Practicing Learner-Centered Teaching: Pedagogical Design and Assessment of a Second Life Project

Shu Z. Schiller
Wright State University
Dayton, OH 45435, USA
Shu.Schiller@wright.edu

ABSTRACT

Guided by the principles of learner-centered teaching methodology, a Second Life project is designed to engage students in active learning of virtual commerce through hands-on experiences and teamwork in a virtual environment. More importantly, an assessment framework is proposed to evaluate the learning objectives and learning process of the Second Life project. The assessment framework is composed of a variety of items, such as reflection essays, chat transcripts, peer evaluations, and a post project survey that measures the learning motive, attitudes, level of difficulty, and the time used to complete the project. The Second Life project was implemented in an MBA-IS course in which thirty-two students were randomly assigned to eight teams. In Second Life, each team managed an avatar and completed a series of business-related activities. The assessment outcomes indicated that students were able to apply what they learned in class into the virtual environment through their exploration and interaction. Students were motivated to learn in the Second Life project and felt that the engaging experiences helped with their learning. On average, students developed a positive attitude toward Second Life and felt that the application was not difficult to use. Lessons learned, recommendations for design issues, and implications for educators are also discussed.

Keywords: Learner-center teaching, Virtual world, Second Life, MBA education, Information Systems (IS)

1. INTRODUCTION: LEARNER-CENTERED TEACHING

Learner-centered teaching methodology represents an educational and instructional philosophy in which the key elements of teaching and learning in the traditional teacher-centered format of education are redefined and reformed (Norman and Spohrer, 1996). In conventional teaching methodology (teacher-centered), which has governed most of the world's teaching for centuries, instructors are the center of instruction and learning, with the students following the leads of the instructors. In learner-centered teaching, students are no longer passive receivers of knowledge; instead, they are "active participants in learning and co-constructors of knowledge" (Meece, 2003, pp.111). The instructors act as mentors and advisors to encourage students' participation in active learning. Interactions between instructors and students facilitate the learning process through discovery, inquiry, and problem solving (Law, 2007). Learner-centered teaching emphasizes students' intrinsic motivation to learn and the development of students' abilities to acquire appropriate techniques in problem solving (Weimer, 2002). Curricula are designed around the learning process and not the content of knowledge in order to provide an environment that adapts to the developmental needs and social influence on learning (APA, 1997).

Guided by the leaner-centered teaching philosophy, researchers around the world have developed various frameworks and teaching principles to facilitate the philosophy. Jones et al. (1995) constructed a framework of twenty-six indicators in eight categorical variables of engaged learning that included vision of learning, tasks, assessment, instructional model, learning context, grouping, teacher roles, and student roles. Similarly, a framework of fourteen learner-centered psychological principles was constructed based on educational and psychological research in a report published by the American Psychological Association (APA, 1997). Other scholars, such as Norman and Spohrer (1996), have suggested that learner-centered teaching should be 1) engaging by providing rapid, compelling interaction and feedback to the student, 2) effective by concentrating on the learning process and outcome but not the test score, and 3) viable by supporting curriculum needs as well as practice (p. 26). Weimer (2002) reviewed the extensive literature on learner-centered teaching and learning and summarized that "to be learner-centered, instructional practice needs to change in five ways" (p.8), which she called the five key changes: the balance of power, the function of content, the role of the teacher, the responsibility for learning, and the purpose and processes of evaluation. Table 1 summarizes the key concepts of conventional and learner-centered teaching of the above five elements.

Learner-centered teaching methodologies have been widely applied in educational practices across a variety of subject fields, such as accounting (Adler et al., 2000), infor-

Conventional Teaching (Teacher-Centered)	Learner-Centered Teaching
Balance of Power	
The professor's role is to be primary information giver and primary evaluator.	Power is shared by faculty and students. Faculties do not make all decision for students without student input. Power is usually redistributed to students in amounts proportional to their ability to handle it.
Function of Content	
The lecture is the primary delivery methodology. Lectures determine the boundary of teaching and learning.	Content plays a dual function in learner-center teaching: establishing a knowledge base and promoting learning. Faculty should develop course content not to cover everything, but to develop learning skills and learner awareness.
Role of the Teacher	
Instructors are the center of the teaching and learning processes. Students listen to the instructors and often follow orders. Faculties are conceived primarily as disciplinary experts who impart knowledge by lecturing.	Instructors guide and facilitate learning, not forcing the learning, by sometimes stepping aside from the center of classroom activities and empowering students to discover knowledge and learn from each other in an encouraging but controlled learning environment.
Responsibility for Learning	
Instructors are agents who delivery knowledge; while students are viewed as passive vessels, ingesting knowledge for recall on tests.	Faculty should aim to create environments with fewer rules and requirements, which are conducive to learning, to encourage students to learn effectively, and to support the learning efforts of others. Students are motivated to build autonomy and responsibility in learning and receive timely feedback from faculty.
Purpose and Processes of Evaluation	
Assessment is used to monitor learning. Emphasis is on right answers. Desired learning is assessed indirectly through the user of objectively scored tests. Traditional tests measure declarative knowledge: learned recitations and applications to small problems. They do not necessarily address depth of understanding or the skills the students have acquired.	Learner-centered methodology deploys a variety of assessment items. Instead of using a single grade as the sole evaluation tool, faculty should use evaluations to enhance students' potential to promote learning and to give them opportunities to develop self- and peer-assessment skills. Evaluations and assessment should be less stressful and motivate students to reinforce their knowledge.

Table 1: Comparison of Conventional Teaching and Learner-Centered Teaching on Five Key Elements (Saulnier et al., 2008; Weimer, 2002)

mation systems (Law, 2007), business statistics (Lockwood et al., 2007), social sciences (Watters et al., 1998), and distance learning (Duffy and Kirkley, 2004; Eastman and Swift, 2001), and have been successfully implemented to reform education in countries, such as Thailand (Khemmani, 2006). Many educators incorporate learner-centered teaching philosophy in developing leadership capabilities (Orr, 2007), instructional interventions (Smart and Csapo, 2007), and strategies contributing to expertise in classroom practice (Thompson et al., 2003A). Other scholars propose that learner-centered teaching techniques should be applied to the design of courses and projects where technology and multimedia play a vital role (Norman and Spohrer, 1996; Schwienhorst, 2002; Watters et al., 1998).

