Leaving the Lindens: Teaching in Virtual Worlds of Other Providers

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Abstract

With the maturity of the OpenSim architecture it is now feasible to use OpenSim for (university) assignments where Second Life has been used previously. To evaluate these potential alternatives systematically a framework has been developed that takes into account the intrinsic/extrinsic view on the usage of virtual worlds and further distinguishes between a 'world' and an 'individual' view. This classification defines the four dimensions cost (the extrinsic, individual view), persistence (the extrinsic, world view), immersion (the intrinsic, individual view) and in-world context (the intrinsic, world view).

The alternatives to Second Life evaluated against the framework are derived from an experience during the Academic Year 2010/11 at the University of Bedfordshire and include: a dedicated provider similar to Linden Lab; a region that is part of the OSgrid hosted by an external provider; a virtual world driven by the university and decentralised hosting of virtual worlds by students.

We conclude that the alternatives are comparable to Second Life in respect to the extrinsic view but not so (yet) from the intrinsic perspective. The specifics of the assignment task need to be considered, in particular the relevance of immersion and in-world context necessary to make the assignment successful.

Introduction

In 2007 the University of Bedfordshire began to utilize Second Life in various teaching and research projects. These projects included a (final year, undergraduate) class in the LSL (Linden Scripting Language) and classes on Project Management (both undergraduate and postgraduate) where students were asked to apply the PRINCE2® Project Management methodology to build an educational showcase on the University of Bedfordshire's Second Life island. The general setup of this latter assignment, in particular the difficulty in dealing with large student numbers have been discussed in (Conrad et. al, 2009). The added value of using Second Life in enhancing the acquisition of Project Management skills is presented in (Conrad, 2011) within the context of situated learning (Herrington and Oliver, 2000).

Issues with Linden Lab (http://lindenlab.com), the provider of Second Life, concerning the ownership of the University island made it virtually impossible, to utilise Second Life for the Academic Year 2010/11. It was therefore decided, at very short notice, to seek alternative solutions without compromising the delivery of these classes. Two providers have been trialed, namely Dreamland Metaverse (http://www.3dmetaverse.com) a company that offers regions within the OSgrid (http://www.OSgrid.org) infrastructure, and ReactionGrid Inc. (http://www.reactiongrid.com) with their own dedicated grid infrastructure. Both worlds are based on the OpenSim (http://opensimulator.org) technology which aims to be compatible with Second Life clients and provides a similar 'look and feel' as Second Life in-world.

We also include in our discussion two other solutions that have been considered for our university assignments but not implemented. These are the hosting of a virtual world on a university server and a fully decentralised solution where each student is able to host their own virtual word on a memory stick or on their laptop. This latter approach became feasible with a software distribution "sim-on-a-stick" that conveniently packs the necessary software in an easy to install zip file (http://simonastick.com).

Lastly we include in our discussion the solution of not using a virtual world at all for the assignment. Indeed this happened in one of our case studies.

In the following we first outline the case studies to clarify the demands the assignments posed on the virtual world. Then we introduce the six solutions: Second Life, a dedicated provider, OSgrid integrated, institutional hosted, student hosted and 'getting on without'. These will be evaluated against four dimensions of virtual worlds considered relevant to our case studies.

The four dimensions naturally follow a classification in intrinsic/extrinsic view and from distinguishing between an individual perspective and the world perspective. These are persistence, cost, immersion and context. They will be discussed in detail later following the case studies.

Case Studies
This paper derives from three assignments, delivered at the University of Bedfordshire with slight variations since 2007. In the previous years Second Life has been used. In the following we provide a quick overview of the nature of these assignments and the respective role played by the virtual world.

Case Study 1: Event Oriented Programming.
This is a five weeks course where the Linden Scripting Language (LSL) was introduced to underpin the understanding of Event Driven Programming (Ferg, 2006). Weekly lectures consisted of the theoretical concepts plus material adapted from the Second Life LSL wiki. In the practical sessions the students wrote scripts with simple functionality. These were deployed in-world and tested by the students' avatars. Typical examples include objects that change colour or produce messages when touched. The implementation of object-to-object interaction explores the various uses of communication channels. The provider used for the course was

Dreamland Metaverse. The reason for choosing this provider was based on the recommendation of a chance encounter while casually visiting the OSgrid. Not all LSL functionality known to work within Second Life however is yet implemented within the OSgrid. Because of the nature of the assignments these differences were irrelevant in our case study.

