

If We Build It Will They Come? Creating a Virtual Classroom in Second Life

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Abstract

The Second Life Multi-User Virtual Environment (MUVE) has been used as an educational resource in many different ways, ranging from simulating the traditional classroom, through interactive experiences, to practical creatational activities. Supporting resources can include traditional multimedia, simulation tools and programming languages. Learning experiences may vary from the wholly extrinsic, learning about the outside world, to more intrinsic study of Second Life's ecosystems and its built environment, or wholly in-world creative work. Within this broad scope, there is an opportunity to support many types of learning, and distance learning in particular. In this paper we propose an analytical framework for virtual learning environments in Second Life based on current practice. We describe the creation of a learning space within Second Life designed to explore how we might support distance learners using traditional environments for extrinsic learning experiences. We reflect on the utility of the framework in understanding the various forces at work in virtual learning contexts and evaluate the student experience. We conclude that despite the potential for Second Life to support distance learners with a broad set of tools and resources, technical constraints suggest that a more effective option would be to provide focused creative tasks for students in a managed laboratory environment.

Keywords

Multi User Virtual Environment, Second Life, virtual teaching environments, distance learning.

INTRODUCTION

While the potential of computer technology to transform education has been discussed for several decades, widespread changes have been slow to appear. Reasons for this are held to include cost, lack of time, lack of technical skills and perhaps unrealistic expectations (Gunn, 1998). In the 1990s research into the potential of virtual reality (VR) as an educational medium became increasingly common. The perceived benefits for teaching and learning include the provision of multiple perspectives for the delivery of material and the ability of students to interact in a three dimensional space (Kuo & Levis, 2002). With the increasing accessibility of Multi User Virtual Environments (MUVEs) such as Second Life, Active Worlds and those build on the Project Wonderland platform, research interest in this type of learning environment has escalated. The US Distance Learning Association believes that a hybrid approach using a range of technologies has positive results on student learning (Doesburg, 2008). Many universities including Ohio and MIT have established virtual university sites in Second Life, while Active Worlds includes high profile projects by, for example, the University of Colorado and London University, and there is a heightened awareness of the possible uses for such sites in supporting tertiary students.

Following a current research theme of mobile and blended learning, the authors began investigating the opportunities for using Second Life as an educational tool. This paper describes a project that grew out of the practical requirements of supporting distance learning for a new introductory course in Information Technology. The authors were tasked with preparing for the first delivery of the course for distance learners, following the first two internal deliveries. As part of this preparation we chose to investigate the potential of Second Life for teaching distance learners. In this paper we begin by reviewing current uses of Second Life as a teaching environment. We then introduce and describe a simple analytical framework, which we developed to encapsulate the various features of Second Life learning to assist us in scoping the activities that we wished to undertake. We then describe a virtual teaching environment that was constructed based on specific aspects of the framework, and explain how this environment was made available to internal students in order to evaluate the practicalities of using Second Life for our distance learners. We describe some of the practical issues in creating such an environment, particularly in the context of limited resources. The paper concludes with some results and conclusions from our experience and our proposals for future work.

SECOND LIFE AS A TEACHING AND LEARNING ENVIRONMENT

In theory, a virtual environment such as Second Life should provide an excellent platform for flexible delivery and online education. Students and facilitators can come together *inworld* to share information and resources, engaging in discussions, presentations, group projects and explorations. Second Life gives the students an opportunity to interact more socially and realistically whether they are distance learners or internal students.

