Virtual Worlds for Enhancing E-Learning and Collaboration

SELF 2012 Project Report

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Background

A virtual world is a realistic, three-dimensional, computer-simulated environment. The best-known example is Second Life. Typically, virtual worlds are made available via the internet and can be used by multiple, interacting users who inhabit the world as “avatars”. Usage is growing – it was estimated in 2009 that there were around 136 million active users of virtual worlds. Their potential for use in education has been identified for some time, and several universities have developed some form of virtual campus and have attempted to conduct teaching online. Virtual words open up exciting possibilities for developing innovating teaching methods, but also present new challenges.

To our knowledge, this project was the first attempt to use virtual worlds for teaching purposes at the University of Stirling. The aim of the project was to use virtual world technology to create an online learning space to be used by University of Stirling students.

Project objectives

As originally envisaged, the project was very ambitious in scope. The original aim was to create an online learning space with a wide range of resources and environments, capable of being used flexibly by different subject areas. The vision was of a virtual university building, complete with lecture halls, tutorial rooms, common rooms and recreational areas, as well as subject-specific areas such as a “sandbox” area for Computing Science students to work on assignments and projects.

As the project progressed, it became clear that this vision needed to be refined and focussed. In the short time span available, it would not be possible both to create a large and rich general-purpose environment for all students, and to fill it with enough interesting subject-specific teaching content to hold the attention of students and give them reasons to visit the world. We decided, therefore, to focus on the latter goal, and to create a world focussed on a specific computing science module. We chose the module CSC9N5, Multimedia and Human-Computer Interaction, because the content of this module lent itself particularly well to demonstrations within a virtual world setting.

Achievements

The SELF grant was used to fund the development of a virtual world that could be used in CSC9N5 laboratory classes to demonstrate how changes in lighting and sound effects can affect a user’s experience of a software interface.
The development work was carried out over six weeks during Summer 2012 by third-year student Mark Borkowski. After investigating options, we chose to use the New World Studio software package, which is a free tool for developing and hosting virtual worlds. New World Student incorporates the Open Simulator virtual world platform, which is essentially a free, open-source clone of Second Life.

The outcome of this work was a virtual “island” containing several demonstrations of sound and lighting effects as well as a few general-purpose teaching areas, such as a computer lab and a lecture screen with seating. Screenshots of the island are shown in Appendix A. The island was used in laboratory classes for CSC9N5 during the final teaching week of Autumn 2012. Students were given access to the island along with a short worksheet (Appendix B) with instructions and suggestions of things to do while within the virtual world. At the end of the session, students were asked to evaluate the experience by completing a questionnaire.

**Evaluation**

The laboratory sessions were not very well attended, perhaps because they took place near the end of teaching, close to assignment deadlines, and because students were not required to attend or given credit for attending. However, those students who were there engaged well with the virtual world and appeared to enjoy the experience. The worksheet they were provided with was quite short, and many students quickly went off-script and improvised their own activities. We were surprised by how quickly some students mastered the functions of the virtual world, and taught themselves how to perform actions, such as adding new trees or reshaping the terrain, that were not described in the worksheet. Some students enjoyed having this (unintended by us) freedom to explore and modify the world they were given. However, a few other students expressed annoyance with what they regarded as the indisciplined behaviour of their classmates, and would have preferred a more formal and structured experience.

Ten students completed the questionnaire, and their answers are summarised below:

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>No response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you enjoy the Virtual World setting for the laboratory?</td>
<td>9</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Did you find this laboratory useful for CSC9N5?</td>
<td>7</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Would you like more CSC9N5 laboratories to use a virtual world?</td>
<td>6</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Would you like to see virtual worlds used more extensively on the course in other modules? (Perhaps available outside of laboratory hours.)</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Which areas in the world did you try?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information board (snowy area) – 7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surround sound demo (fountain) – 8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transparency demo – 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Echo test, sound blocking test (in old house) – 7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching area (outdoor computer lab) – 8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking sound test, drum test (in wooden house) – 7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shadow test, sit and chat, window blinds demo (in brick house) – 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other – “under water, I drowned!”</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Which virtual world functions did you use?**