Case Study 2: Project Management (Postgraduate)
This is a twelve weeks course, delivered at Postgraduate level, on Project Management. It runs every spring and the students are required to build an educational showcase as part of a PRINCE2® managed project. For details about the general setup of the assignment we refer to Conrad, et al (2009). The pedagogic underpinning that contextualises the assignment within the situated learning approach (Herrington and Oliver, 2000) is evaluated in (Conrad, 2011). The decision to use ReactionGrid as the provider was made when the author was approached by an 'evangelist' of this company. Changes to the assignment in the different environment were necessary. The absence of an in-world economy led to a redesign of the 'cost management' and 'procurement' aspects of the assignment. Also students were encouraged to look for example showcases within Second Life while building on the ReactionGrid island.

Case Study 3: Project Management (Undergraduate)
A very similar assignmnent was also used for the undergraduate course. The duration stretches over a period of 24 weeks starting in September. Due to the issues with Linden Lab no university region was available in September 2010 and the assignment was modified by taking out the 'showcase' part and replacing it by a rather unspecific requirement to use web 2.0 technology for the PRINCE2® project. This case study will serve in the following as an example for the 'getting on without it' solution.

Dimensions for the Evaluation of Virtual Worlds
From the issues described and encountered with the case studies we propose four dimensions against which virtual worlds may be evaluated. We distinguish between dimensions extrinsic to the virtual world that relate to 'real life' features and those that are intrinsic: they are informed by the in-world experience of the avatar. The two extrinsic dimensions are *persistence* (how long the virtual environment lasts) and *cost* (measuring the effort needed to participate within the virtual world – including monetary cost as well as time and expertise needed).
The two intrinsic dimensions are *immersion* (the perception of self when operating in the virtual world) and *context* (conflicts and synergies perceived in relation to other content within the virtual world).
We may also group the dimensions according to an 'individual perspective' – the individual that perceives the virtual world as an avatar (immersion) or as a real person (cost) – and a 'world perspective' – the virtual world persists in the real world and has an in-world context. Table 1 summarizes the relationships between the four dimensions. We discuss these four dimensions in more detail later in this paper.

Table 1 The four dimensions in context

	Intrinsic	Extrinsic
Individual	Immersion	Cost
World	Context	Persistence

Furthermore, within these four dimensions we evaluate six solutions of virtual world setup derived from the case study experience. These are:

- *Mainstream provider (Second Life).* The well established solution that has been used until June 2011.
- *Dedicated provider (other than Second Life).* This refers to a virtual world that only exists within the context of the provider, similar to Second Life where all places of Second Life are (eventually) provided as part of Linden Lab's infrastructure. While the region is not "stand alone", an avatar that has been created for the university island would only be able to visit places hosted by the same provider (in our case ReactionGrid). This solution has been used for the postgraduate class on Project Management (Case Study 2).
- *OSgrid provider.* The OSgrid is an architecture that allows several independent OpenSim providers to connect their worlds. For implementation details please refer to the Hypergrid entry on the OpenSim wiki: http://opensimulator.org/wiki/Hypergrid. Avatars are created on the OSgrid website and can freely visit places run by any of the providers. This solution has been used for the LSL assignment (Case Study 1). The OpenSim driven region was provided by 3dMetaverse.
- *Institutional Virtual World host.* The OpenSim architecture may be set up and run by the institution, in our case the University of Bedfordshire. This solution has been considered but not implemented, mainly because it was not obvious that the necessary infrastructure was available at such short notice.
- *Students host their own virtual world.* The Sim-on-a-stick distribution (http://simonastick.com) allows hosting a virtual world on a memory stick (or on a laptop). We considered this solution for the LSL assignment (Case Study 1).The unpredictability of how students would be able to set up their own virtual world on their various architectures and how much time this would take was seen as the main reason to trial the OSgrid instead.
- *Getting on without a virtual world.* This solution has been used for the undergraduate class on Project Management (Case Study 3).

The list above does not aim to show a complete picture of the possible solutions but rather gives a list of those solutions actively considered to meet the needs of the case studies. Other solutions (for instance to run a 'university hosted' stand-alone virtual world based on a cloud service provider) that have elements of some of the above may provide a good compromise or even become the main-stream approach in a couple of years' time. Indeed it should be emphasized that both of our providers (ReactionGrid, 3dMetaverse) as well as others that are not mentioned in this paper are able to provide a tailored arrangement that might be different from any of these listed above.