Although there are many educators expressing interest in using Second Life for teaching it can be difficult to gauge the number of institutions that are actively involved. A list of institutions is available on the Sim Teach Wiki, which contains information for educators in Second Life (SimTeach, 2008), but it is important to note that not all active institutions are listed, and not all listed institutions are active. Loon (2008) reports:

“When I did my study (June 2007) there were about 120 institutions listed in the wiki. Using information gleaned from SLED, from interviews in SL and RL, and from exhaustive mining of campus web sites, I tried to determine how many institutions had a serious presence in Second Life. By this, I meant that they owned or rented property, had an ongoing program of teaching or research, or sponsored in-world events. The key, from this perspective, is sustained involvement on the part of more than a lone faculty or staff member. The answer at that time was 65, or roughly one-half of the listed schools. Of those, 2/3 were in an early exploration phase (owned land but had not built, had a few faculty in-world but without institutional support, had received a research grant but had not started the research yet, etc.). The bottom line was that roughly 20 institutions had a serious presence in SL by last summer.” (Loon, 2008)

The type of educational delivery supported by Second Life can range from simulation of the traditional to imaginative programming environments. Early examples of VR educational designs include allowing students to navigate through foreign cities, study the ecology of wetlands, recreate archaeological sites (Kuo & Levis, 2002) and experience game playing to achieve specific learning objectives (Depradine, 2007). However, a simple meeting room for distance learners can have value in itself through the perception of participation in group learning (Doesburg, 2008).

Moving beyond a simple, virtual representation of standard classroom teaching, the Second Life environment provides building and scripting tools that support the creation of learning spaces where complex tasks can be undertaken and immersive experiences provided. Second Life enables students to engage in a range of role-plays and simulations, practicing real life skills in a virtual space or exploring situations that they could not undertake safely or easily in the real world. For example the Second Life platform allows for the creation of immersive environments based on historical places and events. These environments can be used for a range of learning activities including role-plays, action learning and research and historical study. One example is the British Literature Classroom, where students can access course materials by clicking on paintings and furniture across three floors of a virtual mansion. (McDunnough, 2007).

Simulated environments for learning such as museums, galleries, theatres and historical recreations are useful but perhaps a somewhat obvious application of a virtual world. However there are some educational environments within Second Life that point to the potential of this medium for highly innovative learning in scientific disciplines, including computer science (Ritzema and Harris 2008) software engineering (Ye et al 2007) and artificial intelligence and artificial life modelling, such as the Island of Svarga (Au 2006) an artificial ecology system.

Low Risk Realistic Learning

As well as using Second Life as a learning environment to provide educational material that reflects the world outside, it has been used as a context for student experience that would either be impractical, dangerous or prohibitively expensive in the real world. Projects such as the heart murmur simulator on Waterhead Island take full advantage of the interactive abilities of Second Life, using sounds and visual aids to create a learning environment that would otherwise not be feasible (Levine, 2006; Kemp, 2006). It would not be practical to send hundreds of people to a hospital to check various patients' heart conditions. This is where the potential of Second Life as a learning environment promises much, with projects that enable users to do things that would otherwise be difficult to achieve due to constraints such as distance, cost or the physical laws of the real world.

A different kind of bridge between the virtual world and reality is where Second Life has been used to support real world student exchange programmes. For example, a virtual exchange program has been created between schools in the USA and Japan (Trevena 2008.) The idea is that students will interact prior to their exchanges, share their interests and their cultures, get to know each other and maybe learn a little of their host country's language before their exchange.

The Second Life environment has itself been used as a context for ethnographic field research, with students using qualitative research methods to explore virtual communities of practice (Foster 2007). Each student in the class chose a different Second Life community to research by observation or by conducting interviews. Because

Second Life has a real population it also provides an opportunity to explore various forms of governance and community-building and to engage in political action, such as protests and electioneering, without many of the risks associated with taking action in the real world. Past political action over property rights and taxes within Second Life suggest that it provides a political ecosystem worth studying (Bray and Konsynski 2007.) Similarly Second Life has a real economy and currency exchange making it possible to experiment with running businesses and engaging in economic modelling in a low-risk environment. As well as social study, similar cost and risk reduction is evident with *Machinima* (machine cinema) tools, used to create animated films in a very cost- and time-efficient way, with a large amount of creative control.

