asynchronous, with one social activity
Role-play	Used clothing & lingo 3 times	Used clothing & lingo 1 time
Key Topics studied in SL	Art, Music, Film, Poetry, Sports, Beat Generation culture, Rock & Roll music, Fads, Boxing, Dancing	Art, Photography, Film, Comics, Literature, Radio programs, Presidential addresses, Great Depression, Prohibition
Instructor	Mature, English background	Younger, Literature background
Related Learning Activities	Discussion Forum, Essay in Learning Mgmt. System	Discussion Forum, Essay in Learning Mgmt. System

Procedures

The procedures for the study involved the following:

1. Online surveys conducted in Survey Share were delivered toward the beginning and the end of the semester. Based on polls of previous semesters, it was assumed that most students would not have had any prior experience in Second Life, so the initial survey occurred soon after the first training in order to assess initial reactions to the virtual world. The second survey occurred after the students had most of their Second Life activities in the course, and were more experienced with SL. The surveys contained demographic data and Likert scale items that measured changes in various aspects of self-efficacy. The survey timing was dependent on the amount of virtual world activities completed and when the instructors felt that it would be acceptable in light of their teaching needs and schedules.

2. The survey results were collected, and students with varying levels of self-efficacy as well as varying demographics were solicited for in-depth interview. The purpose of collecting demographics was for descriptive reasons, for linking data, and to find an interview group with diverse backgrounds and levels of self-efficacy scores. The interview was conducted in person, with a deliberative small sample of eight individuals (four from each class).

All of the approximately 80 students in both courses were invited to participate in the survey. To be eligible for interview however, the students had to participate in both the earlier and later self-efficacy surveys. From these survey participants, several students of varying backgrounds and characteristics were selected from each course for a more in-depth personal interview, to ask specifics about their attitudes and perceptions of using a

virtual world. Though no incentives were offered for survey participation, a Visa gift card of $20 was offered for the approximately one hour interview. In addition to the surveys and interviews, the instructors were solicited to be interviewed for their perceptions and for triangulation purposes. Observations were also made of the in-world Second Life behaviors and questions that the students posed to the trainer or instructor about Second Life.

To further document behaviors in Second Life, screen captures of the learning activates were taken from within Second Life. Logs of SL class discussion activities were also saved. Moodle class discussion boards and other relevant Moodle data from consenting study participants were used as triangulation information if deemed appropriate (i.e. applicability to the research questions). It is important to note that final class grades were not considered, since the Second Life activities were only a small percent of course activities, making it too difficult to assess whether the SL learning activities impacted grades. The study this did not explore how using Second Life might lead to better grades in class. The more important items of interest to this study were student self-efficacy in using the virtual world, and student perceptions of its learning value.

<div align="center">Survey Development</div>

Initial Survey Development

As Bandura (1997) describes, there cannot be any all-purpose measure of self-efficacy, and it should be developed according to the specific learning challenge encountered by those being studied. However, other scales were examined in case a similar scale existed that could be used as a starting base. After reviewing similar scales,

the computer self-efficacy (CSE) scale by Brown (2008) was settled on as a starting base

for the Second Life self-efficacy scale, since it had the most applicability to the study at

hand. The scale measured general computer skill with hardware, software, and internet.

Brown's survey questions (Appendix A) used a 6 point Likert scale ranging from

"completely agree" to "completely disagree" with no "neutral" midpoint. The

justification for having no midpoint on a scale is to avoid the tendency for neutral

response. The Likert items were modified from Brown's wording to "strongly agree" and

"strongly disagree" in order to be less stringent.

Since the existing Second Life training materials had already been refined over

several semesters to ensure that all the important Second Life skills for American Studies

were covered, they were reviewed for content and then compared to the Brown scale.

Almost all of Brown's items needed some revision in order to be more in line with the

American Studies Second Life training content (revised questions also in Appendix A).

Fourteen of the items on the scale appeared to be easily modified for use with Second

Life. For example, Brown's "Installing a software program correctly" was modified to

"Installing the Second Life program correctly". Other questions such as "using a floppy

disk" were not appropriate to the Second Life training program and were simply

removed. After reviewing training materials, additional questions were added to ensure

that all the main skills covered in the Second Life training were also covered in the

survey. Bandura (2009) states that the items in a custom self-efficacy survey should

include challenges that need to be overcome to achieve the desired behavior, and the

training was specifically designed and refined over multiple semesters to address all those

challenges; therefore, the training content was deemed the best resource from which to

draw survey questions.

Content Validity

After an initial draft was created of the survey, it was sent to an expert peer reviewer with over four years of experience in developing and implementing educational programs in Second Life, for his input and for content validation. The reviewer was also familiar with the American Studies students and had led a Second Life training with a previous semester's class, when the primary trainer (the researcher) was unavailable. Additionally, the peer reviewer had considerable experience in developing Likert scales for other educational purposes. The peer reviewer was asked for his ideas on wording modification for optimal coverage of content, as well as for student usability. The reviewer was in general agreement of the content of the questions but had some suggestions for slight wording changes for improved comprehensibility, which were then incorporated. As a result of discussion with the other Second Life educational expert, some questions were modified, two were added based on reviewing Second Life tasks for the courses, and a question about previous gaming experience was removed, as it was suggested that it may not be relevant to Second Life skills.

To give the survey expert credibility in the area of self-efficacy, the survey was then reviewed by a college educator/educational researcher with over 10 years of research and expertise on the topic of self-efficacy in learners. The self-efficacy expert modified the wording of the Likert items to be more in line with active skills and tasks. For example, anything that asked about "knowing how to use" something was changed to "using" as appropriate. Additionally, though Brown (2008) had used "I feel confident in" as a preface to all questions, the self-efficacy expert suggested re-wording that

introductory phrase to "I feel I can perform the following tasks very well", to ensure that the student was self-appraising his own skill level rather than his self-confidence level, in order to be more in line with self-efficacy theory (Bandura, 1977). Some questions which only covered internal thought processes were removed entirely, so that the test would only measure self-efficacy in performable skills. By the end of the revision process, the test bore little resemblance to Brown's 2008 survey; therefore, no claims of similarity in reliability or validity measurements per Brown's instrument can be made.

Student Usability Testing

Next, the survey was tested for usability and content accuracy with two students. Two student volunteers similar to the American Studies student population (a 24-year-old male architecture major, and an 18-year-old female theatre major) were given the same Second Life training that American Studies students received, which covers all of the skills listed in the survey. The students were separately given the self-efficacy survey as a written survey. Each student was asked to verbally "think aloud" while taking the survey, in case there were any questions they did not understand, or if they were being asked to evaluate their self-efficacy in a skill they had not been exposed to during the training. The students agreed that the questions were understandable and comprehensively covered the variety of skills they were taught in the training, so no additional changes were needed. Appendix A contains the earlier versions of the survey, while Appendix B contains the final version.

In addition to several questions regarding demographics and course information, the final version of the survey ultimately contained 25 questions about various skills performed in Second Life for the American Studies classes, such as accessing and

navigating through the course locations, dressing their avatar in period clothing, and using various aspects of the Second Life interface to perform their assigned learning activities. All questions are the same for both the 1930s and 1950s class, except one question which is specific to the 1930s class only (where students had to virtually register their attendance on "welcome mats" in SL for their asynchronous activities). This is different because the SL attendance-taking task was only used with the 1930s class per wishes of that instructor, whereas the 1950s class attendance could be directly observed in the lab. All questions specifically answer research question 1: "How do students rate their own levels of self-efficacy in skills needed to use a virtual world for learning, after initial exposure and later after repeated use?". Answers (with the exception of the attendance question) were compared both before and after for each class and the classes combined, in order to measure changes in self-reported self-efficacy over time. After its delivery to participants, reliability tests were also performed to assess internal consistency of the items, which all measured the same general construct (i.e. self-efficacy in using Second Life).

Reliability and Validity

After the results were collected, reliability tests were performed on the data, separately and for test-retest reliability. Each survey was first tested separately using the Cronbach's Alpha, which is used to see how closely that items on a measurement scale are related as a group. The reliability for the pre survey is .92 and that for the post survey is .85, which indicate that the test had good reliability. The test-retest reliability was measured using the Pearson Correlation, which measures how reliable a test is over time. The Pearson Correlation (two-tailed) was .48, with a significance of .013 (therefore

significant at less than the .05 level). Steps to ensure validity were taken during the design phase, but it is noteworthy that the results showed a significant gain from pre-to post self-efficacy, which helps confirm assumptions about self-efficacy increasing over time with repeated use, and lends support to the scale's validity (Bandura, 1977).

Survey Expectations and Limitations

The survey was meant to measure the initial (after 1st training) and late (at end of semester) self-efficacy in students using Second Life skills in these American Studies courses. The scale items demonstrated face validity and expert validity, since they closely followed the training, and were subjected to both Second Life expert and self-efficacy expert review. Additionally, two student volunteers pilot-tested the survey for usability and content comprehensiveness, and they agreed the survey was understandable and adequately covered the skills they had learned in training. The two student volunteers who usability-tested the survey were not able to be re-tested, due to not being in the American Studies courses or having had a semester's use of SL (as the actual subjects would.) However, reliability and validity tests were conducted once data was collected.

According to Bandura (1977), we fully expected that students would show increased self-efficacy by the later measurement, particularly since they would have had several successful (i.e. "mastery") experiences in SL. However, this study did not attempt to prove that students would have increased self-efficacy with increased use, since this general trend or phenomenon has been studied already and would not be informative. Additionally, Hearrington (2010) already previously showed that self-efficacy in using a virtual world increases as usage increases, so we had no reason to expect otherwise with this group. However, if something unexpected occurred (e.g. a student actually reports

lower self-efficacy later in the semester) it would be considered an opportunity for further inquiry.

Since as Bandura (1997) mentions, a self-efficacy survey should ideally be custom designed for the skills it is measuring, the survey created for this study is not generalizable to other groups. There are countless ways to use Second Life, and it is likely that other college courses will not use Second Life in exactly the same manner used by the two American Studies courses. This study focuses on student beliefs about their own self-efficacy, rather than attempting to make any predictions from it. We are allowing themes to naturally arise with the interview, which is the primary focus of the study. The self-efficacy survey for this study was developed in order to examine subjects with different levels of self-efficacy during the interview process.

Relationship of Survey to Interview

In the pilot study, students in American Studies displayed a wide variety of skills and attitudes toward Second Life, with varying (and sometimes mixed) expressions of favorability toward its educational use (Stanton, 2010). We also know from Bandura (e.g. 1977; 1997) that people tend to develop self-efficacy in different ways, for different reasons, and at different rates, with some individuals displaying higher self-efficacy than others, so we expected that there will be differences in self-efficacy scores in the American Studies students. Also in accordance with Bandura (2009), we expected that those who rated themselves as high or low in self-efficacy would have other differences, but at early stages in research we did not know what those differences would be. We were therefore most interested in allowing a naturalistic emergence of qualitative themes to develop from interviews with people who self-rate themselves as higher or lower in

self-efficacy, or those that change to a greater or lesser degree between earlier and later measurements. Information gained may be useful in guiding future research.

Interview Development

Based on the research questions, a series of interview questions was developed, with several questions aimed at illuminating each of the main research questions. Appendix B shows the interview questions grouped by the research question they support. The interview questions were subjected to expert peer review by the Second Life specialist and the self-efficacy specialist. The questions were designed to probe student perceptions of various factors (internal and external) that could influence their self-efficacy in using the virtual world, and to probe student beliefs about Second Life's learning value. A few modifications were suggested by the self-efficacy specialist in order to be consistent with self-efficacy theory and also to ensure the questions were not leading. An instructor interview was designed based on the student interview, covering similar topics but from the instructor's perspective. Unfortunately, one instructor was unable to interview with the researcher, making the other instructor interview not useful due to an imbalanced perspective, and leading it to be removed from the data set.

The researcher designed the interview so that the main questions would be asked as written, but would also allow the interviewee to freely comment on what she or he felt was relevant to the questions, giving the researcher a chance to ask spontaneous follow-up interview questions. Any follow-up interview questions were conducted in a naturalistic way, based on information volunteered by the participants that was deemed relevant to the research questions. Answers that were overly off-topic were gently guided back toward the subject at hand. During the interview, the researcher occasionally

reflected back her understanding of the subject's responses, to ensure that she understood any unclear statements or to gain clarification.

Appendix B contains the survey questions, while Appendix C contain the student interview questions. The interview questions were designed to address research questions 2: "What factors do students believe influence their self-efficacy?" and 3: "What are the student attitudes and perceptions toward the learning value of using the virtual world?". To answer these questions, students were probed about the factors that they felt influenced their level of skill (e.g. trainings, help-seeking, personal characteristics or internal motivation), and the perceptions students had about the learning value of the activities they performed in Second Life (e.g. perceptions about specific learning activities, how SL use may have impacted understanding of course content, whether their efforts in learning SL were worthwhile for the course). Research question 4: "How do students with different degrees of change in self-efficacy describe their attitudes and perceptions toward the learning value of the virtual world?" were answer by holistically look at each interview subject's data, including their interview answers, support data, course discussion board comments and survey answers, and seeing if there were any observable connections that could be made between individuals who tend to have different levels of self-efficacy in using SL and any perceptions they have expressed about using it for learning.

<div style="text-align:center">Data Analysis</div>

Initial Analysis

Data were analyzed primarily qualitatively, with quantitative information being used to help describe participants and also to illuminate qualitative findings. The

quantitative data was initially explored for any obvious trends and outliers, and

descriptive statistics were recorded. Changes from early to late self-efficacy scores were

compared with dependent t-tests. Student self-efficacy rating, as well as degree of change

in self-efficacy, are reported in table form for each participant. Trends in variation were

documented with a mixed analysis of variance. Students with varying levels of self-

efficacy were solicited for in-depth interview, with a diverse group being deliberatively

sought for questioning about attitudes and self-efficacy beliefs, to see if anything

different is at play in different people. Since the study is exploratory, the data were

examined holistically, without expectations for trends, in the desire to see which trends

and themes actually emerged.

Thematic Analysis

Qualitative content was hand-coded for repeated themes (a theme being a topic or

keyword that is mentioned frequently by the interviewee, or by more than one

interviewee). The data were analyzed for themes within and between subjects. All open-

ended and interview data were transcribed for hand-coding. A spreadsheet was used to

help organize the qualitative content, which included interviews, images, relevant

assignments, and support data. Any pertinent communications by participants were added

to the data mix. The constant comparative method (Glaser & Strauss, 1967) was used to

search for themes. This coding method for qualitative data involves reviewing the data

line by line, interpreting the responses, adding memos, searching for themes or

commonalities generated, then going back and re-analyzing the data to further categorize

and create more consistency in the coding until there is no new information that can be

added - a point called saturation (Strauss & Corbin, 1990). The overall goal was to

summarize the experience of the subjects in the most authentic way possible.