In this paper, Weimer (2002)'s framework of five key changes of learner-centered teaching was used as the foundation to construct the pedagogical design and administration of a Second Life project in learning about the subject of virtual business. The remainder of the paper will first introduce Second Life, the online virtual environment, which is followed by the pedagogical design of the Second Life project in the MBA-IS course. The next section presents the application and outcome of the Second Life project, including assessment results of learning objectives and the process. The findings and lessons learned appear in the discussion section before a conclusion is drawn for this paper.

2. SECOND LIFE: A VIRTUAL WORLD FOR LEARNING

Virtual worlds are 3D, online virtual environments where individuals as avatars engage in various activities.. There are currently over one hundred virtual worlds available (Wagner, 2008); of these, Second Life is one of the most popular. Inspired by the 1992 novel *Snow Crash*, Philip Rosedale, the founder and CEO of Linden Lab, created Second Life, an immersive and interactive virtual reality environment that is as complex as the real world (Rosedale, 2007). Different from Massively Multiplayer Online Role-Playing Games (MMORPG), such as World of Warcraft, Second Life is not a game; instead, it is a digital world created by its residents. In other words, it is designed through peer-creation. In Second Life, avatars have the ability to construct and create content. Objects, such as houses, shops, or even whole cities, can be built using basic prims (primitive objects), coupled with texture rendering and computer scripts. The creators of such intellectual content retain the property rights and can sell, exchange, or give away what they build in Second Life.

Second Life is composed of many islands. As of March 2009, there were a total of 21,332 islands in Second Life.

Each island serves a specific purpose, such as education (for example, Harvard University island), or represents business in various areas, including fashion, music, art, and marketing. Some of these islands are amazingly beautiful fantasy lands (for instance, the Straylight Magical Meadow), and others are the virtual reflection of reality, such as the campus of Ohio University. Besides content creation, avatars are capable of flying and teleporting from one island to another and communicating through text chats, IMs, and voice chats.

Second Life has witnessed a growing economy in this virtual world. Linden Lab released Second Life as a commercial product in June 2003. Since then, Second Life has rapidly gained a total of 16.8 million residents with on average 60,000 users logged in at the same time. Gartner, Inc. predicted that by 2011, 80 percent of active Internet users and Fortune 500 enterprises will have a "second life" (Gartner, 2007). In December 2008, 98 million square meters of land were sold at the average price of L$2/$m^2$. Linden dollar (L$), the currency used in Second Life, can be traded for US dollars ($1US buys about L$270 with a $0.30 transaction fee). In February 2009, customers spent $431,306 US dollars in Second Life. Many companies and multinational organizations are using Second Life to facilitate virtual commerce in which virtual service and products are sold and traded with others. Virtual businesses, such as fashion stores, have thrived in Second Life by selling virtual clothing and accessories to avatars while making real money. Other types of businesses are generating returns as well. The first millionaire in Second Life, Anshe Chung (Ailin Graef in real life) made one million US dollars by selling virtual real estate in Second Life in 2006 (Hof, 2007).

Educators and researchers are among the first to adopt virtual worlds in order to examine their capabilities to serve as an innovative environment to facilitate education. For example, Harvard Law School and Harvard Extension School have been offering a joint course called "Cyber One: Law in the Court of Public Opinion" in Second Life since fall 2006. Many others incorporate Second Life as an innovative teaching tool in traditional courses, such as computer science (Slator et al., 2004) and engineering classes (Schwienhorst, 2002). So far, more than 200 universities, museums, and research centers are present in Second Life (Calongne and Hiles, 2007). Jennings and Collins (2008) identified 170 educational institutions that either occupied a virtual location or maintained an active user group in Second Life. Two-thirds of the 170 identified institutions operated on full-sized islands (65,536 square miles).

3. PEDAGOGICAL DESIGN AND ASSESSMENT

The affordances of Second Life, including the 3D environment for communication and interaction, the ability to create, and its structure and governance supporting virtual commerce, have made Second Life an innovative environment for teaching and learning. Many educators are interested in introducing Second Life into their classrooms. Because of the lack of guidelines and the availability of best practices, however, many educators, especially those who are new to Second Life, are struggling with the design and implementation of Second Life's components into teaching and learning. For example, learning how to use Second Life can be highly time-consuming. Activities such as scripting may demand advanced computer programming skills, a requirement that is not normally the case with business students. In addition, the literature has not yet proved if or to what extent the use of Second Life will have on improving learning outcomes. Similarly, the implementation of Second Life into business education courses, such as information systems, is yet to be explored and documented.

To address the above issues, this section presents a learner-centered pedagogical design of a Second Life project that includes a detailed plan for implementation of Second Life into a classroom, as well as an assessment framework about learning objectives and learning process. The next section illustrates a case of the application of the proposed Second Life pedagogical design and assessment in a graduate class in order to facilitate learner-centered teaching. This paper hopes to help educators to grasp the fundamentals of Second Life and to design and implement their Second Life projects successfully in similar education contexts.

It has been suggested that to be consistent with the learner-centered teaching paradigm, IS educators should follow a systematic approach in instructional development in order to achieve successful learning outcomes (Landry et al., 2008). Saulnier et al. (2008) presented a comprehensive framework to be applied in learner-centered teaching, specifically in information systems field. This framework was configured into a template by Wagner et al. (2008) for course development using learner-center approach in the IS curriculum. Guided by the learner-centered teaching philosophy and framework in Saulnier et al. (2008) and Weimer (2002) and by the template in Wagner et al. (2008), the pedagogical design of the Second Life project is composed of three segments of instructional development: context and learning objectives, components of the projects, and assessment, each of which is explained in detail in the following sections.

