

Second Life as a Learning and Teaching Environment for Digital Games Education

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Abstract

Previous studies show that online virtual worlds can contribute to the social aspects of distance learning, improve student engagement, and enhance students' experience as a whole [4]; [3]. This paper reviews previous research of using online virtual worlds in teaching and learning, compares Second Life with traditional classroom sessions and the Blackboard, and discusses the benefits and problems of using virtual environments in the post-sixteen education and how they affect students' learning. It also reports a study of using Second Life as an educational environment for teaching games design at undergraduate level, and investigates the impacts and implications of online virtual environments on learning and teaching processes and their application to digital games education. The sample was 27 first year students of the Computer Games Modelling and Animation course. Students' views on using Second Life for learning and teaching were collected through a feedback questionnaire. The results suggest that virtual learning environments like Second Life can be exploited as a motivational learning tool. However, problems such as identify issues and lacking of role markers may change student behaviour in virtual classroom. We discuss this phenomenon and suggest ways to avoid it in the preparation stage.

Keywords--- virtual environment; interactive learning environments; virtual reality; Second Life; virtual classroom.

1. Introduction

Online virtual worlds such as Second Life (SL) and OpenSIM have been recently used for learning and teaching [9]; [10]. Recently, Second Life has become one of the most popular virtual classroom environments used in higher education in the UK and USA, e.g. University of Edinburgh, Open University, University of Derby, Coventry University, and University of Plymouth in UK. The Harvard, Texas State, and Stanford are just a few of many American universities that have set up virtual campuses where students can meet, attend classes, and create content together [8]. The

subject areas cover undergraduate and masters courses in biology, psychology, forensic science etc.

Previous studies show that online virtual worlds can contribute to the social aspects of distance learning, improve student engagement, and enhance students' experience as a whole [4]. The main benefits include social dynamics in online virtual worlds which can affect students' sense of belonging, especially for isolated students (e.g. part-time, distance learning, international students due to language or culture barrier), and the 'live' element of virtual environments. Online virtual worlds provide social learning [2] spaces where the learning processes of observation, reflection, and assimilation are involved, and they encourage social aspects of learning through communication and interaction in the virtual learning communities. Additionally, the role play element of virtual environments provides a new way for students to analyse and reflect on the events and decisions especially in subjects such as history and forensic science.

The rest of paper is organised as the follows: in section 2, we describe an experimental lecture session in SL for our game design module in the Computer Games Modelling and Animation programme, delivered both in the games lab in the real world and broadcast live in the virtual games lab on the University of Derby Island in Second Life. Students who attend the lecture responded to a questionnaire concerning their attitudes toward using Second Life as a learning tool. Section 3 reports the outcome of the student survey. Next we discuss the problems with using virtual worlds in higher education in section 4, e.g. identity issues, grieving, lacking of teacher's role markers. Finally, we will draw conclusions from critical reflection and student feedback in section 5.

Organising virtual seminars or conferences in SL is only starting to become real recently when Intel's bi-annual Embedded Channel Conference was cancelled as a cost-savings measure in the first life but the conference organisers managed to deliver the same content and level of interaction in Second Life (Immersive Workspaces in Second Life, 2009). However, Intel doesn't see virtual world events as a full replacement for real world activities as much as an additional tool for communication, collaboration, and community building. They believe that *mixing and matching real world meetings and conferences with virtual world events* can keep people connected at a fraction of the cost and

give them a chance to learn and work together. The experiment of two-world lecture that we describe in this paper is the first attempt to mix and match real world educational activities with virtual world events.

2. Methods

We used SL for two lecture sessions at University of Derby during the 2008-2009 academic year to supplement face-to-face instruction in the first year game design module of an undergraduate computer games modelling and animation course. The content of the lectures is about play-testing of games. The learning objectives of the sessions are:

- Outline and define various types of testing used for quality control in game production
- Explain how quality is assured in a game studio
- Design a questionnaire for a playtesting session to cover quality, usability, and fun of a game.
- Peer review a fellow student's game and produce a bug report

27 students attended the virtual lectures and 17 questionnaires were received after the sessions. The age range of the 17 samples was 18 to 34 years (mean = 21.7, SD = 4.1), 1 female student and 16 male students. All participants are on-campus learners.