Data Security

All data were kept digitally and securely behind password protection in online

virtual storage. For illustrative purposes, digital computer screenshots were taken of the

virtual world software, avatars and/or virtual simulation used in the course, but they did

not contain any identifying information. Surveys were taken online and did not collect

real names. Survey data was linked by avatar login name, which is a self-chosen

pseudonym and not the person's real name. The principal researcher securely maintained

a database of avatar login name and real name that were voluntarily shared by

participants with their instructor and researcher only, and not shared with others. The

avatar name/real name database was used for purposes of soliciting interviews and

linking data. The interview audio was recorded for ease of transcription; however the

audiotapes were not kept after transcription to text.

Once the data were linked, codes or pseudonyms were put in place of any

indentifying information. Identifying information connected to survey or interview data

was not shared with the instructor nor included in the final report. Upon completion of

the study, all indentifying information were destroyed by digital deletion. Demographics

such as gender or age were collected voluntarily for descriptive statistical purposes and

linking data, and were not connected to identifying information. For the fully online

1930s class who would not be observed in the lab at any time, a log was maintained of

access to the virtual simulation by avatar name, to verify participation. The researcher did

not collect or view student grades, as they are not relevant to the study. Paper-based data

such as signed consent forms were kept in a locked cabinet in a room not accessible to others outside of the researcher.

Additional Analysis

Images were collected to help catalog and clarify responses as needed. For example, if a student commented on something specific within Second Life, an image of that interface or area of the simulation could be provided, if helpful in showing what the student was discussing or to clarify any thematic content derived from the data. To derive themes, open coding was initially used to pull themes from the content, and then axial coding was applied to combine common themes until no further reduction was possible. Themes were put into categories based on self-efficacy theory (Bandura, 1977). The themes were then reviewed by an outside expert in online teaching and learning who had several years of teaching experience in Second Life, and she had no concerns other than minor wording changes. Each theme was given a temporary alphanumeric code, and then they were re-applied back to the raw data in order to double-check their accuracy of fit. Thematic frequency was counted per person and per class, and was tabulated and described according to similarities and differences. Literature was once again reviewed to help explain and confirm results, particularly literature pertaining to self-efficacy.

It should be noted that since this is an exploratory study with a very specific group, who were subjected to a specific learning activities and a customized educational simulation, some results will not be able to be generalized far beyond the group. However, some general trends emerged that could have broader professional impact, and some possible areas for future study were able to be identified. The areas of potential

interest to researchers and educators will be described in the final chapter, in the form of possible suggestions for professional practice.

Summary of Methodology

The purpose of the study was to understand the role and the development of self-efficacy in undergraduate students using a virtual world for learning. The researcher sought to answer how self-efficacy changed in college students using virtual worlds, what students thought contributed to their change in self-efficacy, and how attitudes and perceptions toward using the virtual world differed in people with different levels of self-efficacy. The study was both qualitative and quantitative, with an emphasis on qualitative findings. A Likert scale measured self-efficacy in Second Life skills, at early and late stages in the semester. The scale was based loosely on an existing computer self-efficacy scale, and modified in light of specific Second Life training topics. The scale was subjected to expert validation measures and student usability tests before its implementation, and was subjected to reliability testing afterward. The interview questions were designed to illuminate the research questions, and were based on students' perceptions about their self-efficacy and perceived learning value of Second Life. Additional data such as relevant student essays, class discussion forum posts, and support information was collected as appropriate.

The majority of data collected was qualitative; however, the quantitative information was used for descriptive purposes, to show trends, and to help illuminate the qualitative data. Supplemental data such as support discussions, relevant assignments, and class discussion forum answers were also added to the data mix for triangulation purposes, and to help shed further light upon findings. The texts of interviews and other

qualitative data was hand-coded for emergent themes. Once themes were derived,

quantitative data were re-analyzed as appropriate, depending on thematic trends.

Implications for professional practice and future research were made based on findings

from this exploratory study.

CHAPTER 4: RESULTS

This study is a quan-QUAL mixed method study, with an emphasis on the QUAL (qualitative) portion. The data collected from the American Studies 1930s and 1950s classes was 2-tiered, with the first tier being the self-efficacy survey offered to the full group of students from each class, and the second tier being the qualitative data (interviews, support requests and class discussions) collected from a smaller group of 4 students per class. The purpose of administering the self-efficacy survey to a larger group of students was to get some basic demographic and self-efficacy information from the broader pool for comparison purposes, and to develop a population from which to solicit interviewees for more in-depth information.

Though we gained interesting information from the wider pool of student self-efficacy information, and confirmed some basic assumptions about self-efficacy increasing over time, our primary focus is on interviewee self-efficacy, examined holistically in conjunction with the perceptions the smaller group expressed during their interviews. In other words, the quantitative data became more informative when the students were able to explain their feelings and thoughts about it. The first part of this chapter discusses the quantitative data from the self-efficacy survey administered early and late in the semester, while the second part examines the qualitative data from interviews and class discussions, for emergent themes in light of self-efficacy theory. The surveys and interviews were designed to answer the four research questions, as follows:

1. How do students rate their own levels of self-efficacy in using a virtual world for learning, after initial exposure and later after repeated use?

2. What factors do students believe influence their self-efficacy?

3. What are the student attitudes and perceptions toward the learning value of using the virtual world?

4. How do students with different degrees of change in self-efficacy describe their attitudes and perceptions toward the learning value of the virtual world?

The survey, administered to 26 participants in both the AMST 1930s and AMST 1950s classes, answers Research Question #1 by showing how the American Studies students rated their self-efficacy on a "Pre" survey, administered just after their Second Life initial training early in the semester, and a "Post" survey, administered after their last Second Life learning activity later in the semester. The other three research questions will be answered with a mix of qualitative information, consisting of primarily interview data, supplemented with support correspondence, and relevant coursework (mainly discussion forum answers and reflective essays) from the 8 interviewees.

Research Question #1: Responses to Self-Efficacy Survey

The survey was designed to measure pre-and post self-efficacy in American Studies students, based on actual skills the students performed as a part of their Second Life activities for the 1930s and 1950s classes. The responses and their subsequent analysis answer Research Question #1: How do students rate their own levels of self-efficacy in using a virtual world for learning, after initial exposure and later after repeated use? An in-depth description of the processes used to design and test the survey can be

found in Chapter 3, and the survey itself can be found on Appendix B.

Survey Participants

Participants in the survey were 26 undergraduate students in the American Studies 1930s and 1950s classes, aged ranging from 19 to 54 ($M = 19.6$, $SD = 2.54$). To qualify as survey participants, student had to take both the earlier ("Pre") and later ("Post") surveys. Students were solicited via email and class announcements, with the assistance of the instructors. Out of a total of 79 students in the two classes, 26 of them took both surveys, for a 32.9% response rate. The survey population was comprised of 19 females and 7 males. 11 students were in the 1930s class, and 15 students were in the 1950s class. Students identified their ethnicity as 18 White, 7 Black, and 1 Hispanic. Due to having few minorities and a small sample size in general, we classified Black and Hispanic together as non-White for ease of analysis purposes. Based on the literature review and previous experiences, we did not expect any differences in self-efficacy due to age, gender, class, or ethnicity, but we tested these factors in case of unexpected results. We did have expectations of a general increase in self-efficacy from pre-to post test, based on the assumptions of well-established self-efficacy theory (Bandura, 1977).

Self-Efficacy Survey Scores

The 1930s and 1950s participants were surveyed after their initial SL training, and again toward the end of the semester, regarding their self-efficacy in using Second Life for class. We did not survey them before their training, since most were not experienced in SL and would have probably not even understood the questions, as the terminology was often very specific to SL. For the self-efficacy measurement, students were shown 26 statements (Appendix B) regarding different Second Life skills, and were asked to rate

their level of agreement on being able to perform that task very well on a Likert scale of

1-6 (with 6 being the best).

Scores According to Demographic Groups

Table 2 below displays the full survey group's demographic characteristics, along

with self-efficacy scores for each sub-group.

Table 2

Self-Efficacy (SE) of Survey Group and Sub-Groups

Variable	N	Percent	Pre SE M (SD)	Post SE M (SD)
Gender				
Male	7	26.9	4.90 (.52)	5.33 (.49)
Female	19	73.1	4.55 (.82)	5.08 (.56)
Class				
1930s	11	42.3	4.89 (.62)	5.17 (.48)
1950s	15	57.7	4.52 (.83)	5.10 (.60)
Ethnicity				
White	18	69.2	4.67 (.74)	5.22 (.48)
Non-White	8	30.8	4.59 (.85)	4.99 (.67)
Total Participants	26	100.0	4.68 (.76)	5.13 (.54)

Repeated Measure Analysis of Variance (ANOVA)

Mixed ANOVAs, both within subjects and between subjects over time, were

chosen so that we could compare differences in the mean of Pre-and Post SE tests

between sub-groups. We initially attempted to perform an ANOVA with the dependent

variable (DV) of self-efficacy, and the independent variables (IV) of class, gender,

ethnicity, and age. In this attempt, the Degree of Freedom (df) was zero for Mauchly's

test of sphericity, violating the assumption of sphericity for the more complicated model.

Therefore, we chose simpler models by testing a small group of independent variables at

a time, both over time and individually, so that the assumption of homogeneity of

covariance matrices could be met. Besides time, our independent variables were classroom (1950s or 1930s), age, gender, and ethnicity (white or nonwhite).

The first ANOVA was conducted to see if the students in both the 1950s and 1930s classes increased in self-efficacy over time, with time being the independent variable. For this model, the assumption of homogeneity of covariance matrices was met ($p = .70$). There was a statistically significant difference between pre- and post-self-efficacy reported; F (1, 24) = 10.01, $p = .004$, and partial $\eta2 = .29$, which is a large effect size according to Cohen (1988). This means that students in both classes significantly increased in self-efficacy over time, as would have been predicted by Bandura (1977). We tested to see if there was a significant difference based on the variables of classroom, age, gender, or ethnicity. We also tested to see if there was an interaction between time and those variables. There were no significant differences due to those variables, as shown on Table 3. This means that all groups increased similarly in self-efficacy from pre-to post.

Table 3

ANOVA table: Differences based on Classroom, Age, Gender and Ethnicity

Variable	F	η2	p
Classroom (1950s vs 1930s)	.976	.039	.333
Classroom X Time	1.218	.048	.281
Age	.626	.028	.437
Age X Time	.014	.001	.908
Gender	1.441	.061	.243
Gender X Time	.118	.005	.735
Ethnicity	.378	.016	.545
Ethnicity X Time	.280	.012	.602

None of these results were found to be statistically significant at the .05 alpha level

Though there are no *statistically* significant differences in the changes over time between the two classes, a somewhat different trend was noticed between the 1950s and the 1930s classes when examining the graph of the self-efficacy increases over time per class. In Figure 3, below, one can see that the 1930s class starts out higher in self-efficacy than the 1950s class, but did not display as strong of a degree in change as the 1950s class. It is possible that the 1930s students practiced more, as a result of needing to take a quiz to ensure understanding of the self-guided training. It is also possible that since they had less highly immersive activities, they were not as challenged by their Second Life activities. Though the 1950s class starts out and remains a little lower, they made greater overall gains in self-efficacy over time. This is possibly because they were more immersed and active in Second Life, and had more SL activities. These classroom trends became more noticeable in the interviewees, and will be discussed further in the section discussing research Question #4, below.

Figure 3. Self-Efficacy Increases Over Time in 1930s and 1950s Classes

Interviewee Self-Efficacy

The interviewees were the eight students that responded affirmatively to a solicitation for interview – thus they were a self-selected population. Initially a deliberative method was employed, to select certain individuals with diverse responses and characteristics. There were challenges in finding students willing to take the time to interview toward the end of the semester, therefore, attempts at gaining interviewees continued with solicitations sent to all the qualified students in both classes, until there was the desired amount of 4 students per class. As a result, the 8 interviewees were not as deliberatively selected as desired, which can be seen as a limitation of the study. A diverse group of 8 students was nonetheless ultimately gathered for interview purposes.

Since the interviewees are the subject of this study, we wanted to look at their self-efficacy scores and later expand upon their feelings of self-efficacy with in-depth interviews. Table 4, below, shows the Pre SE and Post SE Means and Standard Deviations for the interviewees, along with the percent change from Pre-to Post. The table does not show the individual scores for the 18 students not participating in an interview, since the interviewees are the primary focus of this study. However, we listed their cumulative score for reference, below the table.

For purposes of describing results, and to make it easier to identify and discuss different interviewees, the interviewees will be referred to as their SL avatar names for the remainder of this chapter. The students are listed by course, then by percent change in self-efficacy. Gender, age, and ethnicity are shown as well, to get a sense of the diverse makeup of the interview group. It should be noted that the interviewees' avatar names are pseudonyms, and are different from their real names.

Table 4

Self-Efficacy of Interviewees: Pre, Post, and Percent Change

SL Avatar Name	Gender	Class	Age	Ethnicity	Pre SE M (SD)	Post SE M (SD)	Percent Change
Cattara	F	1930s	37	White	5.67 (.48)	5.62 (.58)	-0.89
Hennroc	M	1930s	41	Black	5.62 (.65)	5.58 (.58)	-0.71
RecessionProof	M	1930s	28	Black	4.71 (1.40)	4.71 (1.04)	0.00
SCoach	F	1930s	54	White	5.08 (.78)	5.54 (.78)	+8.66
Lady41	F	1950s	19	White	5.58 (1.06)	5.71 (.62)	+2.30
MrLeroy	M	1950s	19	White	4.33 (1.17)	4.87 (.90)	+11.74
Wolfpacker89	F	1950s	22	White	3.96 (1.27)	4.50 (.98)	+12.77
Lila	F	1950s	19	Black	5.00 (.66)	5.71 (.90)	+13.26

Though some of the interviewees remained relatively (or even perfectly) constant from Pre-to Post-Test, the SE score for the interview group of 8 students as a whole increased from pre-test (M = 4.99, SD = .63) to post-test (M = 5.28, SD = .50), with a cumulative SE increase of 5.65 percent. The non-interview group of 18 students also increased in SE scores from pre-test (M = 4.53, SD = .78) to post-test (M = 5.06, SD = .56), with a cumulative SE increase of 11.053 percent.

Summary of Quantitative Data

The survey was useful for getting demographics of participants and also to measure their self-efficacy at early and late stages of using Second Life for class. It also was useful in finding a population from which to interview a smaller group of four students from each class. The survey was tested for reliability, and ANOVAs were performed so that we could compare pre and post self-efficacy differences in the full group and different sub-groups. There was a significant different in self-efficacy from pre to post for both classes as a whole, but different variables such as age, gender and ethnicity did not significantly impact the changes in self-efficacy.