3.1 Context and Learning Objectives of the Second Life Project

Learning objectives represent the knowledge that should be acquired through the learning process. As an outcome, the achieved learning objectives should allow the students to apply the acquired knowledge, skills, and abilities to help perform the job and ensure success in their jobs (Wagner et al., 2008). As stated in the IS2002 Curriculum and Guidelines (Gorgone et al., 2002), each course represents a prescriptive grouping of learning units, with each learning unit describing a set of material to be learned by students; therefore, each unit has its own goals and objectives.

The Second Life project is to be used to introduce contemporary business models supported by the Internet, one of the multiple learning units in a typical IS course. Unlike a traditional electronic business, such as B2B and B2C on the Internet, with Second Life, students are exposed to the concept of virtual business, such as the business activities carried out in virtual environments. Students learn how new business opportunities can be identified in such environments and how companies should manage resources in virtual worlds in order to gain a competitive advantage

and achieve financial returns. Moreover, team learning has always been an important element in higher education, especially MBA education. The project in this learning unit, therefore, adopts the team project format to facilitate the learning process, which empowers students to discover knowledge and learn from each other (Weimer, 2002).

Second Life is chosen to support the learning of new business models on the Internet for two reasons. First, educators have suggested that the technology has the potential for changing the way teachers teach and students learn (Thompson et al., 2003B). Furthermore, innovative technologies are especially effective for interactive learning because problems encountered in everyday practices are typically emergent and not well defined (Jonassen, 2003; Brown, 2004). Second, Second Life is a highly immersive and interactive environment that facilitates active learning through individual and team activities. To understand the mechanisms of virtual business, such activities allow firsthand experience in learning about how others design, promote, and manage virtual business, therefore, emphasize the learning process. As Wagner (2008) pointed out, "Letting students create virtual world experiences is likely the more attractive one to pursue, such as building e-businesses" (p. 263-264). Similarly, Eschenbrenner et al. (2008) indicated that benefits associated with such virtual worlds come from the ability to conduct activities in a risk-free environment, collaborate, communicate, and engage in this 3D environment in order to provide an alternative space for instruction and tasks and to visualize difficult content.

Three learning objectives of the Second Life project are developed based on the IS2002 learning units and skills proposed in Gorgone et al. (2002). In addition, these objectives are also defined to support the learner-centered teaching philosophy consistently.

- IS 2002.1, unit 5: to introduce quality concept of virtual business. Students understand the concept of virtual business. The Second Life project engages students in active learning and facilitates their understanding of the value, challenges, and the viability of a virtual business.
- IS 2002.2, unit 204: to present specific examples of a new business on the Internet. Students learn about some specific examples of virtual business and how such a business functions in virtual worlds. The Second Life project allows students to gain hands-on experience by interacting with business activities in Second Life.
- IS 2002.7, unit79: to develop skills of effective interpersonal communication and collaboration skills. Students learn from each other and develop interpersonal skills in performing tasks. The Second Life project is a team project that allows students to interact with each other and learn through collaborative work.
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3.2 Components of the Second Life Project

The learner-centered teaching methodology should emphasize learning process and encourage students to participate in learning activities that lead to the desired outcome (Saulnier et al., 2008; Weimer, 2002). The Second Life project requires students to be grouped into small-sized teams. Each team will visit selected locations in Second Life where business activities will be identified. To stimulate business related interactions, each team is granted some Linden dollars as its members' seed money before the team project starts. Depending on the schedule of class, each team can be given one to several; weeks to finish the project. Teams are required to present their experiences and findings in class and/or in Second Life. The project includes the three major components: prepare for the trip, enjoy the adventure, and share experiences, all of which are explained below.

3.2.1 Prepare for the trip. To promote effective learning through learner-centered teaching, instructors should reduce the stress and anxiety of the learning experiences (Saulnier et al., 2008). Because the instructor is no longer the center of the learning process, it is important for the instructors to provide timely help and assistance to students. Considering the fact that many students are not familiar with Second Life, the project starts with an introduction to Second Life and a walk-through training session on the fundamentals of the virtual environment.

Each team registers for a free basic user account and generates an avatar. After the downloading and installation of the application on the computer, the team's avatar logs into the system and goes through four basic training sessions on the help island. The training sessions cover basic skills of the virtual life in Second Life, such as search, move and fly, communicate, and edit appearance. To help students go through the preparation process, a web page is created to assist the learning of the essential skills needed in Second Life. The web page contains three modules: 1) start with registration and installation, 2) learn basic skills needed to search, teleport, communicate, and fly, and 3) accelerate by adjusting the system preference and by using shortcut keys. Students click on each module to follow the instructions and learn the skills respectively.

3.2.2 Enjoy the adventure. After the students become familiar with the environment, they search for Wright State University and teleport to this location. At the university site, they will find twenty kiosk panels, each linking to a Second Life location of a famous brand, such as IBM, Dell, and Adidas (Figure 1). Students can teleport to any of these destinations by clicking on the panel and choosing teleport.

Figure 1: Selected Locations in Second Life on Kiosk Panels

Students are free to choose the places they want to explore in Second Life. They are urged to go to the destinations provided on the kiosk panels because these locations represent the most recognizable businesses in the world. Students are allowed to visit other locations in Second Life as well. At the places they visit, all teams are directed to participate in some business-related activities. For instance, students can use the seed money to purchase clothing and accessories for their avatars or to buy a piece of art at a gallery. They are also encouraged to observe manufacturing activities in Second Life, such as visiting the car production line on Nissan's island, experimenting with concept cars, and giving feedback on the message machines. To facilitate interactivity, during their visits at the selected locations, team avatars will chat with at least one other person (avatar) at the location. The chat logs will be saved and submitted for review by the instructor. In addition, students will take snapshots of their avatar with the surrounding environment at the visited location.

3.2.3 Share experience. Upon completion of all activities, students will return to the university island. Each team will complete the following activities: 1) post snapshots onto the team board and attach reflection essays describing the location(s) visited and the activities accomplished (Figure 2 shows the team boards and a few student avatars), 2) review all other teams' postings and reflection essays and post evaluation comments on their boards, 3) submit chat transcripts to WebCT, an online course management system for evaluation; and 4) complete an online survey individually relating to each member's experiences in Second Life.