Distance Learners in Second Life

Distance learning, with its separation of teacher and learner, is often held to be the natural focus for developments in virtual technologies that will facilitate interconnection of lecturer and student. While technology offers great opportunities to enhance delivery of extramural courses, there are several challenges to effective implementation that need to consider the reasons why a student is taking the distance learning option (Forer, 1998). Forer also argues that flexibility in delivery is important to both distance learners and internal students.

In a large scale U.S. study, it was found that distance learners slightly outperformed internal students based on results, but that interactive technologies appeared to have little impact on the final outcomes (Allen et al., 2004). However, this study did not examine the effectiveness of different technologies, their uses and their impact on the delivery of courses. Allen et al., support Forer's argument that students' individual learning preferences have a significant influence on the effectiveness of course outcomes, whether those preferences are for face to face or distance learning modes.

Thus, the success of the use of Second Life for teaching will depend on the student's enthusiasm for the virtual environment and their need for flexible learning modes, regardless of whether the student is a distance learner or not. Nevertheless, there are held to be some issues that will be more likely to impact on distance learners. On the plus side, Second Life can overcome the inherent distance that exists between instructor and student (Lagorio 2007). Unlike more traditional forms of distance learning, in Second Life there is real-time interaction, encouraging students to engage in discussion much as if they were sitting in a real classroom (Wong 2006). However, it should also be noted that many Second Life learning projects are designed to be delivered to internal students using dedicated laboratories that have the necessary equipment and connectivity. In many cases, distance learners cannot be guaranteed to have the necessary hardware or network connectivity to use Second Life.

Some Potential Risks and Drawbacks of the Second Life Environment

Working within the Second Life environment has many of the restrictions of the real world. Ultimately Second Life is a commercial venture by Linden Labs, and it is expected by their investors that the company generate a profit. At times this may have a negative result on end users' satisfaction with their experiences, or in some cases on their virtual businesses which impacts on their ability to earn real money in-world. These impacts are not necessarily trivial, for example Guest (2007) reports that one dealer in virtual real estate in Second Life makes \$200,000 a year.

Actions by Linden Labs have led to Second Life user protests such as when the company cut stipends (Second Life Herald, 2005) and serious problems have caused the recent ban on in-world gambling and banking (Linden 2007; Sidel 2008). Linden Labs has been likened to a dictatorship (McCarthy 2007) and while it is not a total control situation (residents are free to come and go as they please), the company have the power to make rules and remove anyone from Second Life at will. While this can be seen as a loss of freedom in the virtual world, the need for some form of governance has arisen to maintain control and peace in Second Life. One rogue user or 'griever' can easily disrupt an entire region, degrading the performance of servers and potentially causing losses of inventory for other Second Life users. More concerted anti-social behaviour by the activities of a virtual mafia led by the online character Marcellus Wallace have been well documented by Guest (2007).

Linden Labs have been pressured to take action against some of the activities happening in Second Life by various agencies in the United States that govern banking and gambling activities. This raises further questions that impact on all users: Should Second Life be under the same laws as the real world? If so what country's laws should apply; the country where Linden Labs is registered as a company, the 'country' created by Linden Labs, the country the server is in, or the country of the end user? What happens if Linden Labs goes out of business? Will all of the user generated content disappear? These are questions that have no immediate answer, but they are important for educators considering investing time or money in virtual learning.

Within this virtual world that mirrors many of the behaviours found in the real world, there are several issues that affect the creation of educational sites that have yet to be examined. From a student perspective, there tend to be some untested assumptions that students may be positive towards using a MUVE such as Second Life.

These assumptions arise from the notion that because many of today's students are exposed to online games and are familiar with virtual worlds they will be predisposed to learn in a MUV environment. Also, there is some evidence that whilst the interaction of avatars can be valuable, particularly in the context of distance learning, it is no substitute for real human interaction (McGolerick 2008.)