Qualitative Data and Analysis

The next sections describe the coding and analysis of the interviewee answers, discussion forums, relevant assignment answers, and support correspondence, in order to answer research questions 2, 3 and 4 (listed on page 83). First, the theme coding process is discussed, and then relevant results that pertain to each research question are listed and discussed for each of the three remaining questions in their own separate sub-section.

Qualitative Analysis Results

The large volume of qualitative data from interviews, relevant assignments, and support questions was hand-coded according to common themes, which were them grouped and stated in simple terms. For example, "glitches detracted from experience" was a theme that applied any time the students said they had general problems that hindered their overall Second Life experience, while "got help from others" was a theme that applied any time the student mentioned asking a friend, classmate, or family member for assistance. As a result, over 300 themes were generated, that were then grouped according to broader categories in relation to the research questions. For example, the category "Internal or Personal Barriers" encompassed relevant themes such as "social anxiety a barrier" or "unfamiliarity caused apprehension". Responses from this category could be applied to answering research question #2: "What factors do students believe influence their self-efficacy?". Similarly, the category "Positive Learning Value" would apply to themes such as "promoted understanding of times" and "was interesting or engaging", and their responses could be applied toward answering research question #3, "What are the student attitudes and perceptions toward the learning value of using the

virtual world?"

Grouping of Themes

To validate the themes generated, the researcher consulted an experienced Second Life professor from Brown University, for her feedback. The professor is an expert on teaching in Second Life, and also specializes in learning from computer-based systems; therefore, she was a trustworthy and knowledgeable resource for feedback. She agreed with the themes generated, but simply made some wording-related suggestions for clarity purposes (which were implemented).

The themes were given alpha-numerical codes and were then re-applied to the original data, to ensure fit. Responses were carefully counted, and common themes were grouped per person, per class, and per entire group of interviewees. For purposes of this study, if a thought was expressed by an individual at least three times, it was considered to be a theme for that *person*. If a thought was expressed at least three times by two or more of the four interviewees per class, it was considered a theme for that *class*. Themes were separated by class, so that we could compare and contrast any similarities or differences between them.

Though groups of at least three commonly expressed thoughts were used to generate a theme, we did not want to lose potentially interesting or relevant statements that students may have made *less* than three times that still could be considered useful or informative. Therefore, each student's responses were carefully examined for unique yet particularly insightful or authentic thoughts which were not expressed by any other person. In this way, each student's individual voice and point of view could be honored

by singling out interesting insights that might potentially be relevant to other individuals with similar backgrounds or experiences.

Thematic Frequency Tables

This section discusses common themes listed by frequency per the 1930s and then the 1950s classes. Themes were primarily grouped and listed by class; a natural divide due to the students in each class having had different learning activities and experiences. Though there are some striking similarities between the two classes (which will be discussed), there are some marked differences that could have potential impact on teaching and learning considerations. The tables in this section have been separated by class, according to self-efficacy impact (Barriers and Enabling Factors), and perceived learning value (Positive, Negative, Neutral, and Other Value). Additionally, the students generated a lot of suggestions for improvement of the use of Second Life in American Studies. Many of these suggestions were insightful and useful for discussing implications for practice (to be covered in the last chapter of this study).

Research Question #2: Self-Efficacy Barriers and Enabling Factors

In answering Research Question #2: "What factors do students believe influence their self-efficacy?" it was important to first identify all the concerns that could possibly inhibit self-efficacy (such as anxieties, lack of understanding of procedures, and technical problems) and then all the factors that could promote self-efficacy (such as experience, persistence, or help from others). This section lists and discusses the barriers for the 1930s and the 1950s, and then the enabling factors for the 1930s and then the 1950s. Since each class had different experiences and themes, the themes from the classes are listed separately.

Self-Efficacy Barriers

Table 5 and Table 6, below, show the Self-Efficacy Barrier related themes

generated by the 1930s and 1950s students. Internal Barriers can be considered as self-

perceptions and internal states that could negatively impact a student's perceived ability

to feel skilled in using Second Life. External Barriers are environmental or social barriers

that could negatively impact a student's perceived ability to feel skilled in using Second

Life. Themes are listed by high to low frequency (number of times stated), then by

number of students who expressed that idea. This section answers Research Question #2:

"What factors do students believe influence their self-efficacy?" Please note that for

purposes of the interviews, the term "self-efficacy" was not used, as it is an educational

term and would be confusing to students. We instead spoke about "feeling skilled" or

similar statements.

Table 5

Self-Efficacy Barriers of the 1930s Class

Internal Barriers	Frequency	# Students
Challenges caused distraction/frustration	20	3
Unclear *how* to perform activity (procedures)	12	3
Got lost within the virtual world at times	7	3
Concerned about not doing things right	7	2
Unclear *why* being asked to perform activity (reasons)	7	2
Social anxiety a barrier	6	2
Unfamiliarity caused apprehension	4	2
Felt frustrated with own lack of skills	3	2

External Barriers	Frequency	# Students
Experienced technical problems, needing support	10	3
Coordinating with others for pair/group work difficult	8	2
Others' attitude or lack of effort a barrier	7	2

Since the 1930s students needed to be trained by looking at videos and resources, they did not have the benefit of hands-on training in person, like the 1950s class did. It makes sense that they would have a large number of challenges, frustrations and uncertainties regarding how to perform certain tasks in Second Life. They often spoke of their challenges causing distraction or frustration in very literal terms, while associating an emotionally negative response to that challenge. A prime example would be Hennroc, saying "I had actually been frustrated to not be able to get there. At first I was like "how do I get there"? I really was getting upset". At other times, the students expressed having had problems, but without attaching emotions to them. If a comment was made without expressing concern or emotion, it was simply a matter of being unclear on a procedure.

Getting literally lost in Second Life was another very common issue for this group, much more than the 1950s group. RecessionProof illustrated this experience when he stated "Once I ended up in the middle of the ocean. I found you in Search, and teleported using your link. It wasn't any problem when I found you and teleported". Cattara, the one student who had previous experience in Second Life, also got lost and felt frustrated as a result. When asked her what she felt she did the least well, she said "The least well was Teleporting. I was ending up at least two or three times in different areas… It was different and it was frustrating". This statement thus expressed two common themes: "Challenges causing distraction/frustration", and "Got lost within the virtual world at times".

Support (in the form of direct assistance provided by the researcher) was used more frequently with this group than the 1950s class. Again, not having hands-on training probably impacted this factor. Students were told to directly email the researcher, but

support was offered via email, phone, or even in-person assistance in a campus computer

lab. A statement was counted as "Experienced technical problems, needing support"

whenever a participant emailed or called the researcher with a problem, and a support

interchange occurred. It is noteworthy that three of the four interviewees in the 1930s

group requested and received support from the researcher, possibly influencing their

likelihood of complying with an interview.

Table 6

Self-Efficacy Barriers of the 1950s Class

Internal Barriers	Frequency	# Students
Challenges caused distraction or frustration	8	3
Limited spare time a barrier	6	4
Unclear *how* to perform activity (procedures)	4	2
Regrets not self-training more	5	2
External Barriers	Frequency	# Students
Non-intuitive user interface	9	3
Glitches detracted from experience	8	3
Crowding in SL detracted from experience	5	2
Program is difficult to learn	4	3
Isolation uncomfortable/detracted from experience	4	3
Coordinating with others for pair/group work difficult	4	2
Lab or Home computer not adequate	4	2

The 1950s class similarly expressed frustrations at various challenges

experienced, and also expressed simple lack of familiarity with how to perform different

tasks. All four 1950s interviewees made statements indicating a lack of time. Due to

being primarily a traditional class, this group may not have planned to perform a lot of

asynchronous online work, while the 1930s class was listed as a fully online class (so

students knew they would have to do asynchronous online work). MrLeroy made a

typical statement about the time problem when he said "The things that brought it

down… on a personal level… I think I didn't have enough time". On a related note, Lady41 stated that "Doing [SL] in class was less stressful, because it was at an assigned time. When we had to arrange things on our own time it was more stressful".

The most frequent external barrier to feeling skilled using Second Life for this group was the "non-intuitive user interface". WolfPacker89 referred to it when she said "The [icons] that were on the left - they were hard. I didn't really use them except inventory and clothes. I don't know if it was because of not having words… it was just symbols along the left". Figure 4 shows this interface, with the often-confusing menu bar and its icons along the left.
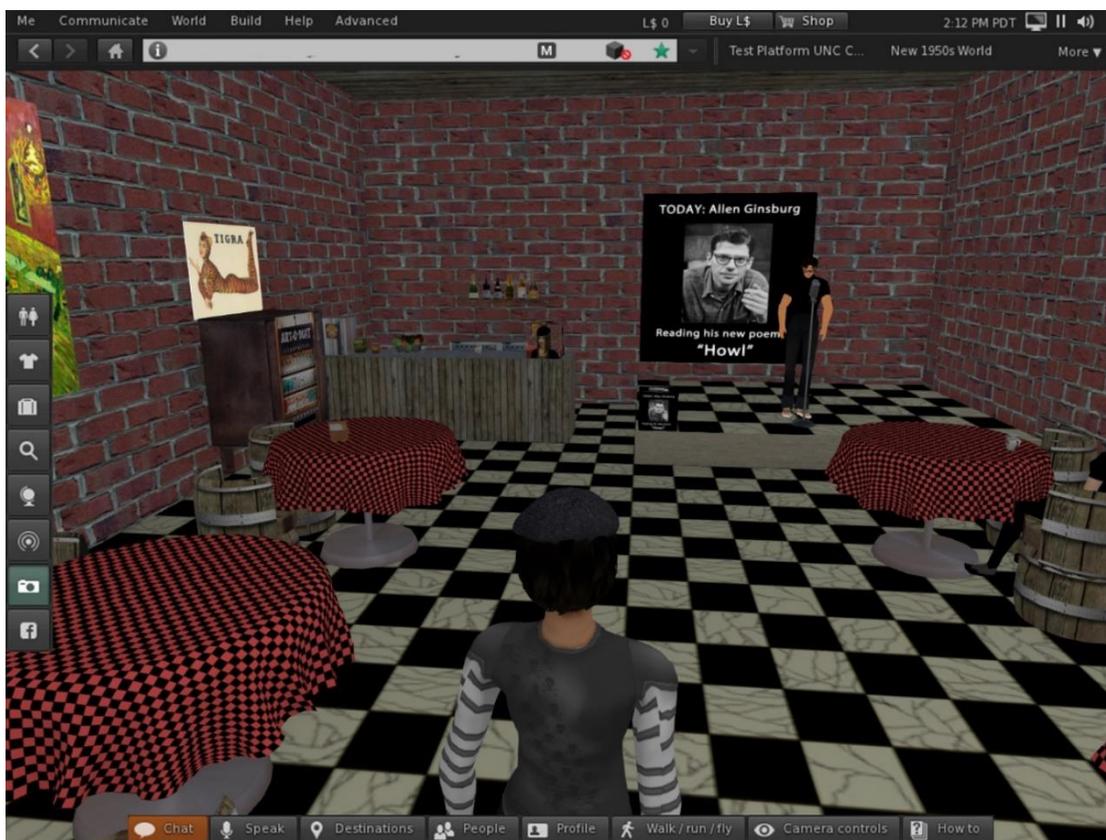
Figure 4. Second Life Left and Bottom Menu Bars

The image above shows an avatar point of view from within the 1950s Beatnik café, where the poetry readings occurred. The more understandable horizontal grey menu along the bottom was labeled with both icons and words, while the white icons in the vertical grey menu bar along the far left were pictures only, and the pictures were not commonly used in other programs.

Another common external barrier expressed by this group, and not the 1930s class, was the "crowding" in SL. This is because the 1950s class entered the simulation all together for several learning activities. Crowding was blamed for a variety of problems in SL, from discomfort to glitches (a "glitch" being any malfunction or irregularity). For example, Lady41 said "I agree about how fun everything was, except the over-crowdedness and uncomfortableness", while Lila mentioned that due to crowding, "We ran into each other. It got glitch with all of the people logged in but I thought we had fun". It is noteworthy that despite the problems, both women mentioned that they still had fun.

Self-Efficacy Enabling Factors

Table 7 and Table 8, below, list the Self-Efficacy Enabling Factors generated by the 1930s and 1950s students. In addition to Self-Efficacy Barriers, this section is also meant to help answers Research Question #2: "What factors do students believe influence their self-efficacy?" Unlike Barriers, this section discusses factors cited by students that could have had a positive influence on their self-efficacy. Internal Enabling Factors are self-perceptions expressed that could positively impact a student's perceived ability to feel skilled in using Second Life. External Enabling Factors are environmental or social barriers that could positively impact a student's perceived ability to feel skilled in using

Second Life. Themes are listed by high to low frequency (number of times stated), then

by number of students who expressed that idea.

Table 7

Self-Efficacy Enabling Factors of the 1930s Class

Internal Enabling Factors	Frequency	# Students
Comfort increased as familiarity increased	10	3
Experience in gaming helpful	10	2
Learned on own through practice/repetition	8	3
Motivated to please instructor and/or researcher	7	2
Was persistent/did not quit	6	3
Undeterred by problems/feels they can be overcome	6	2
Learned by doing/trial and error	5	3
Found some aspects easy	5	2
Uses computers for leisure	4	2
Felt more skilled by later in semester	3	2
External Enabling Factors	**Frequency**	**# Students**
Videos or documents helpful	24	3
Support person (researcher) helpful	18	4
Felt relief when peer cooperated	7	3
User interface was intuitive/convenient	4	2
Simulation was conveniently arranged	3	2
Attendance mat helpful/ensured accountability	3	2
Got help from others	3	2

Three of the 1930s students commented that they felt more comfort as their

familiarity level increased. In regard to changing appearance, Hennroc stated that it was

hard at first but "Once I got familiar, I experimented with changing it up a little. Facial

features, clothing, skin and all that". SCoach commented that increased familiarity with

the town aided her comfort at being in the simulation, stating "I knew where things were.

It was like going home – a home town feeling. I was like... I know where this is. I didn't

have to figure it out, because it was just a matter of retracing my steps".

Two of the 1930s interviewees had a lot of experience in gaming, with one (Cattara) having had actual experience in Second Life. This is because she had actually taken the 1950s class during a previous semester. In addition, Cattara played a lot of other games that use an avatar, such as World of Warcraft. This was helpful to her skills in multiple ways, as shown by her stating "I was familiar in general with gaming chat and using the movement key arrow keys, at right clicking, and to do things. I was also familiar with the voice option". Hennroc did not have Second Life experience but had experience in other games which used an avatar. He cited this experience as helpful, stating that he had played "Xbox, NFL, Ms Pac Man, things that involve maneuvering… and it assisted me there in Second Life".