2.1. Prepare for learning and teaching in SL

To prepare for a lecture in SL, a virtual classroom or lecture theatre which has functions like a traditional classroom is necessary if the educator wants a classroom environment similar to the real world. There are many virtual learning spaces available in SL, which typically include a large lecture hall or auditorium for presentations, and smaller classrooms for discussion. The educator may want to purchase one of these, modify according to his educational needs, and put it on the institution's private island. There are sandboxes available for building if the educator is able to build his own learning area. In this case owning land may be less of an issue. If the tutor holds the class sessions in areas where only her students are permitted, she has to be the land owner who can set permissions to allow only certain users to access the area. An advantage of this is that it's easier to prevent situations such as grieving.

It usually costs money (the SL currency *Linden dollar*) for educators in order to teach in SL. Although many activities are low cost and there are many freebies available which might suffice, uploading images into Second Life costs 10 Linden dollars for each. To simulate a PowerPoint presentation in SL will need access to a few Linden dollars in order to upload the slides as images. The tutor can buy a presenter or use a thin cube with scripts to control the presentation. In addition, it will cost a few hundred Linden dollars if the tutor decides to pay students Linden dollars for taking surveys in Second Life.

Classroom tools will be very useful for communication, e.g. presentation board, drop box, gestures, and interactive whiteboard. Besides basic gestures available for avatars, teaching gestures which appear in class, such as pointing presentation, request silence, and agree (nodding), can be created for the tutor avatar; student gestures such as raising hand could be integrated in the virtual learning space in which gestures are triggered via shortcut keys. A class register is an easy way to monitor student attendance of virtual lectures and to associate students' SL names with their real names. A script which sends a notification to the tutor when a student leaves the classroom during a session could prevent students from wandering away from the learning space.

Since I am not the land owner of the university island, I approached the land owner to ask for permission to modify the virtual classroom, purchased (and created) classroom tools and moved them into the classroom, uploaded presentation slides as images into my SL account and moved them onto the presentation board in the front of the room, and tested all the tools. Just like in the real world, it is extremely common that the tutor who delivers the lesson is not the owner of the facilities, and has no right to modify them. Therefore, it is important that the tutor and the land owner should work together closely to make sure that the virtual learning area is ready before a session begins.

Having some time to get students comfortable with Second Life before any learning and teaching activities is essential. Students need to be able to use the basic controls, such as moving, flying the avatar, changing viewpoint, chatting and IM, before attending a virtual lecture. The novelty of the virtual environment may distract students' learning if introductory time is not adequate.

It is also advisable to warn students about aspects of SL that they might find uncomfortable, e.g. harassment and mature content. According to Linden Lab's statistics, 18% of the world has been designated to have adult content. Reuben Steiger, founder of the Second Life business consultancy, estimated that sex accounts for 30% of the SL economy. Students can easily wander out of dedicated learning spaces and enter the big world of SL. Introducing students to this virtual world might expose them to mature content and virtual shootings, sexist, racist, or offensive avatar behaviours.

Finally, user groups are a nice feature of SL especially for student management. For a hundred Linden dollars, the tutor can set up a group for students, invite all the students to join the group, and then as the group owner the tutor can control messaging and certain activities, e.g. land ownership, editing privileges, to the entire group at once. When setting up the group, the group owner (leader) can assign a title for the owner herself and for the members of the group. For example, in our group, the owner is called the "lecturer" and the members are called "students". The group facilities will make in-world student management much easier. More importantly, the group facilities give the educator more

control over the group because it is not uncommon that the lecturer only has an ordinary account as students' and has no privileges other than modifying classroom tools, for example, students are not allowed to turn slides by pressing the forward button on the presentation board.

2.2. Virtual lecture and student survey

In teaching week 10 of the 2008-2009 academic year, two lecture sessions for the game design module have been delivered both in the school's games lab as usual and in the virtual lab which was modelled and textured based on the real environment on the University of Derby Island in Second Life. Fig. 1 shows a snapshot of the virtual lab.