Figure 2: Team Boards for the Second Life Project

In summary, the Second Life project is composed of three major parts. In the first part of the Second Life project, student teams generate avatars, install the Second Life application, and practice basic skills in Second Life. In the second step, students go to the university island and use the kiosk panels to visit other locations in Second Life. At each location, students chat with other avatar(s) and take snapshots. Students are also encouraged to participate in business activities, such as purchasing some items using the seed money provided by the instructor. In the last step, students return to the university island and post their snapshots and reflection essays onto their team boards. Teams also review other teams' works and comment on what they observe before each student takes an online survey about his or her Second Life experience. In the end, all teams present their findings in class to conclude the project.

3.3 Assessment

Learning is the focus and ultimate goal of the learner-centered paradigm (Huba and Freed, 2000). Weimer (2002) defined assessment as the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of their educational experiences. To assess students' learning, two key questions should be asked: 1) what have our students learned and 2) how effective is the learning process (Weimer, 2002; Jarmon et al., 2008). The assessment, therefore, should address two elements: the outcome of learning objectives and the learning process.

3.3.1 Assessment of learning objectives. As discussed previously, there are three objectives of learning virtual business through the Second Life project (shown in Table 2). To assess learning outcomes in learner-centered teaching, educators have suggested that the assessment elements should meet the following requirements: 1) focus on the learning process, what students are doing, and why they are doing it, 2) reduce the stress and anxiety of learning experiences by providing better guidance and allowing more time to complete assignments, 3) avoid using evaluation to demonstrate the rigor and complexity of the content but use it to motivate students to improve their abilities, 4) incurporate more formative feedback mechanisms, and 5) use peer assessment (Saulnier et al., 2008; Wagner et al., 2008).

The first learning objective (IS 2002.1, unit 5) states that students should understand the concept of virtual business. The Second Life project engages students in active learning and facilitates their understanding of the value, challenges, and viability of virtual business. Students learn through activities and are challenged to explore their approaches during the learning process. To assess the outcome of this objective, students respond to the following questions in their essays: What is (are) the location(s) you visited? What is the business you observed and/or participated in? Do you think Second Life is a good medium/environment for conducting business and why?

The second learning objective (IS 2002.2, unit 204) states that students should learn about some specific examples of virtual business and how such businesses function in virtual worlds. The Second Life project allows students to gain hands-on experience through interacting with business activities in Second Life. The learning process is carried out in Second Life, a 3D virtual environment, and thus brings fun and playfulness to the project. Students learn and play at the same time without the stress and anxiety from the traditional exams. To assess the outcome of this objective, students are asked to provide snapshots of the virtual businesses they visited, their chat transcripts, and their reflection essays. In addition, team members tell about their adventure in Second Life and upon completion of the project, tell what they accomplished.

The last learning objective (IS 2002.7, unit79) requires the students to learn from each other and to develop

interpersonal skills in performing tasks. The Second Life project is a team project, allowing students to interact with each other and learn through collaborative work. A peer assessment method is adopted to increase student involvement. By reading and commenting each other's work, students develop the ability to self-assess as well. This learning objective is assessed by two items. One item is: to give comments to other teams' postings. The other assessment item is one post-project survey item evaluating the teamwork effectiveness where students rate on the statement: working in team helped me with my learning. Table 2 presents all three learning objectives and their assessment items.

Learning Objective	Assessment Items
IS 2002.1, unit 5: Students understand the concept of virtual business.	Reflection essay questions: • What is(are) the location(s) you visited? • What is the business you observed? • Do you think Second Life is a good medium for business and why?
IS 2002.2, unit 204: Students learn about some specific examples of virtual business and how such business functions in virtual worlds.	• Snapshot • Chat transcripts • Reflection essay • Group presentation in class
IS 2002.7, unit 79: Students learn from each other and develop interpersonal skills in performing tasks.	• Peer-evaluation comments • One post-project survey item: working in team helped me with my learning

Table 2: Assessment of Learning Objectives

3.3.2 Assessment of learning process. Students' learning experiences contribute to the final learning outcome, such as what they have learned and how well they have learned (Weimer, 2002). The learning process, therefore, provides critical information to understanding the extent to which the 3D virtual environment motivates learning and meets the instructional objectives of IS curricula. To assess the learning process in Second Life project, relevant and applicable measurement items were adapted from Jarmon et al. (2008) and Wagner (2008). Jarmon et al. (2008) used Second Life for architectural drawing in a design course, and Wagner (2008) applied Second Life in a four-week group assignment in an IS course. The design of Second Life project presented in this paper is similar to these two studies, for the students use Second Life as a technology for project-based experiential learning. The original measurement items from Jarmon et al. (2008) and Wagner (2008) were combined and modified. As a result, fourteen items are now used to assess four aspects of the learning process of the Second Life project (See Table 3).

3.4 Reflection on the Learner-Centered Teaching Philosophy

The pedagogical design and assessment of the Second Life project follow a systematic approach of instructional development and are guided by the learner-centered teaching paradigm reflected in the five key elements summarized in Weimer (2002): balance of power, function of content, role of teacher, responsibility for learning, and purpose and processes of evaluation.

Learning Motive
• I had fun working on the Second Life project • I wanted to learn more in this course because of the Second Life project • The Second Life project was relevant to the course content • The Second Life project was good learning experience for this course • I was able to learn enough Second Life skills to successfully complete the project
Attitude
• I enjoyed using Second Life in this course • It was a good idea to use Second Life in this course • The Second Life project was engaging
Ease of Use
• The registration process and creation of avatar were easy. • Moving my avatar around was easy. • Changing my avatar's appearance was easy • Communicating with others in Second Life was easy • In general, Second Life is easy to use
Time Spent in Second Life
• How many hours did you spend to finish the Second Life project?

Table 3: Assessment of Learning Process

In learner-centered teaching, power is shared by faculty and students. Teachers and instructors do not make all decision for students without student input. Power is usually redistributed to students in amounts proportional to their ability to handle it. The Second Life project allows students to self-control individual and team activities, such as designing and editing the avatar's appearance, choosing the places to visit in Second Life, interacting with others, and participating in business activities in Second Life.