Regarding external enabling factors, three of the students cited that the videos and tutorials were very important in gaining skills. RecessionProof commented that he became more skilled by "following the tutorial videos, using the videos that you made… I did everything pretty effectively when the tutorials were there. I needed it to be explained where to go, and using them made it easier to navigate. You kind of have that prompt of what to look for, for getting the assignments done." Hennroc made a point to say that he tried things right along with the videos, noting that "One time, I tried just looking at the video without actually performing it. That didn't work too well. To me it was beneficial to also watch and perform the action right after. That was a big plus". Cattara, who was the most experienced, still used the resources when she became lost in SL, which was a new situation for her. She said "It was different and it was frustrating. I read the help [document] first… the PDF. The second time I searched for you and used

your bookmark. The third time, I had a bookmark". This shows she was able to use

effectively resources and then retrace her steps to overcome a frustrating situation.

Table 8

Self-Efficacy Enabling Factors of the 1950s Class

Internal Enabling Factors	Frequency	# Students
Found some aspects easy	11	3
Experience in gaming helpful	9	2
Uses computers for leisure	9	2
Learned on own through practice/repetition	8	2
Comfort increased as familiarity increased	4	3
Used SL for social purposes	4	2
Learned by exploring on own	3	3
External Enabling Factors	Frequency	# Students
Videos or documents helpful	12	4
Enjoyable shared experience was helpful	6	3
Got help from others	6	2
Support person (researcher) helpful	4	3
Faster computer improved experience	4	2
Social reinforcement "empowering"	3	2
Absence of glitches improved experience	3	2

The 1950s students were much more likely than the 1930s group to state that they

found some things about Second Life "easy". For example, Wolfpacker89, who

considered herself "not a technical person", thought that "walking was easy, and

changing clothes. sitting, dancing, the things that you can right click and it gives a menu,

that was easy for me. The bottom of the screen was easy. The menu [on the bottom] was

just one word [like Fly, Search, Map, Inventory], and it was simple". Similar to the 1930s

students, experience in gaming was also helpful, though no one in the 1950s had been in

Second Life previously. Lila stated that "I used to play The Sims. That is what I thought

this was at first… you know… something like The Sims. The whole concept is the same,

but in The Sims you don't chat with the characters, they chat with each other".

Also like the 1930s class, the 1950s students cited that the videos were very helpful, though they did not cite using them as often as the 1930s group. This is most likely because they had the benefit of the initial hands-on training with the researcher in person. The 1950s students tended to use only certain videos when they had a problem, or needed info on something in particular. For example, MrLeroy stated that "I used maybe two of them. I don't think I use all of them. The ones I did use helped a lot. They gave me a feel for the different buttons and doing things". When asked about whether she found the videos helpful, Lady41 stated that "They were my life-savers".

Summary of Research Question #2

To sum, both the 1930s and 1950s students experienced similar barriers and enabling factors in gaining self-efficacy in using Second Life for class. The 1930s students experienced a larger number of challenges, frustrations and uncertainties regarding how to perform certain tasks in Second Life than the 1950s students, and had to rely more heavily on support videos and documents to assist in learning what they needed to learn, though both groups found the support resources helpful. The 1950s students tended to have more problems with user interface, glitches, and problems due to crowding. Both groups used practice as a means to increase their own self-efficacy. Interestingly, both groups cited problems with finding partners for group work as a barrier. Previous gaming experience was a strong factor in self-efficacy for both classes. Both groups also felt better or more comfortable in using SL by later in the semester.

Research Question #3: Perceived Learning Value

The following section answers Research Question #3: "What are the student attitudes and perceptions toward the learning value of using the virtual world?" Students

were asked questions about how they felt that SL contributed to their learning for class, and they came up with many ideas on how it did or did not contribute to learning. Both the positive and negative learning values are listed in this section by class, as their experiences and perceptions were somewhat different. However, similarities and differences between the classes are compared and contrasted when they were noteworthy.

Table 9 and Table 10, below, list the Perceived Learning Value related themes generated by the 1930s and 1950s students. Positive Learning Value is an idea expressed that illustrates the student's perceived learning benefits of using Second Life. Negative Learning Value is a factor that could negatively impact a student's perception of the learning value of using Second Life. Other Value is a perceived positive aspect of using Second Life that does not necessarily contribute positively to learning (though it may, indirectly). Themes are listed by high to low frequency (number of times stated), then by number of students who expressed that idea.

1930s Class Perceived Learning Value

The 1930s students were able to find many positive learning values in using Second Life for class. Most of their statements related to enjoyment of the chat activity, sparking curiosity or motivation, engagement value, or the ability to compare the past to today. The results were surprising positive considering that a couple of the individuals had many negative things to say about the experience as a whole (mainly in the challenges they faced). However, when talking strictly about the learning aspects, they were much more positive. This shows that they were able to discern the difference between challenges they encountered with the program from its perceived learning value.

Table 9, below, shows the Positive Learning Value, Negative Learning Value, and Other Values expressed by the 1930s group.

Table 9

Perceived Learning Value of the 1930s Class

Positive Learning Value	Frequency	# Students
SL chat activity was particularly enjoyable and useful	11	4
Sparked curiosity or motivation to learn/do more	11	2
Helps compare past to today	9	3
Was interesting or engaging	9	2
Activities tied well to class content and discussions	7	2
Was good alternative way to present media or info	6	2
Promoted understanding of times	5	3
Would take another class that uses SL	5	2
Use of SL was "Worthwhile"	4	3
Using 1930s lingo interesting or fun	4	2
Reinforced class content	3	2
Negative Learning Value	**Frequency**	**# Students**
Was sometimes unclearly connected to class content	5	2
Other Value	**Frequency**	**# Students**
Enjoyed socializing with peers	11	3
Fun or Enjoyable	5	2
Generally positive experience	3	2

Though the 1930s students stated many positive learning values of using Second Life for class, they did not state as many clear benefits as the 1950s students did. The single most positive learning experience for the 1930s interviewees was the final chat role-play activity, which was performed in 1930s character with a classmate, in a re-created illegal bar (called a "speakeasy"), using the lingo of the alcohol prohibition era. Having been disappointed with most of the other activities for the class (which she found too passive), Cattara felt that the chat was the most positive SL learning activity of the 1930s. She stated that "It brought the 1930s into the studies. We had to look at the lingo,

use the lingo, talk about the events, get excited about the entertainment, and it was all

reinforcing what we were learning. So, I think the activity actually contributed positively

to learning". Hennroc found the chat engaging, stating that "I thought the project was

going to be boring. However, it turnout to be very exciting. I don't know which classmate

it was, but… we had a very interesting 1930's conversation".

Two 1930s students found that the use of SL in the course sparked their interest in

learning more. For example, Hennroc stated that "Overall, it was a great experience in

that it made me want to know other information that existed besides what was assigned".

He noted that "when you have something creative, which Second Life is, it makes it more

pleasant, and motivates you as well". RecessionProof found that the information

presented in SL on the Great Depression of the 1930s sparked his interest in taking

another course using Second Life, perhaps about Economics, because "I would want to

know how we got out of it [the Great Depression]". He also noted that it would be

simpler to use SL for another class.

Though individual students expressed frequent concerns and frustrations with

using SL, the only truly negative theme in the 1930s indicating perceived negative

learning value was an unclear connection at times between class and Second Life. This

usually occurred when students had problems, or had not yet had many interactive

activities. Cattara did not like simply viewing links to videos in SL, saying "I was not

excited, because she was just giving links. What is the point of Second Life at this point?

But then you had the chat". SCoach had a lot of early technical problems, delaying her

from seeing the value of using SL. She was initially concerned about the effort being

worthwhile, saying "I figured that I had to do it (use SL) and there had to be a real good

reason and that it was important for class." However, after gaining comfort, she

eventually came to find the use of SL "worth the effort".

1950s Class Perceived Learning Value

The 1950s students came up with a much longer list of perceived learning values

than the 1930s class. Table 10 shows their Positive, Negative and Other Values.

Table 10

Perceived Learning Value of the 1950s Class

Positive Learning Value	Frequency	# Students
Allowed to see differences in sub-cultures of the times	11	4
SL simulation, clothing or activities helped connect to times	9	4
Was interesting or engaging	8	3
Could feel like you are "in the times"	8	3
Exposed to new info about the times	8	4
Promoted understanding of times	7	4
Allowed hands-on or experiential Learning	7	4
Being in character improved focus or immersion	7	4
SL hands-on activities better than passive methods/lecture	7	3
Simulation accurately represented the times	7	2
Poetry and/or boxing activities had most educational value	7	4
Social activities increased engagement	7	3
Could experience 1950 activities as person from those times	7	4
Gained in interest/engagement/value as SL skills gained	7	3
Use of SL was "Worthwhile"	5	3
Activities tied well to class content/reflection/discussion	4	3
SL represented concepts visually or concretely	4	3
Negative Learning Value	**Frequency**	**# Students**
Unclear learning value when SL skills were lower	4	2
Passive viewing in SL least helpful for learning	3	2
Other Value	**Frequency**	**# Students**
Fun or Enjoyable	8	2
Amusing, humorous, funny	6	3
Enjoyed socializing with peers	4	2
SL environment was calming	4	2
Generally positive experience	3	2
Enjoyed observing others vicariously	3	2

As evident above, the 1950s students expressed more themes relating to positive learning value than the 1930s students, expressed them more frequently, and also tended to express them in stronger terms. Student statements were particularly strong in the idea that SL helped them see different subcultures of the era, and in feelings that it helped them connect to the times. The positive learning value statements often related to feeling various levels of immersion in the times of the 1950s. The students often used phrases about the simulation getting them to feel like they were "in the times" or "into the times". Sometimes they more specifically stated that they could "act as a person from the times", and this was coded differently from simple feeling "in the times", since it implied action.

It is noteworthy to mention that the 1950s students had two major immersive, social role-playing activities. The first one was role-playing as a member of the 1950s intellectual "Beat generation" counter-culture, by performing their own poetry as "Beatniks" in a Beat café for the class, and the second was a boxing activity in which the entire class participated as boxers, "ring girls" (who carry signs announcing the next round), the announcer, or the attendees at the boxing event. The instructor had them write a reflection on the value of these activities, comparing the sub-cultures they role-played about in Second Life. As a result, the students were able to articulate frequent statements about being able to understand different cultures of the 1950s. It is not surprising that the top learning value expressed by this group related to Second Life allowing them to see differences in sub-cultures of the times.

Both the behaviors that students role-played, and the visuals they were exposed to in the virtual world, helped contribute to this awareness of differences in cultures of the times. For example, MrLeroy stated that the Beat poetry activity showed him "how the

norms were different. And how they did really weird poetry. How they dressed in black. It really helped me understand". Regarding the simulation's visual depiction of Beat culture as opposed to more mainstream youth rock and roll culture, Wolfpacker89 said that "The environment in the café is very different than the soda shop. The colors, the environment and even the architecture are vastly different. As opposed to the vibrant, lively, happy environment in the soda shop, the café is laid back, softer colors, bland, and even depressing to me".

The 1950s students often commented that the authentic environment, assorted details, and variety of activities (including the 1950s fad of cramming as many people in a phone booth as possible) helped them connect to the times, or get into the feeling of the times. Wolfpacker89 stated that "I did enjoy cramming into the phone booth and hula hooping. I was much better at hula hooping in second life than in real life. That's for sure! The boxing was a neat experience as well. Easy to get into the time frame when the environment is what it was really like!".

Regarding negative learning value, the students sometimes felt that earlier in the semester, before they gained many skills and before the group role-play occurred, they were unclear about the learning value of SL. MrLeroy stated that "I didn't really like the scavenger hunt, but I think it's because it was at the beginning and I didn't really know how to use SL." However, by the end of the semester, most students expressed many positive learning perceptions and also found the experience to be "fun".

Though being fun is not really a learning value, it could possible help reinforce active participation in class. For example, Lady41 stated that "You know… hearing about [the 1950s] is one thing. But actually experiencing it is another. It was more fun to

actually experience it with others. I was actually going to the diner with other college students. It made it more fun. it was my favorite course and I think Second Life contributed". Another student, Lila, cited that she volunteered to do extra credit as a "ring girl" (woman who announced the next boxing round by holding up a sign) in the boxing match, because she thought it would be fun. She stated that she did it "to get involved in class. It sounded like it would be fun… It brought out the goofy people. Plus, who doesn't like to see a fight and see who wins? The trash talking [in the match] was so funny. I thought it was cute, vibrant and fun. I really enjoyed it".

Summary of Research Question #3

Both classes discovered and expressed a considerable number of statements relating to positive learning value, and made some statements that indicated negative learning value as well (i.e. factors that could negatively impact learning). They also cited some positive aspects of using SL that were not necessarily learning values but could possibly impact learning or affect user student engagement. Both students found clear value in the social learning aspects of Second Life, with the most social and immersive parts (i.e. the role-play activities) being the clearest in perceived learning value. Both groups saw value in feeling immersed in the simulation, with it giving them a feel for being "in" the time they were studying. Most students, particularly in the 1950s group, found Second Life "fun", which is not necessarily a learning value but could conceivably impact learner engagement. The 1930s students had fewer immersive, social activities, and also tended to be less strong in their positive appraisal of its learning value.

Research Question #4: Individual Themes and Self-Efficacy Levels

To answer Research Question #4, "How do students with different degrees of change in self-efficacy describe their attitudes and perceptions toward the learning value of the virtual world?". In looking at the interview group's results we found that they ranged from very little self-efficacy change, to moderately positive and then strongly positive self-efficacy change. However, each individual also had very different experiences and perceptions that often did not clearly relate to self-efficacy changes. Therefore, it was decided that the answer to this question was best approached in two ways; by looking at the 8 interviewees as individuals so as to not lose their personal experiences, and then by grouping the interviewees according to these 3 levels of self-efficacy change from pre-to post measures to look for commonalities.

Though an overall increase in self-efficacy over time was easy to see in the larger group of survey students, it is more difficult to see trends in self-efficacy individually, since some of the statements made by the individuals did not necessarily seem clearly connected to their self-efficacy scores. It is also difficult to make connections between self-efficacy and perceptions of SL's learning value, unless the student explicitly stated something to that effect. Though it is a challenge to make connections, some relevant statements made by the students were used to help shed light upon some of the observed self-efficacy measurements. Please note that if a student is called "traditional", they were between the ages of 18 to 24. "Non-traditional" means they were 25 and over. This factor and the student's gender are only stated to assist in providing a mental picture of each student while they are being discussed.

Individual Themes: 1930s Students

Student 1. Cattara

Cattara was a non-traditional female student that had a lot of experience in games, and also had previous experience in Second Life in an earlier semester with the 1950s class. Table 11 describes her individual themes and perceived learning value of using Second Life.