It is also important to acknowledge that choosing Second Life as a virtual teaching environment is an act of compromise. Research and development into dedicated virtual teaching environments is well established, and there are many such systems that pre-date Second Life, e.g. applications hosted in LambdaMOO (Slator et al 1999) and early versions of Active Worlds (Dickey 2005). Such tools were designed as dedicated teaching tools, whereas Second Life is simply a generic MUVE, not specifically designed for teaching. Therefore if educators adopt the latter, they do so for reasons of convenience and economy rather than necessarily because it is the best tool for the job. For example, support even for the basic file types typically used for educational resources is limited, though this will no doubt improve over time, as tools such as Sloodle mature and develop (Leidl and Rößling 2007.) We might also consider that building a custom environment using systems like Project Wonderland might be the optimal solution, but at a much larger investment cost in building, deployment and maintenance. In addition, ensuring access to Second Life for students is not straightforward due to demanding network and hardware requirements (Zhu et al 2007). These difficulties notwithstanding, an investigation into the effects of creating a virtual classroom will deepen our understanding of the benefits that may be gained for the delivery of tertiary courses.

AN ANALYTICAL FRAMEWORK FOR SECOND LIFE LEARNING ENVIRONMENTS

In order to understand the ways in which Second Life can be used to support learning, we created a simple analytical framework for Second Life learning environments. The intention of this framework was to help us to understand how various requirements and forces might come into play when designing a particular type of educational delivery. We acknowledge that this is a very simple model, and that such an analysis does not come close to defining the 'N-dimensional space' of all the themes that might lead to a full understanding of virtual worlds (Jäkälä and Pekkola 2007.) However we believe that the framework captures the key concerns of educators in their uses of Second Life.

Figure 1 shows our framework, based on current usage of Second Life for learning delivery. It has two axes that relate to the nature of the educational delivery; the type of learning environment, and the types of learning resource used. The environment can vary from simulation of traditional teaching environments, through virtual laboratories or other practical experience, to environments where students can use their own creativity to develop new virtual objects and interactions. The resources to support learning may be basic resources such as documents and multimedia, interactive resources that can be manipulated in the environment, or creational resources (such as programming tools) that can be wielded by the user. These two axes tend to work in concert, with the resources needing to be increasingly creational to support the level of practical engagement with the environment. We note that the stages in these axes are discrete, requiring very different approaches for each stage. All of the stages in these axes can of course have value, depending on the requirements of the learning context. The other three axes are the focus of study, the unique value proposition and the investment and return. These axes are not discrete; rather they occupy a continuum that can change within specific stages. We find that as we move from basic to creational resources and environments, the focus of learning tends to change from being mostly extrinsic (i.e. learning about things outside of Second Life,) through a mix of extrinsic and intrinsic (e.g. using things in Second Life such as its economy and politics to learn about the world outside) to in some case being highly intrinsic (e.g. building components in Second Life to be used inside it.)

The idea of the unique value proposition is that basic resources and environments often mirror alternative sources of on-line learning. For example a resource that simply provides a lecture hall in Second Life is a resource that can be similarly delivered, perhaps more efficiently, using other tools such as Webcasts. However there are many features of Second Life that can provide a unique value proposition that would be difficult if not impossible to deliver by other means (apart of course from using other MUVE systems.) Regarding investment and return there are a number of forces at play. It is possible to enter Second life as an educator at a very low cost, particularly if you are able to utilise land already owned by other educators. Costs can, however, escalate both in terms of the direct costs of supporting a facility in Second Life and also the costs of developing course materials, so calculating return on investment (ROI) is important. However we note that in many cases there is potentially a very high ROI in cases where the virtual environment enables students to work with materials that in reality would be very expensive. In distance learning, peripheral costs such as travel may potentially be reduced. In our work, we were very much focused on using basic resources in a traditional setting to provide learning of an extrinsic nature. Having a limited budget, we were looking for course material that was quick and easy to create. We were, however, aware that our unique value proposition would be low as a consequence.

