

Using a virtual learning environment with highly interactive elements in Second Life to engage millennial students

Wei Shi , Gordon Lee, Jonathan Hinchley, Jean-Pierre Corriveau, Bill Kapralos, and Andrew Hogue

Abstract—The current generation of students is often quoted as millennial students. They are very technologically literate and see technology as a necessity, both in life and in learning. Developing interactive experiential learning becomes a necessity for the educational success of this digital-connected new generation. In this paper, we present a novel virtual learning environment that we created in Second Life. This virtual learning environment is currently used by Business Strategic Management class professor and students to study the Chinese 36 stratagems and use them in different business scenarios. The interactive elements in this virtual learning environment offers the opportunity to the professors to demonstrate different stratagems to the students, as well as the opportunity for the students to practice using different stratagems in a virtual world.

Keywords—Second Life, E-education, Virtual World, Massively Multi-player Game, Business Strategy, Stratagem.

I. INTRODUCTION

The current generation of students is often quoted as millennial students. They are very technologically literate and see technology as a necessity, both in life and in learning. Developing interactive experiential learning becomes a necessity for the educational success of this digital-connected new generation. In fact, a growing number of individuals spend more time interacting in virtual realities than in real life! The main reason for this is the possibility of being, in a virtual world, someone that one is not in real life. Most importantly from a pedagogical viewpoint, not only is the risk of failure in a virtual world significantly inferior to what it is in 'real life', but also, if failure occurs, its consequences are typically downplayed. This fact greatly encourages individuals to stand up to challenges that they might not have considered under the same circumstances in real life.

Another characteristic of millennial student is: they want to spend less time on tasks and reach success with little effort [1]. This significantly increase the challenge to the educators to engage the millennials. Study shows the students are more likely to engage and become immersed in

a challenging simulation if it is presented in a simple but fun way. The problem in the current platform design is that it relies on traditional teacher-centered learning methods and theories that do not fully integrate technology into the learning environment, whereby the teacher/instructor dictates what is learned and when it is learned. When dealing with millennial students, the educators should be more concerned with learners learning results through new type of learning method [2]. It is for the educator to provide an arena for engagement and discovery as well as be a content expert and mentor.

Therefore, based on the features of online learning, applying the innovative technology, considering the current systematic evaluation conditions, we created a highly interactive virtual teaching and learning environment in Second Life. The project we describe in this paper involves the conceptualization and implementation of two main areas for a Business Strategy course that will be taught via the use of a virtual environment. The platform on which this course is being built is Second Life, an online virtual world uniquely suited to delivering educational content due to its accessibility, low cost and integration with other areas of the internet. The purpose of doing this is to bring a more participative aspect to education, and present it in such a way that the current generation of students will be more engaged and learn in a variety of methods. The scope of this project involves the creation of a classroom to host the class material and a specialized area to test the students understanding of the concepts learned.

II. SECOND LIFE

Second Life [4] is a free online virtual world that is both mature and familiar to many of the students of the millennial generation. In addition, several major corporations (e.g. IBM) have chosen Second Life as their platform for the 3D internet. Primarily, Second Life is a massive Multiplayer online game [3]. It has many attributes to be a constructive learning environment that helps students learn by creating and experiencing scenarios that would be difficult to simulate in a real classroom. PowerPoint slides mainly convey information from the teacher to students through texts or images. But Second Life will enable students to discover knowledge on their own, instead of only listening to an instructor. We believe that this virtual teaching and learning environment framework likely offers an attractive solution to many institutions and organizations exploring the use of virtual worlds for the delivery of a wide range of courses and educational events

Wei Shi is with the Faculty of Business and IT, University of Ontario Institute of Technology, Oshawa, Canada, email: wei.shi@uoit.ca

Gordon Lee is with the Faculty of Business and IT, University of Ontario Institute of Technology, Oshawa, Canada, email: gordon.lee@uoit.ca

Jonathan Hinchley is with the Faculty of Business and IT, University of Ontario Institute of Technology, Oshawa, Canada, email: jonathan.hinchley@uoit.ca

Jean-Pierre Corriveau is with the School of Computer Science, Carleton University, Ottawa, Canada, email: jeanpier@scs.carleton.ca

Bill Kapralos is with the Faculty of Business and IT, University of Ontario Institute of Technology, Oshawa, Canada, email: bill.kapralos@uoit.ca

Andrew Hogue is with the Faculty of Business and IT, University of Ontario Institute of Technology, Oshawa, Canada, email: andrew.hogue@uoit.ca

including Distance and Flexible Education, Presentations and Discussions [5].