Table 11

Student 1 Individual Themes and Perceptions

SL Name:	Sex:	Class:	Pre SE:	Post	% Change
Cattara	F	1930s	5.67	SE:5.67	0.89

Theme	Frequency
Experience in Gaming (and Second Life) Helpful	6
SL chat activity was the most enjoyable and useful	5
Instructor did not use SL optimally for class	5
Would like more "active learning" activities (hunt, etc.)	4
SL represented concepts visually or concretely	4
Should not use SL passively (i.e. "link collector")	3
Compares negatively to 1950s class	3
Enjoyed socializing with peers	3

Cattara's self-efficacy was basically unchanged from pre-to post test, but she had stated in her interview that she already felt "overly skilled" in Second Life as a result of gaming and SL experience, so perhaps she was already at her maximum self-efficacy in skill level from the beginning of the semester. Due to her previous experience in the more interactive and social 1950s class, she was largely disappointed with how the two courses compared, repeatedly making comments about how the 1930s class compared unfavorably to the 1950s. Cattara wished that the 1930s instructor had offered more social and interactive activities, stating that it should not have been used as mainly a passive "link collector", and that SL instead should be used "for what it does best" (i.e. more interactive, social, and active-learning activities such as role-play).

Overall, Cattara argued that the way the 1930s instructor used SL in the course was not particularly educationally valuable, except for the single chat activity, which she found made her actively use various learnings from class, such as 1930s lingo and knowledge of concerns of the people of that era. She did state that though SL was not used optimally, that overall, "It was a positive experience as far as the active part of using it. At least it helped me understand more about the 1930s". She also found that representing the 1930s visually, particularly in the clothing styles, was beneficial to her. One unique benefit she also identified was that the small group or pair chat in SL could potentially be helpful to introverts, noting that "I am an introvert and antisocial. But a small chat worked out well. I think in a big group I would have been too shy to talk".

Student 2. Hennroc

Hennroc was a non-traditional male student with extensive gaming experience. Table 12 shows his top themes and perceptions about SL's perceived learning value.

Table 12

Student 2 Individual Themes and Perceptions

SL Name:	Sex:	Class:	Pre SE:	Post	% Change:
Hennroc	M	1930s	5.62	SE:5.58	-0.71

Theme	Frequency
Videos or documents helpful	15
Sparked curiosity or motivation to learn/do more	10
Support Person/Researcher was helpful	9
Challenges caused distraction/frustration	9
Helps compare past to today	7
Comfort increased as familiarity increased	6
Was interesting or engaging	6
Speed or reliability of support was helpful	4

Hennroc was already familiar with being an avatar in several games, and also enjoyed "messing with the computer". He experienced multiple challenges and frustrations during his learning process that he sometimes found distressing, including one time where he failed to be able to dance with a classmate despite another student figuring it out successfully. He was frustrated but ultimately appeared undaunted by these challenges, stating that "Even during the frustrations, I felt I had the necessary skills to manage in Second Life". Hennroc utilized the researcher as support for a few technical problems he experienced. In addition, Hennroc explored SL extensively, and also practiced SL skills repeatedly on his own, following along with the videos as many as eight or nine times to learn the skills. These factors may have contributed to his being at a relatively high self-efficacy during both pre-and post-measurements. However, he still stated that he felt more comfortable in using SL as time passed.

Educationally, Hennroc found SL motivating and engaging, prompting him to explore and "go above and beyond" learning just the required information. He also found SL enhanced his understanding of the 1930s, stating that "Overall I would say it gave a better understanding of jazz. And what people went through in the dust bowl. When I heard the actual [1930s radio] programs and it described stuff, it gave a better perception of how things were". A unique insight he also contributed was the fact that, as African American himself, SL helped him related to African American experiences of the times. He noted that "When I went to Second Life and viewed the movies… Shirley Temple [a 1930s child star] and Bojangles [an African American co-star] … that help me understand as an African American male at that time what they went through then. It

helped me understand how the past relates to today's life".

Student 3. RecessionProof

RecessionProof was a non-traditional male who never was visibly daunted by any

challenges experienced. Table 13 shows his themes and perceptions about SL's learning

value.

Table 13

Student 3 Individual Themes and Perceptions

SL Name:	Sex:	Class:	Pre SE:	Post SE:	% Change:
RecessionProof	M	1930s	4.71	4.71	0.00

Theme	Frequency
Videos or documents helpful	7
SL use was "balanced" (used in right amount)	5
Support Person/Researcher was helpful	4
User interface was intuitive/convenient	4
Is a tech-savvy person	4
Would take another class that uses SL	4
SL was good alternate way to present media or info	3
Is undeterred by problems/feels they can be overcome	3

RecessionProof noted that he was tech-savvy and that the user interface was

intuitive, but if he had problems, all the resources he needed were available whenever he

needed them. He stated that he "did everything pretty effectively when the tutorials were

there". He never once expressed a negative emotional statement, whether encountering

technical problems or getting lost. In those few occasions, he simply used the resources

or asked the researcher as needed to get back on track. It is possible that his confidence in

finding solutions helped him remain level in his self-efficacy from pre-to post surveys.

From a learning standpoint, he expressed that the use of SL was a good

supplement to the course, providing information in a convenient, useful, and engaging

way. As a student that prefers online courses, he found SL a good alternative to some other online learning resources, stating that "I get tired of going in to the e-reserves and printing out articles. It was nice to go in Second Life to find my information". He also found the 1930s attendance mat a good way to track online students and make sure they do the work, noting that "The attendance mat really helped. I don't think people will go in and hit the attendance mat and just leave, because they are already in there". Though generally favorable to SL, he did not express a strongly positive assessment, remaining level emotionally and only doing what was needed to succeed in the course, noting that in his chat activity, "We went the minimum - 20 minutes on the dot".

Student 4. SCoach

SCoach was a non-traditional female who made more negative statements about her SL experiences than any other interviewee. Table 14 shows her primary themes and her perceptions about its learning value.

Table 14

Student 4 Individual Themes and Perceptions

SL Name:	Sex:	Class:	Pre SE:	Post SE:	% Change:
SCoach	F	1930s	5.08	5.54	+8.66

Theme	Frequency
Challenges caused distraction/frustration	10
Unclear *how* to perform activity (procedures)	8
Concerned about not doing things right	6
Lack of recognition/praise from teacher	6
Others' attitude/lack of effort a barrier	6
Over-worrying a barrier	5
Unclear *why* being asked to perform activity (reasons)	5
Comfort increased as familiarity increased	5

SCoach was in frequent communication with the researcher during the semester, sending repeated emails expressing distress over things such as not being able to dress her avatar, wondering whether she was counted by the welcome mat, or wanting reassurance that all was well. She already had had two in-person private SL lessons from the researcher prior to the first SL learning activity. Eventually, toward the end of the semester, she expressed pride that she "made it through and I never thought I would. I didn't have to quit. My kids can't believe I have an avatar". It is possibly that her persistence, despite her anxiety, allowed her to gain enough self-efficacy to finish.

As far as learning value, SCoach initially expressed confusion as to why she was being asked to use SL, stating that "I didn't understand what the teacher wanted. Did she want us to know how to go in and get the clothes and get in SL, or did she want us to know the technical details?". She also complained that the instructor did not come in SL to meet them and to provide positive reinforcement to them, stating that "It would have been nice to know she was in there so that we could meet her, but she did not come in and meet with people". She was also concerned about coordinating with others for activities, and annoyed when other students did not follow directions. Though she had some negative perceptions about its use, SCoach eventually made some positive statements about SL's learning value, noting that "I do think that SL added a layer to class. By putting your avatar in, it mentally and physically put you in the past. She [the teacher] tied it in well. And then we had to discuss how we felt about it and how it prompted us to use what we learned". Even though she eventually saw some educational value, due to the amount of trouble she had experienced with the program, she did not think SL should be used in class except as a voluntary option.

Individual Themes: 1950s Students

      Student 5. Lady41

      Lady41 was a traditional-aged female who experienced repeated troubles with

many aspects of using Second Life, but who ultimately came to find that it had strongly

positive learning value for her. Table 15 shows her themes and perceptions.

Table 15:

Student 5 Individual Themes and Perceptions

SL Name:	Sex:	Class:	Pre SE:	Post SE:	% Change:
Lady41	F	1950s	4.33	4.87	+11.74

Theme	Frequency
Fun or Enjoyable	7
Being in character improved focus or immersion	5
SL hands-on activities better than passive methods/lecture	4
Social activities increased engagement	4
Glitches detracted from experience	4
Challenges caused distraction or frustration	4
Learned through practice and repetition	4
Being able to use from home was helpful	3

      Initially, Lady41 felt inept, stating that "anything to do with inventory was hard. I

don't know if I am dumb or something. But it took forever to change clothing. I just

couldn't figure it out". To assist her, she called on friends to play and explore in Second

Life, sometimes going to a virtual club for fun. She was asked to be a group leader by the

instructor, and said that this worked well, enhancing her experience by giving her more

control and empowerment. Additionally, she stated that she had an ability to "zone in"

and concentrate on enjoying the activities, feeling completely immersed in Second Life

during the social activities such as the poetry and boxing. By the end of the semester, the

1950s class was her "favorite course" in part due to Second Life, so her strategies to gain self-efficacy were apparently effective.

As far as learning value, Lady41's preferred learning aspects of SL included enjoyment of feeling immersed in the time, and being an engaging alternative to passive lectures and readings. She noted that "It helped me understand more about the culture. They were more conservative in dress. The lingo was a lot different. Just the activities they did. It helped me visualize it more, rather than just hearing it through a lecture". For Lady41, social learning and immersion enhanced her learning experience. She stated that "It did help me with the course a lot. You know…. hearing about it is one thing. But actually experiencing it is another. It was more fun to actually experience it with others". She noted that she found it easy to become immersed in being a person from the 1950s, for example feeling "rebellious" while role-playing as a counter-culture beatnik, and cheering on the boxers excitedly during the boxing match. Though some glitches and challenges occasionally detracted from her experience, she stated that the overall experience was memorable, and strongly conducive to learning, noting that "I wanted to maximize my experience in the 1950s and Second Life really helped".

Student 6: MrLeroy

MrLeroy was a traditional-aged male who had some previous gaming experience, but still felt challenged by some aspects of Second Life. Table 16 shows MrLeroy's individual themes and perceptions.

Table 16:

Student 6 Individual Themes and Perceptions

SL Name:	Sex:	Class:	Pre SE:	Post SE:	% Change:
MrLeroy	M	1950s	4.33	4.87	11.74

Theme	Frequency
Could feel like you are "in the times"	6
Could experience 1950 activities as person from times	6
Experience in gaming helpful	5
Found some aspects easy	4
Regrets not self-training more	4
Simulation accurately represented times	4
Was interesting or engaging	4
Poetry and boxing had clearest educational value	4

For MrLeroy, the aspect of having an avatar was similar to other games in some ways, but not others. However, he did not seem afraid to try things, and stated that he would "play with the buttons" to help him figure out how to use Second Life. Even getting lost was a learning opportunity for him, stating that it helped him learn by needing to find his way back to class. He acknowledged that glitches sometimes detracted from his experience, and he blamed himself for not taking more time to learn and practice. He also cited that homework demands from other courses also negatively impacted his time to practice in Second Life. However, he still made large gains in self-efficacy by late semester.

MrLeroy was initially unsure about SL's earning value. Ultimately however, he came to have a positive opinion of it. He noted that when he first found out SL would be used for some activities "I wasn't too excited, because I never did that in a class. At first I was skeptical about whether it would help the learning experience". He said that this feeling changed after he actually did the immersive activities, stating that "the activities

like the poetry and boxing, walking around in the 1950s… It seemed like I could relate to it. That I could see how the fifties actually were". MrLeroy found the immersive boxing activity particularly enjoyable, noting that "I loved hearing everyone cheering for the different boxers. I personally was going for "Tacoman", who got past the first fight but was taken down in the second match". He even commented that SL helped him relate to his grandparents' stories, allowing him to feel a more personal connection between the material and his own life experiences. He stated that "Personally I think I can see what my grandparents did when they got married in the 1950s. I could see what it was like. And I can relate to the stories they told me and everything".

Student 7: Wolfpacker89

Wolfpacker89, a traditional aged female, was a self-described non-tech savvy person who experienced a few problems, some of which persisted throughout the semester. However, she finally came to find Second Life valuable for learning. Table 17, below, shows her individual themes and perceptions.

Table 17

Student 7 Individual Themes and Perceptions

SL Name:	Sex:	Class:	Pre SE:	Post SE:	% Change
Wolfpacker89	F	1950s	3.96	4.50	+12.77

Theme	Frequency
Felt inherently non-tech savvy	5
Found some aspects easy	5
Was amusing, humorous or funny	5
Non-intuitive user interface	4
Allowed hands-on or experiential learning	4
SL simulation, etc. helped feel connected to the times	4
Allowed to see differences in sub-cultures of times	4
Exposed to new information about the times	3

Despite some trouble with the non-intuitive SL interface, Wolfpacker89 found certain aspects of using it to be simple. When she experienced an issue, she sometimes used a video, stating that "If I look at a video, it was because I could not figure out how to work something correctly". She also had a friend in the 1950s class, and stated that "we helped each other". It is possible that her ability to effectively use resources, combined with social support in class, contributed to her strong gains in self-efficacy.

From a learning standpoint, Wolfpacker89 said that "despite glitches", SL contributed to positive feelings of engagement, enjoyment of experiential learning, and an ability to enhance her understanding of the times. Though she was initially skeptical before she "knew what she was doing", she later found that "overall, it was positive because I think it portrayed what it was really like in the 1950s. The talking, the clothing, the environment. The activities too. Without the poetry thing, I would not have known what that was like. Actually, the activities were probably the most beneficial. I don't think there was an activity that wasn't necessary. I think it was all really relevant". She said that details of the simulation, such as "cigarettes, the phone booth, and cars", helped contribute to feelings of immersion. She was also expose to new information about the 1950s, for example "The phone booth [cramming activity] was fun. I don't know how they did that in the 1950s". Wolfpacker89 also commented that the activities were preferable to lecture, stating that "It was hands-on. A poetry lecture is boring. But like… [actually] doing the poems [in the poetry reading] … I don't know if it was the experience of being in the 50s, but it was helpful to know what it was really like".

Student 8: Lila

Lila was a traditional aged female who repeatedly expressed her enjoyment of the Second Life learning activities. Table 18 shows her themes and perceptions of SL's learning value.

Table 18

Student 8 Individual Themes and Perceptions

SL Name:	Sex:	Class:	Pre SE: 5.00	Post SE:	% Change:
Lila	F	1950s		5.71	+13.26

Theme	Frequency
Fun or enjoyable	5
Amusing/humorous/funny	4
Could experience 1950 activities as person from times	4
Experience in gaming helpful	4
Using lab (hours, crowding, location, times) a barrier	4
Provided positive reinforcement to others	3
Poetry and boxing had clearest educational value	3
Allowed silliness, playfulness, or spontaneity	3

Like most of the others, Lila encountered challenges in learning SL, but she stated that "if I had any question I'd just ask". Lila viewed computers as a source of leisure and play, and had some experience in games that used avatars. Lila never expressed overt distress or frustration with any barriers she experienced, even when her inadequate home computer required her to come to the campus lab to use SL. Certain aspects of using SL, such as communications, were easy for her. When she needed to learn more skills, she described her learning method as learning by repetition. Lila preferred to learn directly from a person when possible, but used the videos or documents if needed as a supplement. She showed a strong increase in self-efficacy by the end of the semester.