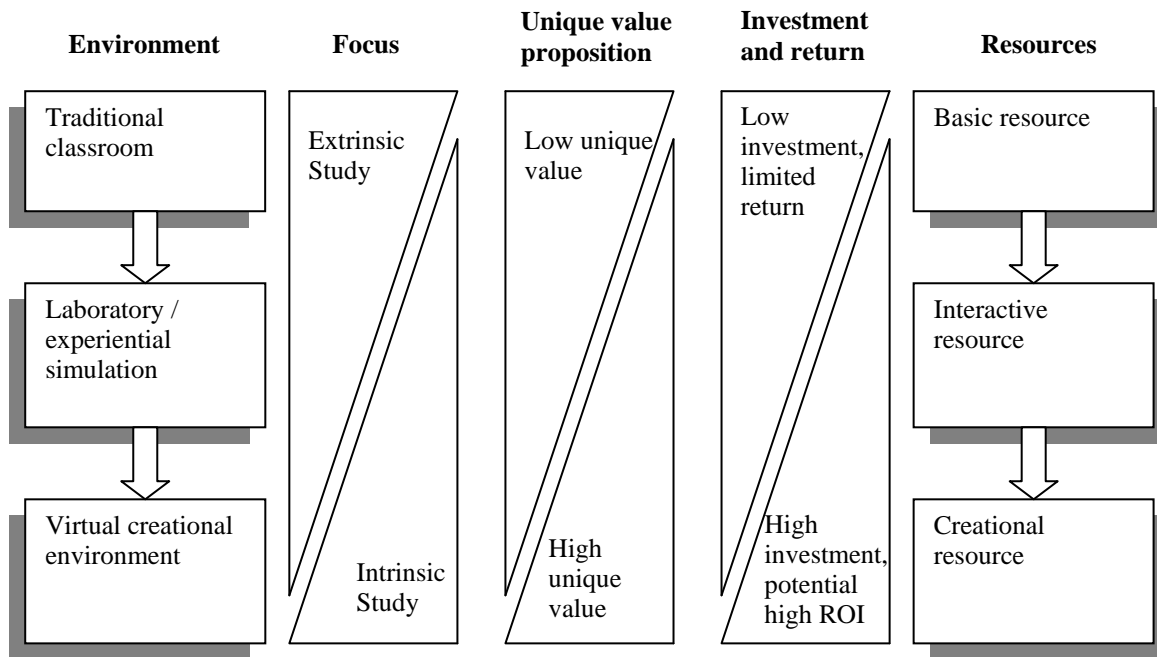


Figure 1: An analytical framework for Second Life learning environments.

PRACTICALITIES OF CREATING SECOND LIFE ENVIRONMENTS

Using Second Life to create content is a mixed bag. The tools needed to create most content are included in the Second Life viewer (software that end users install) so they are accessible to all Second Life residents. The tools are intended to be simple and easy to use to reduce the learning curve normally associated with traditional 3D modelling software. This is good for the casual user who wants to create a simple building or accessory for their avatar, as this can be achieved with the aid of a few tutorials. Objects are easily created, textured and coloured, stored in a user's inventory and can be readily shared with other Second Life residents.

While these tools are good for basic tasks, attempting to create a detailed object is very difficult because of the limited shapes and camera options available. Every object in Second Life is created from a primitive shape (a 'prim'), and can be altered across various dimensions such as hollow, taper and size. It is impossible to create certain types of object in Second Life using the basic tools. Recently, 'sculpted prims' were added to Second Life (Second Life Wiki 2007) which allows the creation of organically shaped objects, although there is limited support for such objects. The camera is also a limiting factor. Most 3D modelling packages offer a standard set of views to allow the user to easily determine an object's position in space. In Second Life, the user has to control the camera in a perspective-style mode to try to get the best view of an object being created. This can easily lead to errors in object construction and placement.