In the following we discuss the six solutions in more detail by evaluating them against the four dimensions. We start with the two extrinsic dimensions, persistence (the world view) and cost (the individual view).

Persistence (extrinsic, world perspective)
A virtual world like any software exists within a physical context that may or may not be available. How long will the virtual world last? Assignments will be conducted over a period of time and the student work needs then to be available for reporting issues (marking and external examining). Student work of previous years may be required to serve as examples for the students of the current year.

Mainstream provider (Second Life)
Two years ago Rupert Neate (2009) predicted in the Telegraph that "Second Life's span is virtually over [...]". Many similar statements can be found by casually searching the world wide web. However today (in August 2011) Second Life still exists. It might be argued that the still large number of residents who have assets (be they tangible such as virtual dwellings or clothes or be they intangible such as relationships) create enough vested interest to keep Second Life running for some time in the future.

Dedicated provider
Our chosen provider offers the possibility to backup the whole region as a .oar file. It could then be run on a different provider's environment when necessary which makes the persistence of the region somewhat independent from the provider itself.

OSgrid Provider
Similar as with the dedicated provider .oar files can be used as backups of the region. Even more so, given that the OSgrid is maintained by a number of different companies or individuals a switch from one provider to another is possible while still remaining within the OSgrid context.

Institutional Virtual World host
Any issues that might come up with the persistence of the virtual world process can be resolved within the institution.

Students host their own Virtual World
The stability and persistence as well as the necessity to make backups is delegated to the student. The accidental or deliberate unavailability of a region – for instance of concern when marking student work – can be addressed via existing university procedures about lost work.

Getting on without it
Depending on the type of assignment, data persistence is an issue here as well. If the learning outcome requires to produce collaborative work within a group of students – as in the Project Management of Case Studies 2 and 3 – the work must be located somewhere and there must be safeguards in place to deal with a situation when this work is lost due to the negligence of an individual or issues with the university's technical infrastructure.

Cost (extrinsic, individual perspective)

In choosing an external provider there are typically (and in both Case Study 1 and 2) setup fees and monthly costs; other costs however are the amount of time and effort of individuals that need to be accounted for when setting up the virtual world. This becomes more complex considering the particular characteristics of educational institutions. Some work invested may be considered part of scholarly activity while other tasks are routine and might be performed either by technical support staff (who possibly have no interest in the usage of the virtual world) or by the academics themselves, taking up valuable time from other duties.

Mainstream Provider (Second Life)
This solution was the most costly concerning setup and monthly fee. Linden Lab's decision to abandon the discount for educational institutions will not help to improve the situation. Because of the abundance of tutorials and other online help the cost and effort required to be put in by staff is low compared to other solutions. There is also a (still large) in-world academic community that is able to provide support, for instance with sophisticated and tailored tools.

Dedicated Provider
The costs encountered for the assignment were very competitive concerning both setup costs and monthly fees. Because of the similarity to Second Life the costs on building and maintaining the virtual world is comparable to the effort needed within Second Life. The provider also offers consultancy if this is considered necessary (which increases the monetary costs but decreases the cost of time and effort).

OSgrid Provider
Setup and monthly fees compared well to those of our dedicated provider. Also, consultancy is offered as an extra. However for the OSgrid, due to its open structure it is also possible to source developers or builders from other providers.

Institutional Virtual World host
Given that the OpenSim standard is free there are no direct monetary costs. For many institutions this might be the preferred solution as internal costs such as server time, staff time both technical and academic are often not perceived as 'costs' (the staff costs are hidden within the fixed monthly salaries and a server may be available anyway for other tasks).
In our case this solution was not followed up. As there was no previous experience on setting up an OpenSim based virtual world and the technology doesn't yet seem sufficiently well documented and mature enough that an easy install could be expected.

Students host their own Virtual World
Concerning costs this is a tempting solution. There are no setup costs or usage fees. Time to install software will be spent by students themselves. However – as with many cost effective solutions – there may be ethical conflicts with this approach and its long-term consequences. While Computer Science students might indeed benefit from the experience of setting up a virtual world using their own devices students of other disciplines might find the point of acquiring the necessary knowledge questionable. In the long term this approach might have a negative impact on the reputation of the course.

Still, with ongoing maturity of the technology there may be merit in this solution. For instance we typically expect students of any discipline to have or acquire knowledge of certain standard software (e.g. Microsoft Office). In the future virtual worlds may have a similar status.