Lila had a strongly favorable assessment of the learning value of SL, particularly of the poetry and boxing activities. She noted that she felt "empowered" by reading her

own poetry to the class. She also felt that the boxing experience in SL promoted "silliness and play", which were positively reinforcing for her. Like some of the others, Lila found the ability to act out things she was learning was beneficial, stating that "I like what we did and how it related to class. It was like… we learn about it, and then we can go do it".

Lila particularly enjoyed the social learning activities, finding that cheering on the boxers was "energizing", and that hearing others' poetry was "exciting". She also made many statements about how the SL learning activities were "fun", "funny" or "amusing". Another benefit she pointed out was that SL was free, and thus an "economical" way to have immersive activities, allowing the students to do things like "dress up and dance" at no charge. She was the only person who also noted that SL could address different learning preferences, stating that "You have different ways of learning. And Second Life can do that". Lastly, she commented that said she wished that there were more social activities in SL, noting that the shared experience was what made it more worthwhile.

Level of Self-Efficacy Change in Interview Students

In examining levels of self-efficacy in the interview group, we found that the students were most easily differentiated according to levels of change from pre-to post measurements. Therefore, we chose to examine differences by levels of change. In addition to similar degrees of changes in score, other similarities were also noted in students in the small groupings, as well as some differences. The interviewees were grouped according to three levels of self-efficacy change from pre-to post measurements. Table 19 shows the groupings according to these similarities, while the following section compares and contrasts students in these groupings.

Table 19

Levels of Self-Efficacy Change in Interviewees

SL Avatar Name	Gender	Pre SE M (SD)	Post SE M (SD)	Percent Change	Level of SE Change
Cattara	F	5.67 (.48)	5.62 (.58)	-0.89	Very Slight Change
Hennroc	M	5.62 (.65)	5.58 (.58)	-0.71	
RecessionProof	M	4.71 (1.40)	4.71 (1.04)	0.00	
Lady41	F	5.58 (1.06)	5.71 (.62)	+2.30	Moderately Positive Change
SCoach	F	5.08 (.78)	5.54 (.78)	+8.66	
MrLeroy	M	4.33 (1.17)	4.87 (.90)	+11.74	Strongly Positive Change
Wolfpacker89	F	3.96 (1.27)	4.50 (.98)	+12.77	
Lila	F	5.00 (.66)	5.71 (.90)	+13.26	

Three individuals remained essentially unchanged in their self-efficacy scores (from -0.89% change to 0% change), two individuals increased somewhat (from +2.3% to 8.66%) and three individuals increased substantially (+11.74% to +13.26%). Statements from students in the three groups were examined for similarities in themes.

Slight Changes in Self-Efficacy

The three students that were very slightly changed, Cattara, Hennroc, and RecessionProof, were all non-traditional students, and all in the 1930s class. Two of these three, Cattara and Hennroc, had extensive gaming experience, while the third, RecessionProof, described himself as "tech-savvy". RecessionProof stayed exactly the same in self-efficacy from pre-to post, while Cattara and Hennroc went very slightly down. Cattara had already used Second Life, and it is possible she did not increase in self-efficacy because she had already peaked in her skills. Hennroc had made a point to note that he never felt he could not master Second Life, even when he experienced challenges. He also frequently self-trained and practiced in SL, making it possible that he

had already gained in self-efficacy before the first measurement. It is also possible that a few disappointments (such as his failure to be able to dance with a classmate during the social activity) caused his self-assessment of skills to slightly decrease.

RecessionProof, on the other hand, was the person who remained emotionally level, and typically did just enough work to get the assignment done. Like Cattara, RecessionProof commented several times that he found SL software simple to use, while Hennroc commented that his gaming experiences felt very similar to using Second Life. Interestingly, RecessionProof believed he *had* increased in skills from the beginning, but he had not in fact changed in score between measurements, leading to the possibility that he simply felt equally efficacious at each measurement regardless of his amount of experience, or that he had used SL enough prior to the first measurement to feel fairly efficacious. Lastly, though each of these students expressed at least one challenge in using SL, none of these individuals ever expressed doubt in their abilities to perform the skills needed for using SL.

In their assessment of SL for learning, Cattara had been disappointed in the passive use of SL in the 1930s, continually comparing it negatively to the more immersive way it had been used in her previous experiences in the 1950s class. Hennroc was strongly favorable of SL's engagement value and its ability to help a person experience the 1930s, commenting that it increased his interest and made him want to learn above and beyond requirements. RecessionProof was only mildly positive about his SL learning experience, noting that it did increase his interest in the topics studied. However, he was more favorable about its potential as a pleasant alternative to other forms of online education, which was important to him as a busy person. From a learning

perspective, each of these students appeared to come from their own motivations and experiences.

Moderately Positive Increases in Self-efficacy

Lady41 (1950s) and SCoach (1930s) moderately increased in self-efficacy from first to second measurements. Lady41 experienced many problems in using Second Life, even stating that she at times felt "dumb" and that she could just not "get it". Lady41 however relied on friends to help her learn how to use Second Life, even using it for leisure and recreation (such as going to virtual clubs). Some of her glitches never went away, but she eventually went on to feel comfortable enough to be a group leader in her class. SCoach was the individual that repeatedly contacted the researcher with frequent problems, and she did not appear to enjoy the majority of her experiences, stating that she told her friend that "it was not fun". By the second measurement, she had had several in-person lessons, troubleshooting sessions and other forms of contact with the researcher, and had practiced frequently. In the interview, she stated that she eventually felt comfortable in SL's use.

From a learning perspective, Lady41 made many positive statements about how fun and immersive that the SL social learning activities were, and how that "despite the glitches", she really learned a lot about the culture of the times. Lady41 also noted that she got completely immersed in the Second Life role-playing events (the poetry and boxing). SCoach was only moderately appreciative of SL's learning value, noting that it was tied well to class, helped reinforce class content, and (despite her many problems) was ultimately worthwhile. However, she was disappointed that the instructor never came into SL, and did not feel positive enough to recommend it as a required teaching tool,

suggesting that it should only be an option. Instead, she seemed mostly relieved that she made it through the class and did not have to quit. Interestingly, both SCoach and Lady41 enjoyed the social aspects of SL, but SCoach never got to experience as many social learning situations in the 1930s class as Lady41 did in the 1950s class. Though it does appear that both of these individuals had ongoing problems and that despite them, both managed to increase moderately in their self-efficacy, they were not very similar in their assessments of the learning value of Second Life.

Strongly Positive Increases in Self-efficacy

The individuals with the greatest increases in self-efficacy were MrLeroy, Wolfpacker89, and Lila, all from the 1950s class. These individuals all increased in SE score greater than 10%, from pre-to post measurement. One thing in common with these individuals was that they all commented on the fun or engagement value of Second Life. In addition, they tended to comment very favorably upon shared social experiences, and Second Life's ability to provide immersion in the times.

Wolfpacker89 and MrLeroy were initially skeptical about SL, but made statements to the effect that their interest and engagement increased as their comfort using SL increased. Wolfpacker89 noted that after a few times in SL, she could "move past the mechanics and start learning". All three students noted was that the boxing activity was most conducive to feeling more skilled in Second Life, with Wolfpacker89 thinking it was "because we used more things" i.e. more of the features of Second Life. MrLeroy noted that activities like the boxing should be done earlier to "feel more in it" (more involved and immersed) and Lila commented that the boxing match made her learn more skills "because she had to", to get through the activity as one of the ring girls.

Regarding their perceptions of learning value, all three of the students at the strongest level of change made statements that the SL activities helped them gain understanding of the times by being either feeling "in the times" or being able to experience things as a person from the times. All three commented most favorably on the poetry and the boxing activities as being most conducive to providing this type of immersive experience, while the simple scavenger hunts and other less social activities did not promote this perception. None of these students said that he or she felt immersed in the times by simply participating in scavenger hunts or just looking around in the simulation.

These students were clear in stating that the immersive activities exposed them to new information about the times, from the differences in culture of beatniks and their radical poetry, to the fads of the 1950s such as the phone booth cramming and hula hoops. This group also tended to comment very favorably on enjoying social positive reinforcement, such as receiving accolades from classmates for their poetry reading, or cheering on fellow students during the boxing match. In these three students, however, it is unclear as to whether the social aspects were causing favorable perceptions of learning value, or the increase in self-efficacy was causing it, or a mixture of both of these things was causing it. In addition, it is hard to know whether the positive perceptions stemming from their enjoyment of the poetry and boxing activities in turn helped promote a substantially higher post self-efficacy measurement.

Summary of Research Question #4

The 8 individual interviewees showed a range of self-efficacy increase from negligible (and even slightly negative) changes, to a substantial increase of over 10%. All

of these students had differences and similarities. In examining each individual

separately, there were clear combinations of themes and perceptions that were unique to

each of them. When grouped by levels of self-efficacy increase, a few commonalities

stood out. The least-changed interviewees (all in the 1930s class) may have already felt

skilled from previous experience in gaming or SL use, or from simply being tech-savvy

about computers, while the most-changed interviewees (all in the 1950s class) tended to

feel more skilled later in the semester, in conjunction with statements about increased

fun, engagement, or feelings of immersion in the times. The interviewee tendency for

1930s participants to be higher overall in self-efficacy but to have lower gains, while

1950s participants remained lower in self-efficacy but had higher gains, was reflected in

the overall trends between the two classes, as highlighted earlier in Figure 3. It is not

known exactly why this occurred, because the data did not provide direct evidence, but it

could can be for a variety of reasons, such as the 1930s students being more tech savvy,

practicing more, or being less challenged by their less immersive SL learning activities.

The themes that seemed to be most consistent with positive appraisals of learning

value for all of these students were the aspects that related to the most highly social and

interactive activities (for the 1930s students the speakeasy chat, and for the 1950s

students the poetry and boxing activities). These activities tended to be associated with

positive statements of learning value for all interviewees. Additionally, a few students

found uniquely positive aspects based on their own personal experiences, such as relating

to the African American experience, appreciating their grandparents' stories, or finding

that the SL learning activities allowed them to be sociable despite their introversion. Due

to some of the complicated perceptions that the students shared, and the lack of a clear

match between increased self-efficacy and increasingly positive perceptions of learning

value, it is challenging to discern all the factors that could promote feelings of positive

learning value, and it could have been influenced by other things such as past experience,

internal states, and the social or engagement value of the learning activities.

CHAPTER 5: DISCUSSION

This study was a study of self-efficacy in American Studies students using a virtual world for class, and their perceptions of its learning value. In many ways, it was an examination of the 8 individuals who were interviewed, and their unique experiences. In other ways, this study was a comparison of two courses with different teaching approaches to using Second Life, and the learning impact that these approaches had on the students.

Our study had four research questions:

1. How do students rate their own levels of self-efficacy in skills needed to use a virtual world for learning, after initial exposure and later after repeated use?

2. What factors do students believe influence their self-efficacy?

3. What are the student attitudes and perceptions toward the learning value of using the virtual world?

4. How do students with different degrees of change in self-efficacy describe their attitudes and perceptions toward the learning value of the virtual world?

Research Question #1 Discussion

How do students rate their own levels of self-efficacy in skills needed to use a virtual world for learning, after initial exposure and later after repeated use?

This question was answered by developing a self-efficacy survey tailored to American Studies students using Second Life for class, administering the survey early

and late in their Second Life experience, and analyzing the data with quantitative analysis of the survey responses of 26 students in two American Studies classes. Data was analyzed with descriptive statistics, and then ANOVA to measure changes in the means over time. Our analysis showed that there was a statistically significant difference between pre- and post-self-efficacy reported. This means that students in both classes significantly increased in self-efficacy over time, as would have been predicted by Bandura (1977).

We tested to see if there was a significant difference based on the variables of classroom, age, gender, or ethnicity. There were no significant effects from those variables, meaning that all groups increased significantly over time. For the 8 interviewees, we reported their statistics separately, from a pre, post, and percent change perspective. We also grouped the interviewees according to slight, moderate, and high levels of change in self-efficacy. This helped spotlight some of the differences and similarities of our core study group of interviewees. We validated our survey with reliability and validity measures showing that the survey was internally consistent and reliable over time, and that it had content and construct validity. Overall, the question of how students rate their levels of self-efficacy after initial exposure and later after repeated use was thoroughly answered by appropriate quantitative means.

Research Question #2 Discussion

What factors do students believe influence their self-efficacy?

To answer this question, we devised interview questions relating to perceptions that our interviewees may have had about how they developed skills needed to use Second Life for class. We then interviewed a small group of 8 students from the 26

survey participants – four from each American Studies class. A wide variety of qualitative answer were obtained about how the students believed they personally learned how to use Second Life. Responses were analyzed qualitatively, and related themes were generated that showed that there were commonalities in the data, generating larger categories of themes. Common themes (defined for our purposes as three or more times an idea was expressed) were listed by frequency per class. Themes in both classes were compared and contrasted using relevant or insightful quotes as examples when appropriate.

Bandura's theory of self-efficacy (1977), a belief in one's capability to perform a given task, was the over-arching theory behind this study. As a reminder, Bandura (1994) stated that self-efficacy is developed in four major ways:

1. Mastery Experience: Having performed a task successfully in the past (a "mastery experience") will increase self-efficacy, while failures will decrease self-efficacy.

2. Social Modeling: Seeing similar peers being able to perform a task successfully is a very good way to gain self-efficacy, since a person will tend to think "If they can do it, so can I".

3. Social Persuasion: Being told by someone else that one can succeed at a task is another way of developing self-efficacy, since it can increase motivation and desire to try harder. However, it is not as strong as actual experience.

4. Physiological Response: A person's autonomic response to a psychological situation (e.g. heart rate, respiration, blood pressure) can have positive or negative impact on self-efficacy, based on how the person interprets his or her own bodily response.

It was found that both classes expressed similar barriers to gaining in self-efficacy. Failures, confusion, lack of experience or familiarity with the program, "glitches", social anxieties, and uncertainties all contributed to negative feelings of being unskilled at using Second Life. Conversely, enabling factors, such as relevant experience (games in particular), vicarious learning through watching videos, and social support from classmates, the researcher, or friends, could contribute positively to the students' assessment of how they gained skills in Second Life.

The most immersive experiences, such as the chat in the 1930s, or the boxing or poetry activities in the 1950s, could be considered to be "mastery" experiences for many of the students, since these experiences tended to have the most positive impact on students feeling skilled in Second Life. A prime example was when MrLeroy from the 1950s class was asked what helped him used Second Life the most. He answered that "Well you gave a lot to us, and there was a lot in the world. I don't know what it was about the boxing. It seemed like we were using more things. We were more hands-on. We were all involved. It was more of a fun activity. That helped all of us get more into it". He and one other student, Lila, suggested that more interactive activities should be inserted earlier in the semester, so that students could gain comfort at an earlier stage in the course. This would be a challenge since students have less skills earlier in the semester, but it could indeed force them to gain skills faster, particularly if the experience was fun and motivating.

