Creating a virtual environment for learning at Loyalist College

Opportunity

Loyalist College in Belleville has been creating simulations for learning since 2006, using Second Life, an online virtual world. A description of one of the projects is included in this series under the title of *Border Simulation – Student learning in a virtual world at Loyalist College*.

Second Life had provided the Virtual World Design Centre at Loyalist with the opportunity to rent space and create a virtual campus, using the structures within Second Life. The Centre staff developed skill sets in educational and physical design and prototyped applications of virtual environments in learning.

However, Second Life has some disadvantages that limit its usefulness. Second Life is an open source, public system so clients have no control over the performance of the environments and the feature sets made available to users (students). Clients cannot create a customized experience. Loyalist College maintained the intellectual property rights to the simulations they created, but they could not control or sell access to the modules as they were in rented space on Second Life. In addition, Second Life eliminated the discount rental rates for space offered to educational institutions.

Loyalist College wanted to host their virtual world locally, establishing their own criteria for its performance and features, as well as who would be permitted to enter this virtual world. They wanted an environment in which they could be more creative technologically and pedagogically to better serve the students at the College and their external clients from governments, school boards, and organizations such as the US Naval Post-Graduate School.

The College began looking for options that would let them develop and maintain a locally hosted virtual world.

Innovation

About 18 months ago, Loyalist College started using the Unity 3D authoring tool set to develop educational simulations. Previous materials, such as the border simulation, have to be rebuilt in Unity, as they cannot be transferred from Second Life. By the end of 2012, all of the College simulations will be operating on Unity.

Unity is a game authoring software that can be adapted for educational purposes, but it requires far more advanced and sophisticated skills to use than Second Life.

The simulations in Unity are built in an HTML frame with the virtual world embedded on the web page. The simulation is designed with space around its visuals, within the HTML frame, that can be used for workbooks, teaching tools, and links to the learning

management system. For example, students can use personal response devices (clickers) embedded in the HTML frame to respond to questions during a virtual experience in class or at a distance – and the results are presented immediately on the screen.

Two simulations are being developed directly in Unity:

Food Process Operator Simulation: This simulation is being built for use by students in the Process Operator – Food Manufacturing Level 2 Apprenticeship Electrical and Instrumentation course to be offered online this fall. The completion of the simulation is mandatory but the results are not part of their course assessment. The students follow three different scenarios and are marked pass/fail on each. They can repeat each scenario until they have achieved a pass. A record is kept of their participation and success, which can be helpful for the instructor is assessing common points of difficulty.

In the simulation of the factory, the students must choose the appropriate safety gear for their avatars before entering the factory floor. The first entry provides an orientation and then the students tour the factory and make must make the right choices in a precise order to repair machinery.

The simulation will be tested this academic year to assess how well it is meeting its learning objectives, and will then be revised and expanded, with such additions as a virtual catastrophic event as a consequence of wrong decisions on the part of a student. The students can gain virtual experience in machinery maintenance and repair that would not otherwise be possible in a factory setting.

Hospital: A simulation of a hospital has been built for the Hamilton-Wentworth Catholic School Board for grade 10 students to use as part of a career choice course. The hospital environment is modelled on the hospital at McMaster University and is designed to replace or complement the field trip. Multiple students can take a virtual tour of various wards and services at the hospital and get information from text pop-

ups on roles and responsibilities of the areas. The teacher can also lead the students through the hospital or the students can visit individually. The simulation is at the first level of development and is to be reviewed this year at the school board. Additional material will be built in after the first review.

Outcomes and Benefits

The move to Unity is providing many benefits for learners, instructors, and developers, including:

- Using Unity and a local server has improved the service for simulations such as the border simulation;

- In Unity, activities can be integrated on one page, with the student having access to voice, data, visuals, text, exercises, and other supports in one integrated page;

- Access to simulations can be limited to students in the appropriate courses;

- Unity runs in any web page, whereas Second Life was a game client that required a lot of bandwidth to download. Simulations are now more accessible to school boards and other users who have limited bandwidth;

- Simulations can become self-guided, with students interacting with automated non-player characters, so that they can use the simulations in their own time. Previously, the interaction was live and so use was restricted to the classroom or to scheduled timeslots for distance learning;

- Unity requires only a single log-in rather than multiple layers of access;

- The simulations can be integrated with learning management systems so that instructors can track and mark progress in one system;

- The simulations can be made accessible to other post-secondary institutions. Once the Food Process Operator Simulation is tested and revised, it may be available to colleges in Ontario through OntarioLearn, a consortium of Ontario colleges who have partnered to develop and deliver online courses.

- Unity provides much greater freedom for the educators and the Virtual World Design Centre as they can create their own expectations and then look for ways of reaching them – whether technologically or pedagogically.

Challenges and Enhancements

Working with Unity requires considerably more development time than Second Life which provided the virtual world. In Unity, everything has to be constructed, resulting in higher development costs, longer timelines, and requiring higher skill capacities to build the simulations.

Potential

Having had the experience with creating effective virtual environments for learning, Loyalist College is now looking at ways of doing it even more effectively. With their own hub for the virtual world, a goal is to make the experience mobile by enabling students to connect through tablets and other mobile devices. The learners are given opportunities to experience something first hand that they could not otherwise access. Situations that can be intimidating can become more accessible and familiar.

Ken Hudson, the Managing Director of the Virtual World Design Centre, works from the principle that: "Virtual worlds are naturally engaging experiences and therefore hold great promise as learning tools for augmenting the classroom reality." The ways of using virtual worlds for learning are becoming clearer and there are affordable ways for educational institutions to try them out. Loyalist College has developed a lexicon of what works.

The Centre works with clients in government and education as consultants, as artists and builders, and as full-fledged developers for virtual environments applied to learning. These services are available to any post-secondary institution in Ontario. As well, Ken Hudson is happy to share the Centre's knowledge, field questions, act as a point of research, and discuss or speak on the experiences at Loyalist College.

For Further Information

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