Currently, normal mapping is the only way to get 3D designed content into Second Life; there is no way to import directly from a modelling package such as SolidWorks or 3D Studio Max. This is most likely due to a lack of standards in the virtual world. This is restricting as not only can 3D content not be imported easily; but anything that is created in Second Life must remain there. Linden Labs are reported to be working with IBM to develop a standard that would allow avatars to transition between various virtual worlds (Silicon Valley Sleuth 2007) although there is no information available regarding user created content. Because of these limitations, the true benefits of Second Life and other virtual worlds will not be seen until more open standards are developed.

Second Life uses a custom scripting language called Linden Scripting Language, which is similar to C and Java in syntax and is designed to allow easy control of objects in the virtual space. Second Life includes a basic script editor with syntax highlighting, allowing users to create scripts entirely within Second Life. Linden Scripting Language does a good job of simplifying the normally complex task of programming in a graphical environment, and the Second Life Wiki is an invaluable resource for function definitions and examples. The language is fairly easy to pick up for basic functionality, although a lack of in-game function definitions makes users rely on the Second Life Wiki for specifics on function arguments. Alternative editors can also be used, and syntax highlighting for the Linden Scripting Language is available as a plug-in for many popular editors (LSL Wiki 2008).

Residents creating advanced simulations will run into limitations of the scripting language implemented by Linden Labs to reduce lag due to server load. Functions and objects are assigned energy values; when functions

are called the energy of the objects they are called upon lose energy and the function loses its effectiveness. Some of the details of how energy values work are unclear, most likely to prevent malicious residents from creating workarounds that could bring down regions or servers with excessive CPU load and lead to denial of service attacks. All functions also have a delay value associated with them, which will pause the script for a given period of time. The delay can range from 0.1 seconds for an object gifting function to up to 20 seconds for the email function. Residents working with time sensitive scripts have created workarounds to time delays, although they increase the complexity of a script.

Financial Constraints

Land in Second Life is bought either directly from Linden Labs or via another user in an auction. What residents are paying for when they buy land is in fact the ability to store objects. Each section of land has a limit on the number of primitive shapes that can be stored, so if a resident wants to increase the number of primitives available, they need to purchase more land. When a resident buys land what they are really paying for is the server time and space needed to store objects and process their actions. This forces residents to creatively design buildings and objects to use fewer prims, and can also increase the cost of bringing a project into Second Life.

Education in Second Life is supported by Linden Labs, who offer a discount on land prices to education and non-profit organizations. There is also a staff member assigned to the support of educators and researchers, and the Second Life Campus programme offers free land for limited periods to educational projects. However it should be noted that competition is high and only a few such awards are made each year. The overall message is that the financial bar to entry can be low, but it is still there.

BUILDING A SECOND LIFE TEACHING ENVIRONMENT

During late 2007 and early 2008, a small team of academics within the Information Technology department at Massey University's Auckland campus explored the potential for Second Life to be integrated into a blended learning environment that could support distance learners in a sustainable way, i.e. an installation that required little funding or technical support but could enhance the students' experience of learning. The context of our experiment was a new first year Information Technology course called 'Computer Applications and the Information Age' developed by the team following internal restructuring. The intent of this new course was to engage with the Bebo / MySpace / iMedia generation of students in a way that capitalises on the potential of everyday Information Technology to teach that very subject. Rather than relying on extrinsic motivation, we relied largely on the hedonic framework (Holsapple & Wu 2007) which meant engagement was ultimately down to the students' own wishes.

Rather than trying to provide a targeted immersive experience, or formal virtual seminars, we looked at providing a virtual resource bank within a building that was simply provided as an optional exploratory environment for students on the course. None of the resources in the virtual building was particularly ambitious or complex. Rather they were intended to provide basic useful resources. The building was sited on Koru Island, a Second Life island owned by the Kiwi Educators Group, and was fashioned to reflect the architectural style of the real university campus. The building contained the following resources:

- Information boards with web links to course related resources such as the course textbook and paper outlines.
- Slide shows containing lecture material from the paper
- Video lectures from the papers
- Interactive quizzes
- A seminar/presentation room for interactive meetings

One of the roles of the interactive quizzes was to provide some non intrusive monitoring of student usage and interaction. Each time a quiz was used, an email message was generated that was sent to the course coordinator. These messages showed which quiz had been taken, which avatar had taken the quiz and what the results were. This allowed us to monitor how many avatars had used the quizzes, if they tended to do both quizzes or just one, and how easy the quizzes were.