Social modeling was built into the course in the form of training, which was in-person for the 1950s and through video for the 1930s students who were fully online. For the 1930s students, videos became essential to their positive learning experience, while to

the 1950s students they were more of a supplement. Students stated that the videos were

so much more helpful than simple directions. Hennroc, from the 1930s class, stated that

"to me it was beneficial to also watch [the videos] and perform the action right after. That

was a big plus for someone who is not a tech person. It helps a lot. I look at them eight or

nine times. If you view the videos you really can't go wrong". For the in-person training

in the 1950s class, modeling was fostered by the researcher asking students who were

successful at completing a task during the training to help the person beside them. Both

classes were also encouraged to post questions on the Moodle (their learning

management system's) discussion forum, so that if a fellow student was logged in and

could answer it, he or she could go ahead and do that. One student, Cattara, an

experienced Second Life student from the 1930s class, did make a point of answering

discussion forum questions when she was able. Other students noted that they helped

each other, even in Second Life, when they were able, such as reminding others how to

use the Attendance Mat in the 1930s, or leading each other through group activities in the

1950s.

Social Persuasion was somewhat harder to promote, but it was provided in the

form of responsive support for the students. The 1950s instructor helped by encouraging

students to seek help from the researcher when needed, and assured them that their

problems would be quickly addressed. Additionally, social support was attempted to be

fostered through planned group work and shared class experiences. Sometimes, students

expressed receiving or giving social persuasion to each other. For example, Lila and

MrLeroy, from the 1950s class, enjoyed "cheering on" the boxers in the Boxing event,

and also enjoyed the positive social support they received from reciting their poems to

other students in the Second Life poetry experience. For the 1930s students, the instructor and fellow students seemed a little more distant. SCoach commented insightfully that "If she (the teacher) had met me in there (SL) she would have known me and she would have seen my outfit and that I was dressed in the 1930s style. It would have held more accountability in class. It would have been nice to know she was in there so that we could meet her, but she did not come in and meet with people. I am from the old school where we try to please the teacher. But I guess SL was not about meeting her, it was about learning and exploring". This suggests that increased social presence, support and feedback from the instructor should be nurtured, even in a virtual world.

Physiological responses and internal states definitely played a strong role in certain people's experiences. SCoach was one person who expressed anxieties about using Second Life as well as social anxieties, and her reactions tended to be strong to any problem. She would report a problem and state that she was "very upset" by it, even threatening to quit the course. Hennroc also mentioning his "blood pressure went to 1000" when he experienced a glitch. However, he was able to calm himself down and use resources to address the problem. Other students, in contrast, were fairly level no matter what problem they encountered. RecessionProof tended to just look at videos or contact the researcher when he had a problem, indicating that he was confident it would be resolved in time. Many other students expressed frustration at various problems encountered, and noted that these frustrations detracted from the experience. But when positive feelings outweighed the negative ones, the students' overall assessment of SL was that it was educationally worthwhile.

Research Question #3 Discussion

What are the student attitudes and perceptions toward the learning value of using the virtual world?

This question was answered by a similar listing of themes per class, along with a discussion that compared and contrasted the 1930s and 1950s themes to each other. Both classes came up with a long list of positive learning values, which included "interesting and engaging", was tied well to class content", "reinforced class content" and "allowed putting learning into practice". The 1950s students had many more positive learning themes than the 1930s students. Like the 1930s class, they said that the use of SL was "interesting and engaging", but also noted such themes as "allowed me to see differences in sub-cultures of the times", and "could feel like you are *in* the times". In addition, they tended to express learning benefits more frequently, and with more strongly positive wording.

For the 1930s students, the most clearly valuable aspect of Second Life was the role-play chat "in character" as a 1930s person. They found it stimulating, challenging and fun, and enjoyed that it allowed them to meet class members. The 1950s students made many more statements about the positive learning value of being immersed in the 1950s world, having had the benefit of two immersive role-play activities (a poetry reading session and a boxing match, both "in character" of the 1950s). They tended to express how SL let them become like a 1950s person, and behave as they would in the 1950s, increasing their understanding of the times. The 1930s students, on the other hand, just barely scratched at the surface of this experience with their brief, 20-minute planned chat, yet it was still a positive experience for them. Only Cattara, who knew how much more immersive the 1950s class was, thought that the 1930s instructor did not use Second

Life effectively enough to cause much learning benefit. Unfortunately, there would have been one more role-play activity in the 1930s (as "hobos" or homeless people from the times), but the professor cancelled it due to the class being behind their planned schedule. It would have been interesting to see if the 1930s students were more strongly favorable if they had gotten to experience that other role-play event. Overall, the question of what the students found valuable for learning was thoroughly explored and discussed.

<div align="center">Research Question #4 Discussion</div>

How do students with different degrees of change in self-efficacy describe their attitudes and perceptions toward the learning value of the virtual world?

This question was best approached by looking at the interviewees' individual scores, and then examining some themes and statements of these individuals by themselves and in groups of self-efficacy change, to help draw some inferences about what was observed. The 8 interviewees were discussed individually along with their personal themes, and were later grouped in self-efficacy change, to be compared and contrasted in these groupings. We looked for commonalities and differences in the themes that they expressed, along with any statements made that may support the self-efficacy findings and their perceptions of SL's learning value.

On an individual basis, each interviewee's top themes were shown, along with the frequency that they were expressed. Then a narrative summary of that student's themes was made to show how their self-efficacy as well as their educational perceptions of SL had grown (or in some cases, had not grown). Positive and negative statements were noted for each student, allowing us to see how these individuals perceived the learning value of Second Life. For the most part, their assessment of the learning value appeared

to increase as they gained in self-efficacy, but even more strongly as they became more socially immersed.

Three students in the 1950s class even made statements to the effect that they gained in interest, engagement, or perceived learning value of SL as their SL skills gained. Wolfpacker89 exemplified this idea when she stated that "Was it beneficial... at the beginning I would have said no. But that was when I didn't know what I was doing. At the end of the semester I thought it was very beneficial. Plus, it was different than just getting a lecture… It was hands on". This is in line with Davis's (1989) Technology Acceptance Model (TAM), which holds that "perceived usefulness" (PU) and "perceived ease of use" (PEOU) grow together and contribute together toward a person's acceptance of a new technology.

Interviewees were then grouped, and compared and contrasted by levels of self-efficacy change, ranging from slight or no change, to moderately positive change, to strongly positive change. It was interesting to find that three of the interviewees in the 1930s group did not gain in self-efficacy, and two of them even reduced slightly. It was posited that they already had feelings of skill due to previous experiences in gaming or computer use. It is also possible that the effect of being initially self-efficacious was mitigated by discovering that certain skills in Second Life were unexpectedly challenging to perform, such as when Hennroc tried and failed at dancing with another student. Self-efficacy can decrease with failure, particularly when a person attributes problems to his or her own abilities (Collins, 1982). Two of these students commented favorably on Second Life's learning value, while a third did not feel it was used effectively for learning – at least in the 1930s class. This was Cattara, who had used SL much more

interactively when she took the 1950s class earlier. It shows that previous experiences and internal states can impact a person's perceptions for better or worse when they compare their earlier experiences and knowledge to the present situation.

The two students with the moderate levels of change had less commonalities, but both of these students felt non-skilled at early stages in the course, and both expressed more positive statements about SL's learning value after having experienced the more social learning activities. They were also distinctly different in their appraisals of the learning value of SL, with Lady41 being much more favorable than SCoach. The three most-changed students however, all in the 1950s group, were all very positive about the social and immersive learning aspects of the poetry and boxing sessions, and how they helped enhance their understanding of the cultures and people of the times.

Connections of this Study to Literature

As highlighted above, attempts were made to ensure that current thinking about self-efficacy was reinforced by actual practice in this study. Many aspects of this study were also in line with the literature about learning online and in virtual worlds. Loke (2015) had shown that if reflection, social interactions, mental operations and vicarious experience can be fostered by virtual worlds, that real-world learning can be achieved. The American Studies students experienced all of these, by reflecting in their essays and discussions, by having chat sessions, by requiring assignments based on virtual experience, and by role-playing as a person from the times being studied. Biedatsch and Broomhall (2010) also noted that simulations can facilitate empathy in historical role-play, and that was clearly fostered by many of this study's interviewees saying how they felt they were a person from the times, or had a better understanding of people from the

times. De Freitas and colleagues (2010) had noted that it was important (among other things) to have an interactive experience, a simulation with high fidelity, and strong learner support, and these factors were mentioned as valuable by the interviewees in this study. Additionally, in line with Edirisingha and colleagues (2009) this study supported the idea that students enjoy having a sense of social presence with their peers in a virtual world learning environment.

Literature about barriers in using a virtual world for learning was also reinforced by this study. The steep learning curve described by Sanchez (2009) was evident in this study's learners stating they had a difficult time learning how to do things in Second Life. Also, like students in the 2010 study by DeFreitas and colleagues, students in this study frequently expressed frustration with technical glitches and the challenging SL user interface. Computer anxiety resulting in negative emotional states and frustrations per Saade and Kira (2009) was sometimes noticed in several of the students in this study, particularly SCoach, who frequently expressed being "upset" at problems. Mitigating or enabling factors were in line with some literature, such as the sense of enjoyment potentially outweighing negatives (Sanchez, 2009) and ensuring that timely, pertinent, and effective resources and support were in place so as to promptly address problems (Keskitalo et al., 2011). For example, Lila noted that the SL activities were enjoyable despite glitches, and Hennroc commented that support was provide in a timely manner, which helped ease his concerns.

This study was inconclusive regarding whether there were differing experiences per gender in the American Studies students, though it really did not concentrate on some of the ways their experiences may have been different. Some earlier literature on online

learning had noted that males and females may focus on different factors in online

learning adoption or satisfaction, with males focusing more on perceived usefulness (PU)

and females focusing more on perceived ease of use (PEOU) (Ong & Lai, 2006;

Venkatesh & Morris, 2000). In this study, both males and females perceived many useful

aspects of Second Life, and had opinions about its ease of use, but these kinds of

comments were unclearly connected to gender. A factor that may have been found to be

more influenced by gender was the notion that female learners tend to enjoy the social

aspects of online learning more than males (Rovai & Baker, 2005; Tsai & Tsai, 2010). *All*

of our interviewees seemed to enjoy social aspects in this study, but had our focus or our

guiding questions been a little different, it is possible that some gender differences could

have been uncovered.

Implications for Practice

Educators wishing to implement Second Life for use in their classes may wish to

note that social engagement and support were very important to both the 1930s and the

1950s classes. Level of immersion in the form of educational role-play using the visuals,

clothing and lingo of the times was also found to be very beneficial to both classes.

Adequate resources, particularly videos, were especially good for online learners, when

an in-person lesson in using the technology was not possible. Students were more

successful when they were able to problem-solve on their own, or when they helped each

other, and both of these strategies should be encouraged. Passive uses of SL and lack of

teacher presence both contributed negatively to student perceptions of the value of using

the virtual world, as well as negative assessments of the instructor herself.

Individual differences in perceptions and pre-existing experiences should be considered, and attempts should be made to address or even prevent concerns by having safeguards in place such as resources, training, and support. Managing student expectations is helpful by making sure that students understand *why* they are being asked to perform an activity in Second Life. Social support in the form of praise, socializing, and shared positive experiences seemed to be most favored by students, while solitary or passive activities were least favored. Additionally, the concept of "fun" is powerful and is something that can potentially be motivating and engaging to students.

It should be noted that though the students found group work valuable, it was expressed as being hard to arrange by many students, with some of them expressing concern that they would not find a suitable partner. A remedy could be to reserve in-class time when possible, so that group assignments could be completed together in the computer lab. To prevent social anxieties in having the students find their own group members, and ease concerns about whether or not they may find a person to work with, faculty can assign students to pre-made groups. Additionally, as Wolfpacker89 expressed, it was hard to understand group assignments if tasks were split up. Students should be encouraged to complete their group assignment all together as a group, rather than breaking things up and doing them piecemeal, as they will not get the social benefits or "see the full picture" otherwise.

<div align="center">Implications for Research</div>

There are many ways that research along these lines can be continued or expanded upon. Research into temperament, approaches to problem-solving, impact of internal states, the educational benefits of "fun", impact of social or technical anxiety,

introversion versus extroversion, previous experiences in gaming, levels of immersiveness, different types of role-playing, teacher presence, attitudes toward technology, and impact of social learning could all be examined in conjunction with self-efficacy and virtual worlds. Additionally, studies could be conducted showing the impact of virtual world learning to actual grades, enrollment, or even retention. Studies could also be performed comparing the effectiveness of virtual learning activities to more traditional methods, to other forms of online learning activities, or to other forms of real-life learning activities. For example, research could be conducted comparing the effectiveness of Second Life role-playing to real-life role-playing, or comparing social experiences for online students who use discussion forums, chat rooms, or online meeting tools, to online students who use virtual worlds for such things as group collaboration.

As for this particular study, if it could be done over, it would be beneficial to possibly give the pre-test earlier, before students had much time to practice. This may have given a better baseline and prevented some students from already being efficacious due to practicing on their own before the first measurement. In addition, the faculty would have been pursued for interviews more strongly, so that their experiences and perceptions could be used for triangulation. One of the two instructors in this study provided an interview, but the second did not (despite repeated attempts), making the use of the one instructor's interview not valuable without the corresponding instructor's feedback to balance the perspective. The researcher also had a gut instinct to include a question on previous gaming experience in the self-efficacy scale, but it was suggested to be removed by a peer reviewer. Experience in games turned out to be a very important factor however, according to the interview students.

In addition to requiring instructor interviews, the researcher would have been more clear during the design and planning phase to state that the immersive, social, or role-playing activities were essential to the course, and to have the instructors refrain from simple passive viewing of content in Second Life. As one of the students (Cattara) stated, SL should be used for what it does best (i.e. interactivity and immersion), not just a passive "link collector". In addition to American Studies, there are other possible kinds of courses that can be immersive or utilize role-playing. For example, role-playing could be performed in a culture studies class, such as African American or Women's studies. This comes from some favorable comments that Hennroc made about viewing African American culture within the 1930s world, and personally relating to it. It may be a good framework for research studies to see what happens if culture studies are supplemented with role-play in Second Life, to see if this kind of activity can help raise awareness or sensitivity to marginalized populations' experiences and concerns. This all can be possibly when a person can virtually "put themselves in someone else's shoes", and it can be a safer and more economical way of doing so.