Students were asked to do the following tasks before attending the lecture sessions:

- Register a SL account
- Explore the world, search and teleport to University of Derby's island and find the virtual computer lab B213.
- Learn the basic controls of movement, communication, transportation, appearance, searching, and inventory. Visit the Help Island and Orientation Island which have many good tutorials instructing new residents on the basics of SL.

The lecturer also spent half an hour helping them familiarise with the basic controls before starting the lecture session. During the lecture, students logged in SL and teleport to the virtual lab B213 to attend the session, while physically they were in the real lab B213. Student responded to a questionnaire after the session concerning their attitudes toward using Second Life as a learning tool.



Figure 1. A snapshot of the virtual classroom

The questionnaire is a revised version of Hong Kong Polytechnic University's Student Questionnaire on Second Life for the PolyU Virtual Hotel Project [10]. It contains five parts: section 1 is about students' social orientation, personality, and learning styles; section 2 is about SL itself,

e.g. basic controls, features, usability; section 3 is focused on questions relating to student attitudes towards learning in SL; and section 4 is about learning through games and simulations other than SL; and section 5 is for collecting demographic data and students' personal habits of using the Internet.

Since the students reported that they were unable to create a basic SL account in the university computer labs due to using the same IP address. They were given temporary accounts which we had prepared before the session.

2.3. Using SL avatars for character design

Since SL is a good example for player-designed characters, we also used SL for a tutorial exercise on character design for the same module in week 11, following the virtual lecture sessions. The students were asked to model their avatars based on their own images.

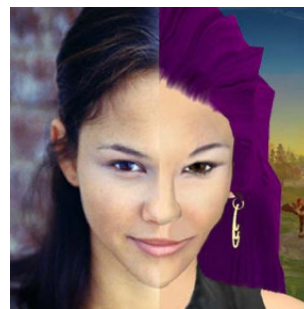


Figure 2. A Second Life avatar based on the real life image (source: secondlifemarketingtips.com)

3. Results

The 30 minutes introduction to SL was followed by about 50 minutes virtual lecture in SL.

3.1. Observations of the class

During the lecture the students can either watch the PowerPoint presentation in front of the lab as they normally do in a regular lecture or watch the presentation in the virtual lab. Students have the choice of which way to engage. If they choose the SL presentation—most of them did—they can use gestures such as raising a hand on their avatars if they want to ask a question. They can also use chat or IM to communicate with each other. Almost all the students are engaged in SL activities and switch to the real world presentation occasionally.

3.2. The incident of grieving

Griefing is essentially online bullying and can occur either verbally (written or spoken) or physically which would mean that individual's avatar could be impeded, damaged, tampered with or destroyed [1]. A griefer is a person who

derives enjoyment from being obstructive, diminishing or preventing the enjoyment of others. Depending on the environment, there are a wide variety of specific behaviours such as stealing, blocking, player-killing, and verbal abuse. Griefing is not uncommon in Massively Multiplayer Online (MMO) worlds like SL.

The second virtual lecture session was stopped by an incident of griefing where a student avatar deliberately kept bumping into the virtual tutor and pushing her with his own avatar. It was difficult to identify the griever in the real world due to the facts that most participants were using the temporary accounts provided by the tutor and that a user can change the appearance of his avatar instantly. As the lecturer I felt embarrassed at the moment but didn't bother to waste time on checking the identity of the griever. The lecture was resumed with the ordinary lecture in the real world.

An important lesson from this experience suggests that the virtual tutor should be able to take disciplinary actions such as ejecting the griever from the classroom. This can be done if the tutor is the land owner of the virtual learning area or through uses of scripts to kick the griever out of the classroom.

3.3. Survey results

The survey helps us to understand needs and desires of using virtual environments for teaching and learning from the students' prospective. As it was possible to skip questions, for each of the findings the percentage is based on the number of respondents that answered that particular question.

Section 5 shows that 52.9% of the students spend more than 10 hours using the Internet for learning each week, and 47.1% spend 5 hours to 10 hours each week.

Asked to rate the experience of using SL for learning on a scale of 1 to 5 (3 being neutral) the average score was 3.4 out of 5, with 47% rated it 'interesting' (4 being interesting). Students' comments on this experience can be classified into three categories. Positive feedback includes:

"It was funny, unique and different."