III. TRADITIONAL TEACHING-LEARNING VS. NEW APPROACH: SERIOUS GAME AND VIRTUAL LEARNING ENVIRONMENT

Traditional teaching-and-learning environments are often quoted by the millennial generation as boring and they do not address the unique learning needs of this generation. Millennials are very technologically literate and see technology as a necessity, both in life and in learning [6].

The fact that the millennial generation has always been digitally connected has led to a mindset unlike any that educators have ever seen. Understanding this mind set is an important aspect of educational planning and course development. This generation highly regards doing rather than knowing, making interactive, experiential learning, a necessity for their educational success. They prefer, expect, and appreciate the use of technology in learning.

However, the problem in the current platform design is that it relies on traditional teacher-centered learning methods and theories that do not fully integrate technology into the learning environment, (traditional teaching-controlled learning, even in a virtual space relies on the lecture-method of delivery) whereby the teacher/instructor dictates what is learned and when it is learned.

In contrast to traditional teaching environments whereby the teacher controls the learning (i.e., teacher-centered), video games present a learner centered approach to education whereby the player controls the learning through interactivity and allows the player to learn via an active, critical learning approach [7].

Game-based learning provides a methodology to integrate game design concepts with instructional design techniques to enhance the educational experience for students [8]. Video games provide students the opportunity to learn to appreciate the inter-relationship of complex behaviors, sign systems, and the formation of social groups [9]. Games inherently support experiential learning by providing students with concrete experiences and active experimentation [10]. By designing the scenario appropriately, a problem-based learning approach can be realized [11].

Similar to a good game designer, an educator should provide trainees/learners with an environment that promotes learning through interaction [7]. Although no particularly clear definition of the term is currently available, serious games usually refer to games that are used for training, advertising, simulation, or education and are designed to run on personal computers or through PCs to connect to internet.

Serious games provide a high fidelity simulation of particular environments and situations that focus on high level skills that are required in the field. They present situations in a complex interactive narrative context coupled with interactive elements that are designed to engage the trainees. Goals and challenges require the trainees to solve specific problems that they may have never seen prior to engaging in the game increasing the fun factor. In addition to promoting learning

via interaction, there are various other benefits to serious games. More specifically, they allow users to experience situations that are difficult (even impossible) to achieve in reality due to a number of factors including cost, time, and safety concerns. In addition, serious games support the development of various skills including analytical and spatial, strategic, recollection, and psychomotor as well as visual selective attention [12]. The creation of meaningful play for training purposes is the underlying goal of developing Serious Games. The underlying concept of a serious game is to provide high fidelity simulation of particular environments and situations that focus on high level skills required in the field.

Serious games are more than just simulations. They present the situations in a complex interactive narrative context with interactive elements to engage the trainees. Challenges require the trainees to solve specific problems that they have never seen prior to engaging in the game increasing the fun factor. One group was taught in the traditional manner and the other group was taught the same concepts through a video game. The group playing the game were found to be extremely engaged in the subject matter and were much more attentive. Further benefits of serious games include improved self-monitoring, problem recognition and solving, improved short- and long-term memory, increased social skills and increased self-efficacy [13].

Virtual environments and video games offer students the opportunity to practice their skills and abilities within a safe learning environment, leading to a higher level of self-efficacy when faced with real life situations where such skills and knowledge are required [12]. Gaming and interactive simulation environments support learner-centered education whereby learners are able to actively work through problems while acquiring knowledge through practice. With these experience-based, instructional methods, faculty work as facilitators, facilitating the experience and subsequent knowledge acquisition. These experience-based methods incorporate more complex and diverse approaches to learning processes and outcomes; allow for interactivity; allow for cognitive as well as affective learning; and perhaps most importantly, foster active learning [15].

IV. OUR VIRTUAL LEARNING ENVIRONMENT IN SL

Therefore, to carry out an effective, interactive and fun learning environment is one of the significant factors to guarantee the sound development of online education. The project we describe in this paper involves the conceptualization and implementation of two main areas for a Business Strategy course that will be taught via the use of a virtual environment. In this project we first created a virtual learning environment (an ancient Chinese village) to host the class material (including video and audio materials). The entire village is structured in six areas and 36 classrooms in total. In order to offer the students a highly interactive learning method, we created a specialized area to test the students understanding of the concepts learned: a battle field. We describe the details in the following subsections.