Getting on without it
This is not necessarily the cheapest solution. The lack of use of certain types of technology within a course may well be a reason for a prospective student to choose a competitor institution. The role of virtual worlds in particular is however unclear. During the Second Life 'hype' it was perceived as somewhat obvious (as with most hypes) that virtual worlds will play a significant part in education, see for instance Virtual World Watch (2010) for an overview of past and current projects in the UK. We believe that despite the end of this hype the usage of virtual world technology within a curriculum might still provide a certain market advantage.

Immersion (intrinsic, individual perspective)
Virtual Worlds provide the opportunity of immersion (Cunningham, 2007), to become part of the virtual world, to lead a 'second life' in its most literal meaning. Indeed this distinguishes virtual worlds from other social and collaborative places such as chat rooms or discussion forums. Questions of identity may raise the debate about the way such a virtual world can or should be separated from the real life experience (Peachy and Childs, 2011). In a university assignment it is questionable what role immersion has to play: student work is assessed in real life with real grades.

Due to the ad hoc approach in deploying our solutions there is no systematic collection of data on how our students felt about the degree of immersion they encountered. Therefore the argument below can only be based on anecdotal observation. Still we hope that it gives some reasonable insight.

Main stream provider (Second Life)
In our experience Second Life offers the highest degree of immersion compared to the other solutions. The whole concept and marketing strategy appears to be based around the idea of escaping from the 'real world' and the various amenities including shops and party spaces underline this. While it is a minor aspect for our LSL course (Case Study 1) where the focus is on the technical understanding of a programming paradigm, immersion is more central for the assignment of Project Management (Case Study 2 & 3): the project task must feel 'real' to make the assignment a success.

Dedicated provider
Immersion did not seem to have materialized. While it is indeed possible to teleport to other regions of our provider there is no evidence that this was tried or has happened. Indeed, given the perceived or real absence of 'recreational facilities' or actual other avatars on these other regions no incentive is given to explore this world to a wider extent than necessary for the assignment.

OSgrid provider
The configuration of the OSgrid environment allows the possibility to teleport to various recreational places including those not hosted by our provider. Promoted as an open source alternative to Second Life many amenities are mirrored within the OSgrid environment. This includes a place to party or to hunt for clothes. During

Case Study 1 some students seemed to have used these opportunities. It was our understanding that the OSgrid at least was more perceived as a 'world' than the region provided by the dedicated provider in Case Study 2.

Institutional Virtual World host
Clearly the degree of immersion will depend on how the virtual world is set up. It can easily be envisaged (and might even become the norm in the distant future) that 'virtual space' becomes normal within a university similar to 'real' spaces: library, lecture theatres, student union or prayer rooms. Immersion into that virtual world may become part of normal student life (and it may be open to debate if this behaviour should still be termed as immersion or rather an 'augmentation' of student life).

Students host their own Virtual World
Many virtual worlds (one for each student) would co-exist independently from each other. It would depend very much on the individual setup how much 'immersion' would be possible.

Getting on without it
If there is no virtual world immersion may happen in the real world for instance via role play. How necessary or desirable is an immersive experience anyway? In the context of the LSL assignment (Case Study 1) where the focus is on a technical understanding, immersion is a minor aspect. For the project management however a higher degree of immersion is desirable: students role play a 'professional' project team following a methodology to achieve a project goal. The better the opportunity is to 'immerse' into that role the more valuable the assignment would be.

Context (intrinsic, world perspective)
While educational institutions are often keen to see their courses in the context of certain aspects of the wider society ('industry relevant', 'vocational', 'impact' are words that come into mind here) other aspects of this very same society they would rather protect their students from: filter software is deployed within colleges or universities to restrict access to Internet sites containing so called 'adult' content and disciplinary action may follow attempts by staff or students to circumvent these filters.
For the sake of this discussion we distinguish between 'positive' and 'negative' context within a virtual world. Positive context might be in the form of tutorials, scripts or recreational places to stimulate immersion. Negative context may come from 'adult' rated themes: for instance places that display sexually explicit material, feature intense violence or endorse racism.

Main stream provider (Second Life)
Linden Lab's system to distinguish between regions with general, moderate and adult content has reached a certain level of maturity. Although it may be debatable how effective this control is in practice, it provides at least a basic means to classify 'adult' sites. This classification can then be used within a general policy on appropriate behaviour (e.g. avatars that can be identified as students of the university must not visit regions flagged as 'adult'). Positive context is still abundantly present in the form of tutorials, support from other residents and other resources in-world.