Content plays a dual function in learner-center teaching of establishing a knowledge base and promoting learning. Faculty members should design course content that will develop learning skills and learner awareness and not be an attempt to cover everything in a textbook. In the Second Life project, instruction files (how-to instructions and FAQs) are prepared and provided on a web site to which students refer when they need guidance. To accommodate different learning styles, instructors should not require students to review all files; instead, students should be able to use the content they prefer.

Instructors should guide and facilitate learning and not force the learning by sometimes stepping aside from the center of classroom activities and empowering students to discover knowledge and to learn from each other in an encouraging but controlled learning environment. In the Second Life project, students work in teams to complete the semi-structured activities. Seed money is granted to each team to stimulate business-related activities, such as shopping in virtual stores. Besides providing help when needed, the instructor observes team activities and reminds the teams of the deadlines. Students are free to explore the

virtual world on their own and are never restricted in performing only class-related activities.

Faculty members should aim to create environments that have fewer rules and requirements, that are conducive to learning, and that encourage students to learn effectively and to support the learning efforts of others. In such classrooms, students are thus motivated to build autonomy and responsibility in learning and receive timely feedback from the faculty. The Second Life project is managed by its team members, not by the instructor. The instructor designs the requirements for the project but only enforces the deadline of completion. The format of the project is flexible so that teams can go to any of the selected locations or other places in Second Life to participate in business-related activities. Teams develop a strong sense of group cohesion by sharing the same virtual identity. Students also learn from each other by performing activities together through the whole process and by giving peer-evaluations.

Learner-centered teaching emphasizes the development of a variety of assessment items. Instead of using a single grade as the sole evaluation tool, faculty should use evaluation to enhance students' potential, to promote learning, and to give students opportunities to develop self- and peer-assessment skills. Evaluations and assessment should be less stressful and should motivate students to reinforce their knowledge. The Second Life project is not evaluated on a better-or-worse scale; instead it emphasizes the completion of the project. Students are encouraged to participate and observe and to engage in business activities. Students share their experiences and learn from each other by posting snapshots and reflection essays on team boards and giving feedback to other teams. The assessment, therefore, is engaging, respectful, and reasonable, thereby echoing the guidelines on learner-centered teaching assessment proposed in Huba and Freed (2000).

4. APPLICATION: AN EXAMPLE

4.1 Participants

The MBA course in which the Second Life project was applied was titled Information Technology and Business Transformation. The course introduces a mixture of IT applications and theories to enable organizations to use information technologies in order to achieve their strategic objectives. The Second Life project was used to introduce the concept of business in the virtual world as a new business model of e-commerce.

Thirty-two full-time MBA students participated in the Second Life project. These students were also working full time in job positions on the level of managers and above. There were 20 female students (62.5%) and 12 male students (37.5%). Eight teams were randomly formed with four students in each team. After each team generated an avatar, team members took turns controlling the avatar for approximately equal lengths of time. Figure 3 shows the instructor and students in Second Life.

The project lasted two weeks. During that period of time, team members met and worked together on all the activities required for the project. Students first practiced basic skills on the help island. They then went to the university island and visited selected locations in Second Life. Team avatars talked to other avatar(s) during their visits, learned about business functions in the virtual world, and experienced virtual business by purchasing items. At the end of the exercise, each team posted onto its team board a snapshot and a reflection essay describing the location visited and the activities accomplished in Second Life. In addition, each team reviewed other teams' postings and made the members' comments on how well others completed the project. Upon the completion of all project activities, an online survey was administrated to all students to assess the learning objectives and learning process, the results of which are presented in the next section. In the last class, all teams met in Second Life and gave comprehensive reviews of the project.

Figure 3: Instructor and Students in Second Life

4.2 Assessment Results

The assessment was conducted through a collection of items: the reflection essays, the snapshots, chat logs, group presentations, peer-reviews, and post project survey. All thirty-two students completed all of the assessment items. Responses to these assessment items included both quantitative and qualitative data. The quantitative responses in the post project survey were recorded in an excel file and analyzed using descriptive statistical methods. Reflection essays were analyzed by summarizing the key points in each response for the same question and then finalized by combining similar terms and decomposing complex terms.

4.2.1 Assessment results of learning objectives. Essay questions, snapshots, chat transcripts, and group presentations were used to assess students' understanding of the concept of virtual business and how such business functions in virtual worlds. By the deadline of the project, all teams had posted snapshots and reflection essays on team boards and uploaded chat transcripts. In the last class, each team presented a review of its experience in the virtual world. Students learned that various types of virtual commerce in Second Life were able to generate real profit measured by real money. They were able to relate what they had learned in the textbook to the virtual business activities taking place in Second Life. All students agreed that Second Life provided opportunities for virtual business and that the program was capable of influencing real business. The final review in class also covered some controversial issues connected to the virtual world. For example, students

Learning Objective	Assessment Items	Results
Students understand the concept of virtual business.	Reflection essay questions: • What is(are) the location(s) you visited? • What is the business you observed? • Do you think Second Life is a good medium for business and why?	• Students visited a variety of places and businesses in Second Life such as fashion stores, art galleries, business centers, and casinos. The appendix shows the summary of teams' Second Life activities in students' own words. • 75% students believed that Second Life is a good medium for business, and 15.6% disagreed.
Students learn about some specific examples of virtual business and how such business functions in virtual worlds.	• Snapshots • Chat transcripts • Reflection essays • Group presentation in class	All teams posted snapshots and reflection essays, uploaded chat transcripts, and presented their Second Life experience in the final review.
Students learn from each other and develop interpersonal skills in performing tasks.	• Peer-evaluation comments • One post survey item: working in team helped me with my learning	• All teams commented on other teams' postings in Second Life. • Response to the survey item had a mean value of 3.136 out of 5.0 (s.e. = 0.231)

Table 4: Assessment Results of Learning Objectives

exchanged ideas on whether it was or was not a good business strategy to have a presence in Second Life or how strategic decisions about virtual business could lead to real life profits such as in the case of American Apparel.