A. The Business Course

“Business Strategies for Professionals” course examines strategy and related concepts. The focus is on strategic management: choosing and defining a viable strategy, and monitoring strategic performance. The thrust of the courses is to view the organization in its totality: the external environment in which it operates its strategy, and its internal administrative. The emphasis is on assessing the kinds of problems and issues that affect the success of the entire organization. The main objective of this course is to apply the traditional Chinese Military strategy: the ancient 36 stratagems to the business world.

The virtual learning environment we created was organized in six major areas. Each area corresponds to one of the six situations of war (see, figure IV-A):

- Stratagems when in a superior position
- Stratagems for confrontation
- Stratagems for attack
- Stratagems for confused situations
- Stratagems for gaining ground
- Stratagems for desperate situations



Fig. 1. — Figure IV-A: The Virtual Lecture Hall.

In each area of our virtual learning environment, there are six buildings, in each of which hosts all the material related to each lecture. Each lecture corresponds to one of six specific stratagems that belongs to one of the six situations of war.

These 36 ancient Chinese buildings are gathered in an Asian style village.

B. Virtual Classroom

Contrary to the “powerpoint” lecture courses and traditional online courses that students download lecture notes and upload assignments and participate group discussion through Blackboard or WebCT, the framework we build offers Multiple intelligences, active learning, practical knowledge, use of educational technology, collaborative learning.

We created 36 virtual classrooms in our virtual learning environment (See Figure IV-B). Each classroom was set up according to the context of each war stratagem. In each classroom, there is a presentation (powerpoint) display board and a TV screen beside it. The instructor can upload powerpoint slides and video clips a priori. Once the lecture material is uploaded to the server, the students can login Second Life using their own avatar account and study the lecture material at any time and anywhere in the world.

The students are able to view each page of the lecture notes and watch the instructor’s lecture video on the TV screen at the same time. The synchronization between the powerpoint slides and corresponding video or audio guides is automatic. The students can choose to advance or rewind to a particular section of each lecture by simply clicking “forward” or “backward” buttons.



Fig. 2. — Figure IV-B: Lecture room examples.

C. Battlefield

The battle field we created will be used by the instructor to demonstrate each specific Chinese war stratagem, as well

as by the students to practice implementing new stratagems created in class or as homeworks/projects. Our framework offers a simple interface, which enables both the instructors and students to control the movements of the soldiers to illustrate a stratagem. Three observation perspectives were created to offer a user different views on an execution of each battle strategy. The three observation perspectives are: sit alongside the general on one army, or sit alongside the general of the opponent side or, view from a vantage point high above the battlefield (See Figure IV-C)

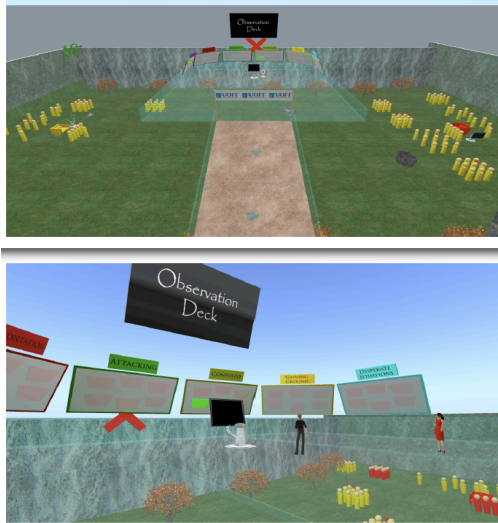


Fig. 3. — Figure IV-C: The sky view of the battle field and the observation deck in the battle field.

D. Simplification of Second Life Script Language and An Example

During the development of our project, we noticed that:

- The target users of our virtual learning environment are not computer science or I.T. professors or students.
- Manipulating the objects in Second Life is not trivial to someone who was never exposed to any computer programming language.

We decided to simplify the script language, which was used to manipulate the Second Life environment and objects. In fact, we created a layer between Second Life environment and our end user. Instead of letting the end user of our Virtual Learning Environment to program directly using Second Life scripts, we allow the end user to describe a stratagem execution in layman words. Our middle layer program will automatically translate what the end user wants to the script language that Second Life understands. The details are explained in the following example.