To attract students to the resource in a simple and accessible way, we made a video of the facility, set it to music and put it on YouTube (Figure 2). The internal students were shown this video in a lecture and then largely left to their own devices as to whether they viewed it again themselves and whether they then chose to visit the Second Life building

One major constraint on this project was that in practice many of the computers available to students on campus proved to be unable to support the Second Life client application. Despite apparently meeting the minimum

requirements for running the client, it was found that many machines did not contain suitable graphics cards. Therefore we had to set up a special facility of just two machines that could guarantee student access. Otherwise students could only access the site if their own home computers had appropriate graphics cards, as well as broadband Internet access. This clearly limited the number of students who could effectively experience our Second Life facility. A further problem emerged during testing, which was that access from some other networks was prevented by the security policy of the network owner. Therefore even if a remote student was able to access a suitable machine with a fast network connection, they may not be able to access Second Life. Another technical issue proved to be the upgrade strategy of the Second Life client. Some updates are compulsory, meaning that an older client can no longer be used. In a network where installations are managed by a central process with long lead times, that can prove a major problem.

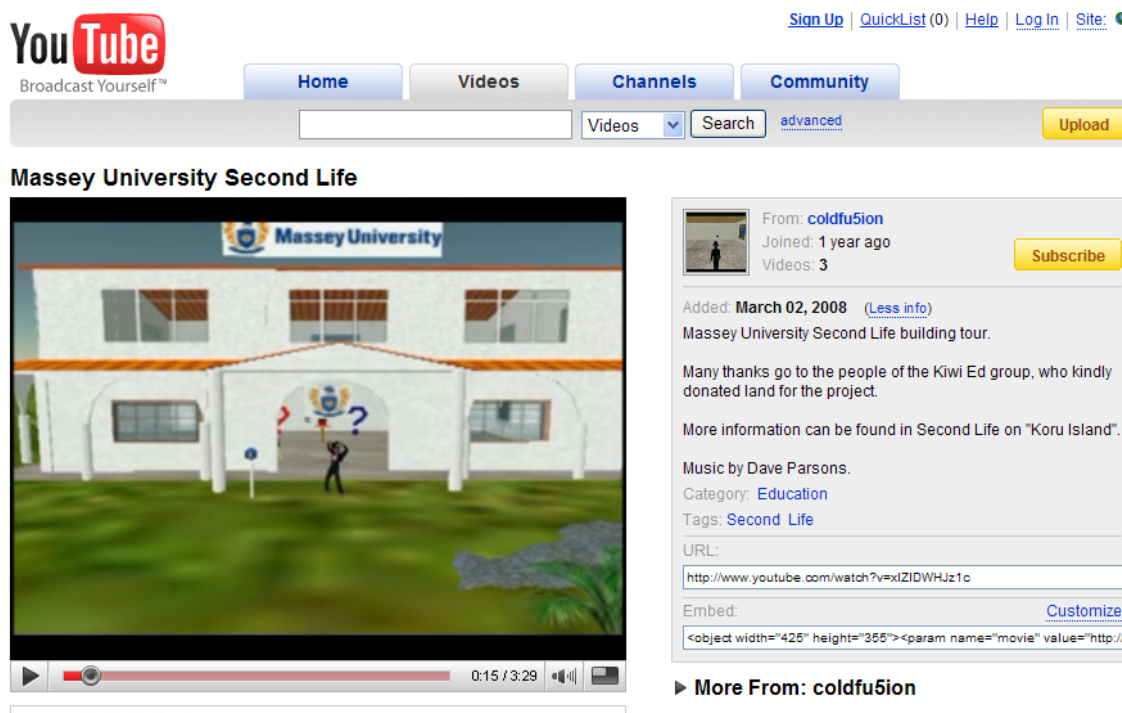


Figure 2: The YouTube video of the university building in Second Life

RESULTS

We did not attempt a formal evaluation of the Second Life environment at this stage, as the material was no more than a pilot designed to inform future development. We were also aware that the technical problems described in the previous section meant that we were unlikely to get a large enough sample of participants to enable us to draw very meaningful conclusions. Therefore our results are primarily observational and based on informal discussion with students using the facility. However, we did have some measures of interest via the quizzes and YouTube hits which, though they could not in any way be regarded as statistically useful, at least gave us some idea of whether or not we had succeeded in engaging those students who were able to access those resources.

We do not present any raw data here regarding use of the quizzes, since the same person may have multiple avatars, and multiple individuals may choose to share the same avatar, so we have no way of identifying unique visits by individuals. However we did note that quizzes were being undertaken three or four times a week during the twelve week semester, often in clusters, suggesting that students were visiting the virtual building in each others' company. Most of the time, avatars would take both quizzes rather than just one, suggesting that there was some engagement in the experience. Given the technical restrictions that had become apparent in terms of widespread access, this feedback suggested that an encouraging number of students were interested enough in using the resource to make the effort required to access it.