"It was an interesting concept to be able to have a class online. Makes it more enjoyable."

"I like the idea of been in an interactive world with people I know."

Some students don't prefer SL for various reasons but like the idea of using online virtual environments in learning and teaching:

"I have played MMO games in the past, an it's not anything new to me. To be honest the graphics let it down but I guess this is so it can be played on almost any PC with no problem, so its worldly accessible, so in that terms it's a good community game for new and old players of MMO."

"I didn't particular like Second Life but would like this kind of lesson on a different MMO."

Others (some students who attended the second session) commented on the griefing incident:

"The idea is good, but with wrong audience, I am quite upset about those childish guys."

"Second Life isn't meant for learning."

"It is different and therefore works (until people ruin it)."

Asked to rate the benefits of using SL to assist learning, the most valued benefits to students were:

- Fun (the average score was 3.4 out of 5)
- Interactive (the average score was 3.1 out of 5)
- Arouse learning interest (the average score was 3 out of 5)
- Improve collaboration (the average score was 2.9 out of 5)

The least valued features were:

- More realistic (the average score was 2.4 out of 5)
- Updated information (the average score was 2.6 out of 5)

This is unsurprising considering the facts that all the subjects were Computer Games Modelling and Animation students who are trained to be game artists and that 59% of them have used virtual worlds before, such as World of Warcraft or Habbo Hotel (Questionnaire Part D).

The results confirm Carr [4]'s finding that students with a gaming background when first introduced to Second Life were generally scathing. This suggests that it should not be assumed that 'students like games so they will like Second Life'. Most criticism of SL is related to its graphics, constant freezes, and lack of game goals compared to ordinary online games like World of Warcraft.

Some students felt that games and virtual worlds as part of learning could easily become tragic and that "*Second Life isn't meant for learning.*" They would need to understand the educational benefits of games and virtual worlds, for example, cost efficiency, accessibility, and flexibility by enabling educators and learners around the world to synchronously collaborate, communicate, and learn. Online virtual classrooms are not automatically good for learning and teaching just because they are simply new. This result is in line with the July 2007 survey of 501 students aged 16 to 18 from across the UK [11].

3.4. Virtual classroom as a supplement to conventional teaching

Asked to compare SL, lecture notes on the Blackboard, and borrowing notes from a classmate if they are unable to attend a lecture physically (n=17), 65% prefer lecture notes on the Blackboard, 47% felt that live presentation in SL was 'slightly better' or 'best' for this purpose, 23.5% of all would like to combine SL virtual lecture and lecture notes on the

Blackboard. Unsurprisingly, none would borrow notes from a classmate solely.

In most of the previous experimental teaching activities mentioned in section 1 including our own experience of teaching the Game Design module of a computer games undergraduate course, Second Life is used as a tool to supplement face-to-face instruction rather than replacing classroom teaching. However, some ad hoc evidence in literature [14] shows that distance learners and part-time learners could benefit more than on-campus learners in a virtual classroom due to its flexibility that allows students to avoid travel and physically attending classes while still retaining a collaborative learning experience.

4. Problems with using virtual worlds in education

Different rules of confidence and trust apply in virtual worlds than the “first life”. The lines between lecturer, students, and residents blur in the Second Life. We can learn much about classroom dynamics through the analysis of strange situations which can only occur in an immersive environment like Second Life.

4.1. Pseudonymity and identity issues

Pseudonymity is anonymity that hides a person behind an online persona via a username. While pseudonymity may allow people to feel more free and disinhibited to discuss things, it allows people to hide behind their computers while saying or doing whatever they want with little ramification. Psychologists [17] found that online communication is far more disinhibited than face-to-face communications.

Every avatar in SL has a name which is different from the player’s real life name. Residents in SL can use any first name they like and choose a last name from a drop-down list of choices when they join. This means that the teacher has to remember two names for each student. The fact that avatar appearance can be changed instantly makes it more difficult for the teacher to remember their students. If the educator opts for “group setup” which is available with a fee, she can choose a new last name for the whole class. All the students will share the same last name. If she doesn’t use the group setup option, each student needs create his or her own username and log in separately. We asked our students to use their real first name as SL first name so that we can identify them more easily.