In the reflection essays, students wrote about their experiences visiting a variety of places in Second Life, such as fashion stores, art galleries, business centers, casinos, and nightclubs. Students gained firsthand experience with virtual commerce through observing business and participating in business-related activities. Moreover, students developed a business mindset when engaging in virtual commerce using Linden dollars. One team wrote in the essay that it made L$800 in the first week by providing services, such as planting flowers and cleaning floor in a shopping mall in Second Life.

One essay question asked the students to think about the value and viability of Second Life for business. To answer the question, "Do you think Second Life is a good medium for business?" the majority of the participants (75%) believed that Second Life is an effective medium for business activities; however, 15.6% of them disagreed and pointed out that technology and computer efficacy would hinder the adoption of Second Life in business. There were 9.4% participants remained neutral on this subject. Students expressed their concerns about the program and identified some barriers to the adoption of Second Life in business. For example, fast computers, cable or DSL Internet connections, and good quality graphic cards are necessary to run Second Life without a disturbing delay. In addition, users needed to have relatively advanced computer skills and be comfortable with virtual collaboration in the highly interactive environments. One student pointed out that:

> *It is still a long way to go before we know whether Second Life is a good medium for business [or not] I think. The crucial factor is whether it [Second Life] can attract more and more people to join this place. [The business] All [all] depends on the amount of player and their ability to communicate and to perceive the value of such communication.*

Students also commented on some problems they found in the Second Life application itself. For example, some indicated that the interface should be more user-friendly to allow efficient searching and convenient communication. Others recommended that the inventory should be more organized to host the large amount of items in numerous folders. Suggestions also addressed the mobility of avatars. Students suggested that the mobility of avatars in Second Life was not satisfactory, compared to those in video games. Besides the arrow keys, a mouse should be able to move avatars and the avatars should be designed with more flexibility to change the appearance and perform gestures.

The last learning objective requires the students to learn from each other and develop interpersonal skills in performing tasks. First, all student teams studied other teams' postings and reflection essays and commented on each item. Most teams gave positive and encouraging comments, such as "good job," "great places" and "you guys had fun." Some teams commented on other teams' avatars, indicating that the avatars looked unique and "cool." Second, one survey question was used to assess the teamwork effectiveness by rating the item "working in team helped me with my learning," which had an average value of 3.1 out of a possible 5.0. Table 4 shows the assessment results of the learning objectives.

4.2.1 Assessment results of learning process. The learner-centered teaching methodology emphasizes the learning experience through an engaging and effective learning process through which students are motivated to learn, not to prepare for tests. Four categories of assessment items were used to evaluate students' learning motives, attitudes toward the Second Life project, the ease of use of Second Life, and the amount of time spent on the Second Life project. These assessment items were measured on a five point Liker scale in the post survey questions, the results of are presented in Table 5.

	Mean (out of 5)	s.e.
Learning Motive		
I had fun working on the Second Life project.	3.00	0.24
I wanted to learn more in this course because of the Second Life project.	3.96	0.17
The Second Life project was relevant to the course content.	3.39	0.19
The Second Life project was good learning experience for this course.	4.00	0.15
I was able to learn enough Second Life skills to successfully complete the project.	3.26	0.25
Attitude		
I enjoyed using Second Life in this course.	3.44	0.24
It was a good idea to use Second Life in this course,	3.48	0.23
The Second Life project was engaging.	3.83	0.19
Ease of Use		
The registration process and creation of avatar were easy.	3.52	0.19
Moving my avatar around was easy.	2.74	0.22
Changing my avatar's appearance was easy.	3.91	0.17
Communicating with others in Second Life was easy.	3.13	0.20
In general, Second Life is easy to use.	3.14	0.23
Time Spent in Second Life		
How many hours did you spend to finish the Second Life project?	6.25	0.97

Table 5: Assessment Results of Learning Process

On average, students felt that they were able to learn enough skills to complete the Second Life project (mean=3.26) successfully. The results indicated that the Second Life project promoted students' learning motives in this course (mean=3.96). Students also felt that the Second Life project was relevant to the course content (mean=3.39) and generated a good learning experience (mean=4.0). In addition, students developed a positive attitude toward Second Life. Students seemed to have enjoyed using Second Life in this course (mean=3.44) and agreed that it was a good idea to use Second Life in this course (mean=3.48). Students rated quite positively on the engagement of Second Life, indicating that the project was engaging (mean=3.83); however, they rated only moderately on the fun aspect of working on the Second Life project (mean=3.0).

Regarding the ease of use of Second Life, in general, students felt moderately easy in using Second Life (mean=3.14). They felt that the registration process, including generating the avatars (mean=3.52) and changing the avatars' appearance (mean=3.91). Communication in Second Life was rated moderately easy (mean=3.13), indicating some difficulty of communication during the project; students seemed frustrated with moving the avatars around in Second Life (mean=2.74).

Students expressed great interest and excitement working on the Second Life project. They spent significant amount of time working in teams outside the class time to learn about this virtual world experiment and to finish the assignment. On average, teams spent 6.25 hours on the Second Life project upon completion.

At the end of post survey, one open-ended question asked students to share additional thoughts and comments. Topics on social behaviors in the virtual world appeared popular in their responses. First, 71.9% of students said that they were serious about the communication in Second Life, and some students felt the virtual world seemed real to some extent when communicating with others. Students realized that English was not the most commonly used language in Second Life, an issue that added some difficulty for chatting and IM communication in Second Life.

Furthermore, some students felt that it was very difficult to establish trust with others in Second Life because they could hardly detect the purposes of others' behaviors in the virtual world. In contrast, others perceived their avatars as the extension of their real selves. They looked at Second Life as real life in a different dimension of space and believed that people should be responsible for their behavior in the virtual environment just like in the real world and that avatars' behaviors should be limited by regulations and law. One student wrote

> *In my MMRPG [Massively Multiplayer Role Playing Game] experience, I like talking to people and I take the communication seriously and sincerely. I think what you do and what you say in the virtual world can reflect your true personality in real life. I want to be a good man in both worlds.*

Some students looked at the virtual world as an extension to the reality but not the reality itself. They felt that Second Life was just a game and that the avatars and their lives in no means represented reality; therefore, according to these students, residents in Second Life should have freedom to do whatever they want, especially what seemed impossible in real life. Although most students perceived Second Life as a social network, a few students experienced loneliness in this virtual space. One of them commented, "Sometimes I could not find anybody to talk to, and I feel [felt] lonely and helpless when getting around in second life."