On a research-related as well as practice-related note, instructors and instructional designers should be made aware of (or should even actively search out) relevant studies about virtual learning activities that pertain to the activities they are thinking of doing with their classes in a virtual world. To simply make up learning activities or just randomly "try things" without first considering existing data on actual student perceptions and reactions could be unwise, possibly resulting in less than favorable educational results.

The Future of Virtual Worlds is Now

Finally, in looking toward the future, there are some even more highly immersive 3-D virtual reality (VR) technologies such as headsets being developed and already sold (including Oculus Rift, Samsung Gear VR, and Google Daydream View) that may greatly increase the feelings of immersion that can be experienced in a virtual world. These technologies are capable of helping a person see a full 360 degrees around them within a virtual world, and even allowing a person to move their body while experiencing sensations and visual effects as though they are actually moving physically within the virtual world.

Though some of these VR technologies are capable of being used with SL and other established virtual worlds, Second Life's creator, Philip Rosedale, is actually developing a new social virtual world called High Fidelity specifically for use with these new 3-D headsets and gear. High Fidelity, currently in the beta testing stage, is touted as being able to promote interconnected, shared virtual environments for educators and entrepreneurs, allowing people to share virtual experiences with up to thousands of people in a single virtual space (High Fidelity, 2017). Rosedale is so confident that 3-D VR technology is going to become mainstream that he recently asserted in an interview that all internet will be VR in 10 years (Wired Magazine, 2017). Though current prices for some of the more sophisticated 3-D technologies are high, these prices may come down as adoption increases, making them more viable for students. Some 3-D viewers can even use one's own smart phone, such as Google Cardboard, which currently sells for as little as $7.00 USD on Amazon.

With increasing development of new technologies that are related to immersive virtual worlds, and with many such products already coming into the market, this would indicate that virtual worlds are only going to gain in use. Therefore, studies should continue along related lines so that educators can best anticipate developing and incorporating these up-and-coming technologies effectively into the curriculum. Globalization and technology use will continue to develop and grow, with more classes being able to find more ways to immersively teach online. Since students are the center, focus, and reason for teaching, both their self-efficacy in adapting to new technology *and* their personal perceptions of that technology's learning value should be considered, so that we may maximize learning benefit as we move forward into this brave new virtual world.

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APPENDIX A: SURVEY DEVELOPMENT STAGES

Step 1: Modification from Brown, 2008	
Questions from CSESA (Brown, 2008) I feel confident in: 1. Using software to learn how to do new things on a computer. 2. Playing games on a computer. 3. Knowing how to download files from the Internet. 4. Knowing how to read an Internet address. 5. Knowing how to set up an electronic mail (email) account on the Internet. 6. Knowing how to send attachments to others over the Internet. 7. Knowing how to maintain personal information on the Internet. 8. Using the menu options from within a software program. 9. Installing a software program correctly 10. Understanding typical computer words for hardware, such as plug and-play (pnp) devices. 11. Using an Internet browser (such as Internet Explorer) to access the World Wide Web (WWW). 12. Responding to a dialog box within a software program. 13. Using a computer mouse to point or click on the computer screen. 14. Using a search engine (such as Google) to find information on the Internet.	First Modification by Author I feel confident in: 1. Using software to learn how to do new things on a computer. (kept as is) 2. Playing games on a computer. (kept as is) 3. Knowing how to download Second Life from the internet. 4. Knowing how to use a Second Life Landmark to get to a place in Second Life. 5. Knowing how to use the messaging system to communicate in Second Life. 6. Knowing how to share items or attachments with others in Second Life. 7. Knowing how to maintain my personal information securely in Second Life. 8. Using the menu options from within the Second Life program. 9. Installing the Second Life program correctly 10. Understanding the typical terminology used in Second Life such as IM, chat, landmark, lag, etc. 11. Using the Second Life browser (viewer) to access the different features of Second Life. 12. Responding to dialog boxes such as notifications or messages that pop up within Second Life 13. Using the mouse to a perform actions in Second Life such as moving, sitting, opening doors, etc. 14. Using the Second Life search tool to find information, places or people within Second Life
	All New Questions (specific to Second Life from training content, which was based on course needs and pilot studies): 15. Finding or returning to where the 1930s town is located in Second Life.

16. Using the tutorial videos to perform the actions in Second Life requested by my instructor.
17. Using the tutorial documents to perform actions in Second Life as requested by my instructor.
18. Modifying my avatar by putting on the 1930s clothing.
19. Locating my teacher, support person or classmates in Second Life and adding them as "friend".
20. Locating items in my Inventory such as clothing that I purchased.
21. Performing general movements in SL such as opening doors, sitting and standing, and flying.
22. Modifying my Preference settings in Second Life, such as graphics or sound.
23. Becoming increasingly comfortable in the Second Life software as I progress in the course.

Step 2: Modification after Second Life Expert Peer Reviewer

First Modification by Author
I feel confident in:
1. Using software to learn how to do new things on a computer.
2. Playing games on a computer.
3. Knowing how to download Second Life from the internet.
4. Knowing how to use a Second Life Landmark to get to a place in Second Life.
5. Knowing how to use the messaging system to communicate in Second Life.
6. Knowing how to share items or attachments with others in Second Life.
7. Knowing how to maintain my personal information securely in Second Life.
8. Using the menu options from within the Second Life program.
9. Installing the Second Life program correctly
10. Understanding the typical terminology

Second Modification after Peer Reviewer Input
I feel confident in:
1. Using new software to learn how to do new things on a computer.
2. Knowing how to download Second Life from the internet.
3. Knowing how to use a Second Life Landmark to get to a place in Second Life.
4. Knowing how to use the chat or instant messaging in Second Life
5. Knowing how to share items with others in Second Life.
6. Knowing how to maintain my personal information securely in Second Life.
7. Using the menu options from within the Second Life interface
8. Installing the Second Life program correctly
9. Understanding the typical terminology used in Second Life such as IM, chat, landmark, lag, etc.

used in Second Life such as IM, chat, landmark, lag, etc.
11. Using the Second Life browser (viewer) to access the different features of Second Life.
12. Responding to dialog boxes such as notifications or messages that pop up within Second Life
13. Using the mouse to a perform actions in Second Life such as moving, sitting, opening doors, etc.
14. Using the Second Life search tool to find information, places or people within Second Life
15. Finding or returning to where the 1930s town is located in Second Life.
16. Using the tutorial videos to perform the actions in Second Life requested by my instructor.
17. Using the tutorial documents to perform actions in Second Life as requested by my instructor.
18.   Locating items in my Inventory such as clothing that I purchased or landmarks I receive
19. Modifying my avatar by putting on the 1930s clothing.
20. Locating my teacher, support person or classmates in Second Life and adding them as "friend".
21. Performing general movements in SL such as opening doors, sitting and standing, and flying.
22. Modifying my Preference settings in Second Life, such as graphics or sound.
23. Becoming increasingly comfortable in the Second Life software as I progress in the course.

10. Using the Second Life browser (viewer) to access the different features of Second Life.
11. Responding to dialog boxes such as notifications or messages that pop up within Second Life
12. Using the mouse to a perform actions in Second Life such as moving, sitting, opening doors, etc.
13. Using the Second Life search tool to find information, places or people within Second Life
14. Finding or returning to where the 1930s town is located in Second Life.
15. Using the tutorial videos to learn to perform the actions in Second Life requested by my instructor.
 16. Using the tutorial documents to learn to perform actions in Second Life as requested by my instructor
17. Locating items in my Inventory such as clothing that I purchased or landmarks I receive.
18. Modifying my avatar by putting on the 1930s clothing.
19. Locating people such as my instructor, support person or classmates in Second Life and adding them as "friend".
20. Performing general movements in SL such as opening doors, sitting and standing, and flying.
21. Modifying my Preference settings in Second Life, such as graphics or sound.
22. Modifying my camera controls.
23. Using the Second Life welcome mats to register attendance.

Step 3: Final Modification after Self-Efficacy Expert Review – please see Appendix B, below.

APPENDIX B: SURVEY QUESTIONS

Answers will be as follows per each question 1-25:

- ⦿ Strongly Agree
- ○ Somewhat Agree
- ○ Mildly Agree
- ○ Mildly Disagree
- ○ Somewhat Disagree
- ○ Strongly Disagree

Please rate how much you agree with the following statement as it relates to each item below.

I feel I can perform the following task very well:

1) Downloading Second Life from the internet.
2) Using a Second Life Landmark to get to a place in Second Life.
3) Communicating with the chat or instant messaging system in Second Life.
4) Sharing items with others in Second Life.
5) Protecting my personal information in Second Life.
6) Using the various icon and menu options within the Second Life interface.
7) Installing or updating the Second Life program correctly.
8) Using the typical terminology (for example: IM, chat, landmark, lag) found in Second Life.
9) "Buying" an item in Second Life (including free items).
10) Responding to dialog boxes such as notifications or messages that pop up within Second Life.
11) Using the Second Life search tool to find information, places or people within Second Life.
12) Finding or returning to where the 1930s/50s town is located in Second Life.
13) Using the tutorial *videos* to perform actions in Second Life as needed for the course.
14) Using the tutorial *documents* to perform actions in Second Life as needed for the course.
15) Locating items in my Inventory, such as clothing, notecards or landmarks that I received.
16) Modifying my avatar's appearance by putting on the 1930s/50s clothing.
17) Locating people such as my instructor, support person or classmates in Second Life and adding them as "friend".
18) Performing general movements in SL such as walking, opening doors, sitting and standing, and flying.
19) Modifying my Preference settings in Second Life, such as graphics or sound options.
20) Performing unfamiliar tasks on my own in Second Life.

21) Locating resources to help complete assignments or tasks in Second Life.
22) Helping someone else do something I learned in Second Life.
23) Accessing Multimedia (such as a video or website) from within the Second Life interface.
24) Registering my Attendance using the special "Welcome Mat" devices set up for the course. (If used in your course)
25) Modifying the camera or "view" angle so I can see something closer, further, or from a different direction.

Demographics (for linking data and for providing descriptive statistics)

26) Avatar Name

27) Course I am enrolled in:

☐ American Studies: The 1950s (Ms. Bruner)

☐ American Studies: The 1930s (Ms. Belus)

28) Age:

29) Gender (M or F)

☐ Male

☐ Female

30) Ethnicity

○ Hispanic or Latino

○ American Indian or Alaska Native

○ Asian

○ Black or African American

○ Native Hawaiian or Other Pacific Islander

○ White or Caucasian

○ Other: (Specify)

APPENDIX C: STUDENT INTERVIEW QUESTIONS

Interview Questions
Undergraduate Student Self-Efficacy and Perceptions of Virtual World Learning
Experience
L Stanton, C Wang, Investigators

The following are the Research Questions and associated Interview Questions for the study. The students will not be asked the Research Questions directly; they are shown for illustrative purposes here.

Research Question I. How do students rate their own levels of self-efficacy in skills needed to use a virtual world for learning, after initial exposure and later after repeated use?

This will be answered quantitatively using data from the surveys.

Research Question II. What factors do students believe influence their self-efficacy?

Supporting Interview Questions (with their follow-up questions): Note: The topic is to illustrate the question category and is not part of the question to be asked.

1) (Topic: Overall skill)
Overall, how did you feel about your skills in using the virtual world to competently perform the tasks required for each learning activity? What types of actions or tasks do you feel you could perform *best* in the virtual world? What types of actions or tasks did you feel you could perform *least* well? Why do you think that is the case?

2. (Topic: change over time)
Earlier in the semester, you said you can perform ____% of skills very well in Second Life. More recently, you said you can perform ___% of the Second Life skills very well. Can you please explain why you later felt that way? What do you think is most responsible for that change?

3) (Topic: Preferred learning method- slightly different depending on class)

For 1930s Students:

There were several methods available to you, to learn about Second Life. You had the initial orientation, online videos, written handouts, a trainer/support person available to help, etc. In thinking about the ways you had available to you to learn about how to use Second Life itself, what was most useful to you and why? What resources did you utilize the least?

For 1950s Students:

There were several methods available to you, to learn about Second Life. You had the initial orientation, an in-person training session online videos, written handouts, a trainer/support person available to help, etc. In thinking about the ways you had available to you to learn about how to use Second Life itself, what was most useful to you and why? What resources did you utilize the least?

4) (Topic: Help-seeking or helping behaviors)
Did you *seek* help at any time from any person (SL helper, classmate, teacher, etc.)? Why or Why not? (If they did seek help) Can you tell me how that went for you? Did you *provide* help at any time to another person? Can you tell me about that?

5) (Personal skills)
Is there anything about yourself that may have either helped you or made it more challenging to gain competency in the skills required to perform those task? (for example: computer skills, interests, habits, learning preferences, etc.)

6) (External factors)
Are there any other external factors that helped or hindered you in gaining skills in using Second Life? This can be anything from people, resources, time factors, demands such as family or schoolwork, the types of activities you were asked to participate in, the Second Life software itself, or any other *external* factors outside of yourself. Which of these was most important and why?

7) (Topic: Other potential factors)
What are some things you can think of that *could* have contributed to your feeling more skillful at using the virtual world for class, *if* it was *available*? Is there any challenge that would have helped you feel more skillful at using Second Life if it was *removed?*

Research Question III. What are the student attitudes and perceptions toward the learning value of using the virtual world?

Supporting Interview Questions (with their follow-up questions):

1) (Topic: Overall understanding of course)
How did the use of the virtual world positively or negatively contribute to your understanding of the course content? How did it contribute to your overall learning experiences in this course? Can you please elaborate on that?

2) (Topic: Learning activities)
In your course, you participated in the following activities in Second Life (the interviewer will list the main activities per that person's class). In thinking about those, was there any particular learning activity that helped you understand the course content better? Not as well? Can you explain?

3) (Topic: Potential changes)

In your opinion, how could the course have been modified to enhance the learning value of the virtual world? Note: this can be anything – whether additional or different learning activities, simulation design, training and support for the virtual world, etc.

4) (Topic: Positiveness of learning experience)
Aside from the learning value, was the use of the virtual world generally a *more positive* or *less positive* learning experience for you? What specific aspects did you find more positive or less positive about it? Why do you think that is the case?

5) (Topic: Effort vs. usefulness)
What do you think about the effort required to use the virtual world for class? Was it worth or not worth the effort needed? Was the virtual world a *useful* or *non-useful* addition to the course? What types of learning activities were more useful or less useful to you? Why do you think that is the case?

6) (Topic: Relation of self-efficacy to perceived learning value)
Was there anything about your personal level of skill in using Second Life that contributed to your feeling the way you do about the learning value of using the virtual world? Can you please explain why? As you changed in feelings of your ability to perform tasks in Second Life, did your feelings about the learning value of Second Life change? How so?

Research Question IV: How do students with different degrees of change in self-efficacy describe their attitudes and perceptions toward the learning value of the virtual world?

This will be answered with both quantitative and qualitative data from answers to all of the above questions and from the surveys.