Since students reported that they could not create a SL account in the university labs because Linden Lab limits individual users from creating more than 5 accounts from any one IP address. They end up using the temporary accounts which we had prepared before the sessions.

4.2. Griefing

The incident occurred in one of the virtual lecture session is a type of griefing. Griefing is closely related to the pseudonymity feature of online worlds and individual’s attitudes towards game avatars.

Some players may express their genuine personality online and use an avatar to represent themselves, whereas others may use virtual worlds to play out characters who have little relation to their own identities. If an individual sees a virtual world as a game environment, they are less likely to see other avatars as individuals with ethical rights so much as other game pieces. Though SL is an online virtual world rather than a game due to lacking of game goals, most people still view it as a game. Just by calling SL a MMO (Massively Multiplayer Online) world like many students did in their questionnaires, one shows his understanding of the virtual world from the literal meaning of *player*. This gives a ground for viewing SL avatars as a play thing rather than taking them seriously. Paired with pseudonymity this can bring potential disaster for a virtual classroom.

Armitstead-Pinkney [1] points out that the main issue in terms of ethics and virtual worlds was the differences between virtual world situations and real world situations. One cannot assume that each situation is ethically equal. It is unclear whether actions taken in virtual worlds can be harmful to others. For instance, in real-life situations, the ethical issues of bullying, either verbal or physical are simple; there is often clear harm to the victim. In virtual worlds it can be less clear as to whether harm occurs. Damage to an avatar is not a physical action and it could be argued that it is only a game piece and therefore damage to it should not count as harm, not to mention hurting an avatar’s feelings. The issue of harm in a virtual world is dependent on whether one views an avatar as a character/game-play or self-representation/life-play.

We didn’t try to identify the griever of the incident in the real classroom. Even if we did, it seems not appropriate to discipline a student for mischief in a virtual world; an in-world ‘virtual’ discipline would be more suitable for this situation.

Conklin [5] states that it was critical that the virtual learning environment maintains a proper balance between *encouraging freedom and exploration* and *not getting out of control*. Setting ground rules and telling students which behaviours are not acceptable in a virtual lecture in advance is a good way to prevent griefing in the virtual classroom. The incident may be preventable, had we done this before the lecture sessions. The ground rules should include basic community ethics, such as harassment, assault, indecency, and disturbing the peace, and rules for the class, such as arriving on time and not leaving without permission. It is a good idea to display these rules on a poster on the wall or the door, just like some shops in SL do.

Additionally, an in-world discipline mechanism can guarantee the class not getting out of control in case griefing

does occur. The virtual tutor should be able to take disciplinary actions such as removing a griefer from the classroom.

4.3. The teacher's role markers

This unique situation of education in SL is due to the lack of identity and role markers [13] in virtual worlds. In the real world the role of the tutor is identified by visual/physical and verbal markers, such as age, position in the classroom, and who is giving speech, which clearly mark authority and sanction by the university to be the educator in the room. The teacher stands at the front of the class, and is usually older than students. They have a roster in hand, speak to begin the lecture session, and set the agenda for the class. They have the power to give permission to students to speak. However, the visual differences between the teacher and learners blur in Second Life where everyone is physically equal. The tutor doesn't necessarily appear older than students, and they most likely don't carry a brief case or other markers of authority except a tag above their SL name marking them as the leader of a group in which students are members (see Fig. 3).

If the voice feature is not used, the tutor can't talk louder to get the audience's attention by typing texts. Robbins [13] suggests that the lecturer can use all capital letters in text chat to lead a discussion so that students can easily pick out her text out among the lines of chatter, but this verbal marker is easily snatched away if one of the students decides to use capitals too. Since the voice viewer of SL was released in 2007, educators can utilise this feature to regain the verbal marker of the teacher role, especially in the regular situation that the teacher is the only one who has a microphone in the virtual and real classroom. Other in-world communication modes like IM and group IM can be used to establish or enhance the verbal marker of the teacher.



Figure 3. A tutor avatar with a tag above her head

The lack of role markers encourages equality among the class and blurs the line between teacher and student in SL where the teacher loses obvious authority and the students gain in ownership of their own learning. This isn't necessarily a bad thing if learners are self-disciplined.