Figure IV-D shows the powerpoint display board and TV screen in lecture room 18: “Close the door to catch the thief”

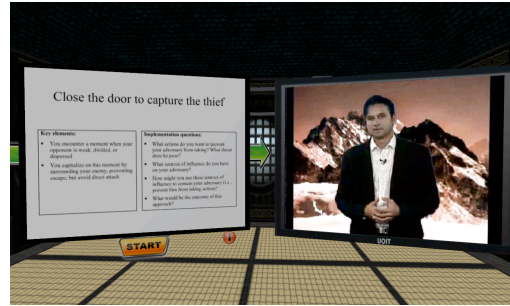


Fig. 4. — Figure IV-D: Close the door to catch the thief stratagem explanation in the lecture room.

stratagem. In the battle field demonstration, we use red and blue soldiers to represent two armies in a battle. The red team uses “Close the door to catch the thief” Stratagem by separating the who army into two groups:

- group 1 fights against the blue army face-to-face;
- group 2 sneaks from each side of the battle field to the back of the blue army.

Once group 2 soldiers arrive at the back of the blue army, it gradually circles around on each side until both groups from the red army trap the entire blue army in the middle and eventually red army will attack the blue army and win the “game”. The following example shows the simplified script of “Close the door to catch the thief” Stratagem.

Script detail of “Close the door to catch the thief” Stratagem

```
// audio indicates the video URL is the next line: links to a short
// explanation for this stratagem audio; youtube.php/watch?v=a-etKG-
// qjM;
```

```
//These units stand in front of the blue army chariot
player 0; colour blue; position 18, 32 facing 90; wait 63; die;
player 1; colour blue; position 18, 33 facing 90; wait 63; die;
player 2; colour blue; position 18, 34 facing 90; wait 63; die;
player 3; colour blue; position 18, 35 facing 90; wait 63; die;
player 4; colour blue; position 18, 36 facing 90; wait 63; die;
player10; colour blue; position 20, 34 facing 90; wait 63; die;
... ..
```

```
// This is the group that sneaks around to the back
group 1;
position 113, 65, facing 270; colour red; move forward 125, speed
0.5; goto 32, 50; fight 1;
```

```

goto 30, 62 facing 270; move forward 44; rotate left 90; move
forward 17; fight 1;
goto 3,34, facing 90;
// This group is attacked first by group 1
group 6;
colour blue; wait 32; rotate left 10; wait 1; die;
// The second group to be attacked by group 1
group 4;
colour blue; wait 49; rotate left 90; wait 5; die;
// Large force of the red army
group 9;
position 113, 34, facing 270; colour red; move forward 104, speed
0.5; fight 55;
// Large force of the blue army
group 8;
position 4, 37 facing 90; colour blue; move forward 103, speed
0.5; fight 54; die;
// Keyword end, lets the parser know the script is done
end

```

E. Key Features

Compare to the other online courses, our virtual learning environment offers the following features:

- Lectures on Demand:
The PowerPoint's and videos clips are viewable by the students at any time as long as they have internet access.
- Interactive Battle Field:
The battles field allows the instructors to demonstrate the course material using animation as well as allows the students to practice the knowledge learnt and produce assignments in animation.
- Simple User Interface:
Easy- to-use script allows students to create animated demos of stratagems relating to the course concepts.
- Fun and Highly Interactive Environment:
The real classroom feedback (from both students and professors) results well illustrate that explaining dry course material/concept to the students using animations rather than verbal description is a more powerful methodology to engage the students. Both students and instructors think using Second Life this online game virtual world is a new and fun experience and it encourages them to explore and practice the knowledge related to their course.
- Collaborative Teaching/Learning
The online virtual world we used to build our virtual learning environment opens the door for students collaboration and student(s)-instructor interaction when they are physically apart. This reduces the constraint usually happens in traditional group work setup. It also increases the possibility and desire for students and instructors to work collaboratively.

V. CONCLUSION

Traditional teacher-centered learning methods and theories do not fully integrate technology into the learning environment, whereby the teacher/instructor dictates what is learned and when it is learned. Contrary to the traditional teacher-centered learning methods, video games present a learner centered approach to education whereby the player controls the learning through interactivity and allows the player to

learn via an active, critical learning approach. Virtual environments and video games offer students the opportunity to practice their skills and abilities within a fun, flexible and interactive learning environment. Therefore, to carry out an effective, interactive and fun learning environment is one of the significant factors to guarantee the sound development of online education. The virtual learning environment we created in Second Life involves the conceptualization and implementation of two main areas for a Business Strategy course: virtual classrooms and a battle field. The combination of PowerPoint's, videos and/or audio clips through Second Life enables the students to study the lecture material at any time and anywhere in the world with internet access. The highly interactive battle field allows the students to visualize how ancient war stratagems were carried out in animation. The easy-to-use script framework allows the students to create animated demos of stratagems relating to the course concepts. Currently we are working on generalize our virtual learning environment from course-specific to multi-course supporting.

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