Dedicated provider
The context we experienced can be best described as 'neutral'. While the relationship between the provider and us was good and productive there was no perceived interaction with other residents: there was no 'community' feeling. If at all, community interaction happens outside the virtual world through means of social media such as twitter, youtube or facebook. Indeed students were encouraged to seek examples from within Second Life (i.e. to use the Second Life 'positive' context) and then to build their showcase onto our provider's region.

OSgrid provider
The OSgrid – as a result of its distributed and appraently unregulated structure – is able to carry contents of any type, including adult themed areas. Indeed Mathers (2011) writes in his blog "We are building a new BDSM community on OSgrid and your are welcome to join [...]". How this or other attempts will materialize is difficult to forsee. The situation is similar with positive context: many places offer freebies or recreational activities. Still much of the contents of the OSgrid seems to be experimental or in an early stage with low traffic numbers.

The 'negative context' might well become a lesser issue due to how virtual worlds in general and the OSgrid in particular will be perceived by society. Similarly to the current situation where the abundance of 'adult' content on the World Wide Web doesn't deter universities from going online with their own web sites, a similar perception might occur within the OSgrid: where content that is hosted with one provider will not be seen as related to content hosted by another provider although both are connected through the same grid.

Institutional Virtual World host
The context can be designed and monitored similarly to any other (real world) student service. Behaviour can be controlled as part of the overall student conduct measures. Therefore potential negatve context can be dealt with appropriatly. Positive context may be provided as part of a university strategy.

Students host their own Virtual World
The sim-on-a-stick solution puts the responsibility for any type of content solely on the student.

Getting on without it
Any course project that requires students to leave the university boundaries – for instance in the context of situated learning as defined by Herrington and Oliver (2000) and therefore utilising real world positive context will face the question on how these students can and should be protected from undesirable encounters (negative context). Indeed an inherent feature of virtual worlds is that the context of the 'world' is more controllable than the real world (for instance a virtual world can be switched off or pre-populated with supportive content).

Conclusion

While only a couple of years ago the hype made the term 'Virtual World' become almost a synonym for 'Second Life', there are now more and more alternatives available. In particular OpenSim based solutions are in direct competition with

Linden Lab's Second Life due to the OpenSim history and hence technical similarity. OpenSim based solutions are embraced by both dedicated providers with their own infrastructure and as part of the OSgrid. It is also possible to install and run an OpenSim based virtual world as an institution or even as an individual.

The author of this paper made the switch away from Second Life out of necessity due to a particular experience where poor customer support from Linden Lab made it impossible to continue with them as a provider.

It is tempting to generalise from this one experience and herald the demise of Second Life; however this must be seen in perspective. Weak customer support is only one aspect of the virtual world experience, and even this experience is only a snapshot of a given period of time and may change or may have changed already driven by Linden Lab's very own commercial interests. Similarly other providers might face customer support problems when they become successful and have to scale up their business.

Nevertheless the switch to an alternative virtual world provider presented an opportunity to assess the feasibility of these for the purpose of a university assignment and we aimed to explore these in a systematic way.

We took both an intrinsic and an extrinsic view on virtual worlds and further refined this by distinguishing between the individual and the world's perspective. This framework then defines the four dimensions persistence (extrinsic, world), cost (extrinsic, individual), immersion (intrinsic, individual) and context (intrinsic, world). Within these four dimensions we evaluated – based on three case studies – the solutions: Second Life, various OpenSim based solutions and 'getting on without it'.

There is no 'best' solution. All approaches have advantages and disadvantages and need to be balanced according to the specific needs: the duration of the assignment determines constraints on the level of persistence needed. Cost is determined by available funds and the existing technical knowledge at the instituion. The necessary level of immersion depends on the nature of the assignment (an LSL class only needs a 'technical' presence in the virtual world while a project management assignment benefits from an immersive experience). The benefit from working within a virtual world in a community context is to be balanced against the level of 'risk' an institution allows itself to take that undesirable content may be encountered by the students.

All solutions discussed are viable alternatives to Second Life. Concerning the extrinsic dimensions, cost and persistence, they are comparable or even better. However a loss of immersion due to the lack of in-world context needs to be taken into account when switching away from Second Life. Activities such as our case studies 2 and 3 that benefit from the Second Life in-world context will suffer and measures are necessary to compensate for this loss.

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