- Flying – 10;  Chatting – 5;  Changing appearance – 6;  Building – 4;  Befriending people – 1

**Do you have any suggestions for improving the virtual world?**

- “More clear on what we had to do in the virtual world”
- “More guns”
- “Initially could have been clearer what we were doing”
- “More availability”
- “Use something that can’t be abused quite so easily”

Our own evaluation is that the project was successful. The laboratory session using the virtual world was engaging and enjoyable for students, and provided a high-impact, live demonstration of some of the topics taught in the module. However, the project has barely scratched the surface of the potential offered by virtual worlds in teaching, and there is much that can be explored in future work.

**Future development**

Specific improvements to the CSC9N5 virtual world are suggested by some of the comments from students. Protections need to be added to restrict students’ ability to modify and even vandalize the environment. This is a technical issue and is easily solved. More detailed worksheets should be developed giving clearer and more structured instructions about what students should do and what learning outcomes are to be achieved while within the virtual world. The request for “more guns”, however, is best ignored!

More generally, we would like to work towards our original goal of a general purpose teaching environment, suitable for use by all students, and accessible remotely at all times rather than just within a computer lab environment during a scheduled class. This environment should contain resources that complement traditional teaching arrangements; for example by allowing some classes to be conducted “in-world”, or by providing new ways for students to return feedback and to support one another’s learning.

Further development along these lines is being carried out in two ways. First, we have applied for a follow-up SELF proposal in 2013 to develop a virtual world to enhance student feedback. This project is now well underway, and will develop an environment for use by all students that will give them new feedback mechanisms such as virtual suggestion boxes and notice-boards, as well as a single point of access to traditional methods such as module
evaluation questionnaires, the RATE awards, and the National Student Survey. Secondly,
many Computing Science Honours students are interested in doing final-year projects using
virtual worlds, and this can be exploited for further development of our project. In 2013-
2014, we have a student who will be looking at the integration of virtual worlds with Virtual
Learning Environments. The aim of this is to make it easier for lecturers and students to use
teaching materials such as slides, hand-outs, and quizzes, within a virtual teaching
environment. By these means we hope to grow the project, and eventually establish a firm
basis for the use of virtual worlds in teaching at the University of Stirling.

Appendix A: Views of the CSC9N5 Virtual World

Lecture area
Fountain with surround sound demo

Transparency demo
Sound blocking demo

Entrance to brick house
Entrance to wooden house

Walking sound demo
Drum sound demo

Outdoor view
Echo demo

ECHO TEST
This test checks to see if the echo of your footsteps makes you feel like you are in a large room. Try turning off the echo.

button red = on echo
button green = off echo
Appendix B: Lab worksheet

Getting access to the CSC9N5 Virtual Sound Laboratory

1. Start up the Imprudence viewer (from Start/All Programs/Imprudence Viewer/Imprudence).

2. If you see a splash screen saying “Welcome to CSC9N5 Virtual World”, proceed to step 4.

3. If you do not see this welcome screen (or see a different welcome screen) then you must first add the CSC9N5 virtual world to the set of worlds that the Imprudence viewer knows about:
   - Click on the “Grid Manager” button near the bottom of the Imprudence screen.
   - Click on “Add New Grid”
   - Enter these details, then click OK:
     Grid name: CSC9N5
     Login page: http://139.153.253.214:9000/site
   - In the main Imprudence screen, select “CSC9N5” from the “Grid” dropdown menu. This should cause the “Welcome to CSC9N5 Virtual World” screen to appear.

4. Click on the “Create a free account” button. Then, fill in the form to create your avatar identity, choose your initial appearance, and click “Register”.

5. You can now log in to the virtual world with your new account. Explore the world, try out the different sound-based activities, have a go at flying, chat with your class-mates in-world, and finally register your opinion in the voting area. Have fun!