YouTube of course has a much lower accessibility threshold than Second Life, so we would have expected more access to the video, at least when it was initially introduced to the class. The YouTube video had 190 hits by the end of the semester, averaging about 3 hits per student. It is of course impossible to tell how many of the students actually viewed the video as some may have viewed it more than once. Others who were not on the

course may also have viewed the video. Only one visitor had chosen to comment (a rather encouraging 'that is so kw!!!!'), so little feedback could be gained from this.

Informal feedback from the students suggested that interest in the facility was limited because there was little for them to do there other than the quizzes. It did, however, promote an interest in learning how to build objects, i.e. the experience of seeing the facility generated an interest in how such a thing can be constructed in Second Life. This suggested that the provision we had was too passive and that more creative participation was what we needed to support.

Further positive feedback from students who had expressed a real interest in the facility focused on other educational opportunities on Koru Island. Two students had wandered into another tertiary institution's facility and become involved in the development of online games for people with learning disabilities. The enthusiasm displayed supports our finding that more creative participation would be beneficial and has provoked discussion on the opportunities for inter-organisational collaboration.

CONCLUSIONS AND FUTURE WORK

Our experience led us to believe that providing a support facility for distance learners in Second Life has some value, but that resource demands for both educators and students precluded making it a central teaching platform for such students. Its main value seems to be that it provides an opportunity for engagement between staff and students that provides some kind of link between the everyday experience of many of our students and the content of an academic course. It became clear that there was interest from the students in creative engagement with the virtual environment, and that enabling this would be an appropriate way to teach Information Technology skills, particularly programming with scripting languages.

In terms of our analytical framework, we believe that it has value in terms of understanding the opportunities and returns from a Second Life learning environment. Student feedback underlined the limitations of our value proposition, which lacked uniqueness, as the framework had indeed indicated. In retrospect, we can see that an additional axis of student engagement and satisfaction might be added that would increase as we move from the top to the bottom of the framework.

The next stage is to formalise our experiences through a funded research project to create resources that move further through our analytical framework, to advance development beyond the basic resources and traditional classroom scenario and seek the greater ROI that the framework suggests can be achieved. However this will of necessity shift our focus away from the distance learner and more toward internal students, using Second Life not as a bridge to the students we do not see but as a classroom tool for those that we do see, and whose learning environment we can effectively manage and support. We also propose to evaluate the various virtual environments currently available to see how their features and challenges compare to Second Life for delivering virtual learning worlds.

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