5. LESSONS LEARNED

During the Second Life project, the instructor encountered many issues and hopes that the discussions in this section will help others using virtual worlds and programs akin to it in teaching and learning activities. First, technological challenges need to be addressed, and alternative solutions should be prepared. Running Second Life successfully has at least three requirements: a fast computer, a fast-speed Internet connection (cable or DSL), and a good quality graphic card. It is the instructor's responsibility to provide accessible and adequate computer technologies to students. Some students may prefer using their personal computers, while others may need to use labs on campus. Scheduling a computer lab for students will certainly help. The design of

the project also matters. If activities are required to be completed by team members synchronously, the computer and the appropriate working environment should be available at the same time. For example, a computer lab may not allow loud voice conversations; therefore, chat and IM functions, other than voice chat, should be the main medium for communication in Second Life.

Second, the majority of the students are not familiar with Second Life. They may have problems going through the registration, installation, and training procedures. Enough guidance and assistance should be made available to students throughout the whole process of project. Information and instructions should be provided in the forms of handouts, web site resources, and face-to-face help sessions. Enough time should be allowed to finish the project. Depending on the complexity and scale, one activity may need only a few hours, but collaborative activities usually need more time to complete. Instructors should design the Second Life project with the expectation that some students may need extra time to finish the requirements. It is also very helpful to deliver an encouraging message occasionally to students in order to bolster their confidence.

Additionally, instructors should be aware of the potential harm and unexpected incidents that students might encounter in Second Life. Second Life is an online virtual environment created by its residents; therefore, it contains some level of sexuality, adult content, disturbance, and misbehavior. Griefers, defined as the disruptive residents who create harassment and disturbances by showing airborne genitalia and giving offensive comments in multiplayer game or virtual world (Giles, 2007), may interrupt project activities at places accessible to all Second Life residents. Although whether or not instructors should accept liability is controversial, "Cases can be brought against professors and their institutions when participation in Second Life is required or recommended and harassing behaviors occur there" (Bugeja, 2007). Fortunately, it is possible to protect our students and our instructors in such situations. Instructors should consider using a closed or exclusive island or site in Second Life where only authorized personnel can be allowed. Instructors should also be extremely careful of the choice of locations to send students. Some islands in Second Life have inappropriate content and should be banned from educational context. In addition, teaching projects are recommended to be submitted to Institutional Review Board (IRB) for review before applied in courses. Instructors should include statement of consent in the description of project or invite students to participate into Second Life project voluntarily. Lastly, it is helpful to maintain a good channel of communication between the instructor and students in order for teachers to respond quickly when any student appears vulnerable at certain potential harm.

6. IMPLICATIONS AND CONCLUSION

This paper presented a pedagogical design and assessment plan to guide the implementation of Second Life in learning business activities in virtual worlds. The case example included in the paper demonstrated that students, on average, were motivated to learn more through the Second Life project. The learning outcome indicated that the majority of the students felt the project was fun, engaging, and effective in delivering the learner-centered experience.

This finding echoes other researchers' practices in applying Second Life in teaching and learning. For example, Eschenbrenner et al. (2008) pointed out that virtual environments are capable of enhancing existing technological capabilities to achieve interactive learning and thus increase learning outcomes. Similarly, other educators believe that "technology that does not advance students' learning has little value in the classroom" (Jones et al., 1995, p. 8). It is recommended that educators should use innovative tools such as web-based technologies to promote learner-centered education and flexible teaching and learning in IS education (Law, 2007; Goode et al., 2007). Research has shown that in 2000, web-based technologies have been employed in 42.7% of college courses compared to 10.9% of courses in 1995 (Jennings and Collins, 2008). With its capabilities of fostering innovation and interaction, Second Life offers a good medium for promoting learner-centered teaching in higher education.

This paper makes two major contributions to the adopting of Second Life in teaching and learning. First, guided by the philosophy of learner-centered teaching, a pedagogical design of a Second Life project was developed. Given the increasing visibility of Second Life and the rapidly rising popularity of using Second Life in education, more educators have started to design new curricula to incorporate the element of virtual worlds such as Second Life in their courses. The pedagogical design of the Second Life project presented in section three can be adopted by other educators and tailored to suit different teaching and learning objectives. The implementation of the Second Life project in an MBA-IS course demonstrated that the pedagogical design is effective and can be applied successfully in IS courses. The design of the Second Life project is valuable in helping others to achieve a trouble-free experience in applying Second Life in teaching and learning.

Second, and more importantly, this paper proposes an assessment framework, one of the first for evaluating learning objectives and learning process of using a Second Life project in IS education. Researchers and educators, such as Croasdell et al. (2003) and Freeman and Urbaczewski, (2001), have been concerned with the difficulty and challenges of the assessment of student learning in business and IS education and have proposed different methods and techniques, such as concept maps, for course assessment. The assessment framework proposed in this paper attempts to address the challenge of assessment and consists of two parts. The learning objectives evaluate the outcome of learning in the area of virtual business through a new business model in the virtual world, and the other part of the assessment model evaluates the learning process of using Second Life in aspects of learning motive, attitude toward Second Life, ease of use, and time spent on the project. The assessment framework is modifiable and portable in order to be applied in similar learning context where Second Life is used as a technological portal to support teaching and learning.

The implementation of the Second Life project presented in this paper has a few limitations. First, because of technology issues and the limited amount of time, students

worked in teams and managed a shared avatar in this project. In future courses, each student will own and manage an individual avatar and thus will become more immersed into the virtual world. Second, future design of projects will engage students in virtual team activities. Students will collaborate from different geographic locations and be able to conduct virtual collaboration in the virtual world. Tasks will be designed to test the effectiveness of collaborative teamwork in student learning; therefore, the project will be possible for distance learning students, and collaboration will be possible between universities. Moreover, depending on the availability of funding, instructors can purchase land in Second Life and create a space exclusively for education and research activities. In this study, land for the Second Life project was rented from the New Media Consortium. Owning a full-sized island will give the instructor more ability to design, experiment, and conduct teaching projects.