To prepare for unforeseen situations that might occur in a virtual lecture in SL, it might be useful for the tutor to create a group and ask students attending the virtual class to join the group so that the tutor can change their title to 'student', which will show in the tag above every member of the group, and hence to increase visual role markers for distinguishing between the educator and learners. Other ways to enhance role markers include changing appearance of the virtual tutor to make his/her look more mature and to wear a formal, professional dress, and carrying props such as a brief case, etc. In addition, using voice chat can regain the verbal role markers of the educator.

4.4. Information overload

Another problem we found is information overload for the teacher. Since we did the SL lecture in real-time in the case study, i.e. the virtual lecture in Second Life and the real lecture in 'first life' happened at the same time, the teacher who delivered the lectures had to switch her attention constantly between two worlds: apart from talking the subject content, she needed to observe the class in the real world and SL in case any student raising their hand or something, move forward through slides in the two worlds (on presentation screen in the real environment and on SL presenter), control her avatar, adjust the viewpoint in SL in order to watch the presenter and to observe the class, response to student chat (occasionally), and sometimes ask questions to encourage interactivity. According to Festinger [6], attention switching can be accelerated to the point of information overload which produces the appropriate level of cognitive dissonance. A lesson from this experience is to avoid doing this again in real-time unless a teaching assistant can offer help on either one of the worlds.

4.5. Reflection on the survey questionnaire

Having conducted the experiment and analysed student feedback, we think that two parts of the survey questionnaire could be improved: assessment of students' learning styles, especially their social learning styles [12], could be added in Part A; and add more specific questions in Part C to directly address the issues that we found important for effective learning in virtual environments.

In Part A, beside student learning habits and attitude towards technologies, we want to determine how students interact in the classroom based on Grasha and Reichmann's types of learners: independent, dependent, collaborative, competitive, participant, and avoidant.

In Part C, we will add questions like "How anonymity in SL is important to you?" and suggest a list of possible

activities in SL, such as virtual seminar, group discussion, visit museums, and curriculum-related activities (e.g. modelling objects, creating animations), and ask students to rate, so that we may draw more information from students even if they don't answer the open questions in the questionnaire.

A section to measure presence in SL could be added to the survey questionnaire for future experiments. The data will be used to find out if matching virtual environments with real world environments might improve the sense of presence without using an immersive HMD to block out real world stimuli.

5. Conclusions

The educational potential of SL is only beginning to be realised. We have demonstrated our experimental use of SL in teaching game design on a computer games course and reported student feedback in this paper. Through our reflection, we have discussed the implications of SL in post-sixteen education. We don't evaluate the effectiveness of using SL as a learning tool in terms of the content of the curriculum, since we only used it for two lecture sessions and the data collected is not sufficient to draw a conclusion on this. However, based on our limited experience of teaching in SL we conclude that SL can be used to deliver lectures, and it might benefit distance learners more than on-campus learners. Still, it could be a useful supplement to conventional lectures for on-campus students if well-prepared. We suggest the following steps when preparing a virtual lecture in SL:

- Asking students to register their own SL accounts using real first name. This might partially solve the identity issues.
- Allowing at least one hour introductory session prior to the teaching so that students can familiar with the basic controls
- Warning students about aspects of SL that they might find uncomfortable such as harassment and mature content
- Policy making. Clearly state the behaviours which are not acceptable in learning areas, e.g. harassment, assault, indecency, and disturbing the peace.
- Having in-world discipline mechanics ready for unexpected situations, for example, virtual warning cards or removal from the virtual class
- Preparing a virtual classroom or auditorium with classroom tools according to the learning activities planned
- Uploading teaching materials, e.g. presentation slides
- Preparing a questionnaire and SL currency to pay students for taking survey (if applicable)
- Setting up a user group to facilitate in-world student management and enhance visual role markers
- Changing avatar appearance of the virtual tutor to compensate for the lost visual role markers

- Using voice chat whenever possible to enhance verbal role markers

Apart from virtual lectures, SL is most suited to active learning activities such as modelling (building), coding (scripting), and discussion groups. We will explore/utilise modelling and coding activities for future practice in teaching game design, modelling and animation.

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