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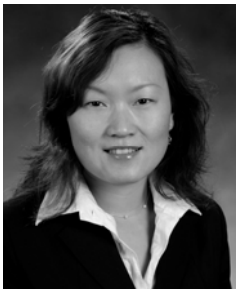
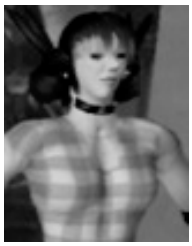
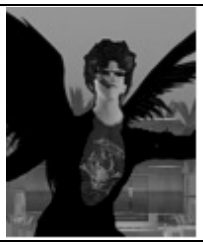


Shu Z. Schiller is an Assistant Professor of Information Systems in the Raj Soin College of Business at Wright State University. She holds a Ph.D. in Business Administration with the concentration on MIS from the Fox School of Business and Management at Temple University. Dr. Schiller's current research focuses on virtual reality and its applications in consumer behavior and team collaborations. Dr. Schiller is the recipient of the 2008 Award of the Innovative Excellence in Teaching, Learning, and Technology. Her research project, titled Virtual Teams in Virtual Worlds, received a $9,500 funding awarded by the Research and Sponsored Program of Wright State University. Her early publications appeared in refereed Chinese journals covering various topics on Enterprise Resource Planning systems. Her recent publications have been included in proceedings of the Americas Conference on Information Systems and appeared in Small Group Research and the Production and Inventory Management Journal.

Appendix: Summary of Team Activities in Second Life Project

Team	Avatar Image	Place Visited & Reflective Comments (excerpts)
1		*Place visited: Art Painting, Amazing Women's Fashion Shop, and A Gentle Madness Bookstore.* Firstly, we arrived at the help island and learned how to walk, fly, and use the inventory. We then found something exciting: we could buy many beautiful clothes in Second Life and get some coupons for buying the same ones in the real world! That was so interesting! But some clothes were more expensive than we could afford. On the beach we visited, we found out that if we sat, we could earn money! But you need to sit there for a long time such as 10 minutes to start to make money. We even got a racing car!
2		*Places visited: Art Center and Art Museum, Alice Free Library, Black Library, Money Island, and Linden Bank.* There is no doubt that Second Life is not a PC game! We wandered over the world of Second Life, and we visited shopping malls, libraries, museums, and clubs. We traveled through cities, hills, lakes, and the ocean. When we were tired, we lay down on the beach, watching rainbow above in the sky. You can do your business and make money in Second Life. The important thing is that you can transform your linden dollar into real dollar! That is not a dream. That's true! We found some ways to make money, (1) dancing in a bar, (2) sitting in a chair on the beach and you will be rewarded 2-4 linden dollars per 10 minutes, (3) planting flowers, doing some cleaning, and being a bodyguard, (4) opening a shop and sell clothes, (5) investing in stocks and real estate, and (6) gambling.

3		*Place visited: We visited several resorts, shops, clubs, and casino.* Second Life is fascinating: we can design a new life in Second Life. Now we find a good place to accomplish our dreams that are not possible in reality. Second Life allows you to make money and enjoy at the same time. We made some money by dancing in a bar. It feels like a real life in Second Life! We have realized that Second Life needs a fast Internet connection which can be a real challenge to some people. It is also possible to get computer virus from here. We hope these will be improved in the future.
4		*Place visited: T-online beach, Dell, casino.* A place named T-online beach is a very good place to dance and make money, however it is very crowded and you have to compete with others to get a spot. At DELL's island, people can buy real completers in Second Life and receive some discount. Second Life is a very good place for fun, business and entertainment. We believe that a lot of business in real life can be transferred to Second Life and there are a lot of opportunities to start a business in Second Life. Some businesses we've seen are casino and real estate. Second Life needs some control because the place contains something bad as well. The adult content appearing in Second Life will certainly harm teenagers. (Added by author: The Teen Second Life is another version of the virtual world built for teenagers between 13 and 17 years old. Participants must agree to its regulations and service terms to ensure the safety of the Teen Second Life for its residents.)
5		*Place visited: the Beach.* The Second Life is almost the reflection of the real world and we think that it is even better than some part of the real world. For example, I can fly to wherever I want and there are no gas fees which is excellent! The 3D effect in Second Life is good but it does slow down my computer significantly. The other amazing thing about Second Life is the creativity that everyone can have. You can create almost everything.
6		*Place visited: China Red's Mall And Dance Dock, Adam & Eve, Gadgets Free, Advanced Tools, Paintings Pictures Art, Photo Contest, and Star Trek Museum Complex.* The first thing we did was shopping. We bought a very beautiful blue dress for L$50 and a white jacket for L$150. We also wanted to buy some skin and shape but the price was not affordable. Some places we visited had nobody around and we didn't receive any service. Some stores such as Advanced Tools even sell books for free. We asked someone for a favor. He lead us to a sandbox area, but we were a little confused what it was for. We were excited visiting Paintings Pictures Art and enjoyed some famous paintings in the world such as Leonardo Da Vinci's Mona Lisa and Géricault's paintings.
7		*Place visited: Lost Garden Apollo.* We are like babies in Second Life; we need to learn how to move, sit, and fly. You easily spend way too much time in this virtual world. There are fantasy places in Second Life such as Lost Garden Apollo with palaces, statues, and lake on the island. People can dance and buy clothes although some clothes were very expensive. We even saw some people sat on a flying blanket! The sun was setting and they looked so relaxed! That was a beautiful picture.
8		*Place visited: Money Island, casino.* We learned to move, fly, chat, drive, and also change appearance to make our avatar look pretty. We sent a postcard to everyone in the team with the first picture of our avatar. That's cool. We also learned how to do some business in Second Life. We went to Money Island where we could make some money by dancing or sitting somewhere. There was also a casino where we can make or lose a lot of money. We've also seen people speaking Chinese and Spanish. They made friends in Second Life and played sports together. We had a great experience in Second Life!