Bringing Concepts Alive in *Second Life*:
A Design-Based Experiment

Casper Harteveld[1,2]
Harald Warmelink[1]
Michele Fumarola[1]
Igor Mayer[1]
[1]*Delft University of Technology, the Netherlands*
[2]*Deltares, the Netherlands*

Abstract

Although the added value of virtual worlds like *Second Life* is to create and build communities with new and groundbreaking ways to communicate and interact with each other, the actual usage of *Second Life* for non-entertainment purposes has been rather disappointing. This inactualization problem may be attributed to the inappropriateness of *Second Life* for serious activities. To understand what it means to use this platform for non-entertainment purposes, a design-based experiment with the aim of creating a successful implementation in *Second Life* was undertaken. Based on the reflections of this experience, it is found that designing a virtual world application entails dealing with four types of challenges: Conceptual, managerial, technical, and perceptual. Together, these challenges create the image of a virtual world designer as a puppeteer, someone who is trying to bring concepts alive while being constrained by and - at the same time – controlling a number of elements. For the next generation virtual worlds, it is important to understand how the constraints and controls can be improved to be able to create a rich and well-established virtual community.

Introduction

In the past couple of years virtual worlds have sparked the interest of many organizations for non-entertainment usage. These three-dimensional, audiovisual, and persistent spaces enable multiple users to interact with each other and the environment around them (Bartle, 2004: 475). As such, they may offer a new and groundbreaking way of how people communicate and interact with each other. IBM, Sun Microsystems, NASA, Philips and other high-profile organizations were the first to jump on the bandwagon. In their wake, other organizations have stepped into virtual worlds as well, most notably public institutions (e.g., local governments, universities). Although it is currently unclear which direction virtual worlds will take, there are strong indicators that the concept of virtual worlds and their usage by organizations for serious applications is here to stay (Smart, Cascio and Paffendorf, 2007; Hendaoui, Limayem and Thompson, 2008). Indeed, we have observed high investments in various virtual world technology by IBM alone from 2006 onwards.

Of the existing virtual worlds, most attention has been given to *Second Life*. This is among many reasons due to a) technological superiority in terms of graphics, user creation possibilities, and interconnectedness of worlds, b) media attention and good branding by its creators, c) the existence of a virtual economy, and d) a snowball effect among organizations using it. However, there are reasons to belief that usage of *Second Life* for non-entertainment purposes has been disappointing. On the one

hand, users indicate that the developed spaces provide little interactivity and are incoherent or non-uniform (Ludlow and Wallace, 2007: 257-8; Meadows, 2008: 65-7). The disappointment of users is also expressed in a significant decrease of the percentage of 'premium residents' between April 2006 (8,4%) and April 2008 (0,7%) (Linden Lab, 2008). On the other hand, organizations themselves indicate that they have trouble in realizing their objectives, such as creating an active community surrounding their application. Their disappointment is expressed in either ceasing investments or a reorientation toward other platforms, as we have observed with the Dutch businesses ING Bank and ABN-AMRO, as well as the U.S. businesses Wells Fargo, AOL and Pontiac.

Hence, when it comes down to *Second Life*, one of the leading virtual worlds, we see that organizations as well as users enthusiastically started using it as it provides a user-friendly platform for high-quality interactions. Yet, as an almost five month long weekly census revealed in 2007, most developed activities hardly got a well-established body of users (Tateru Nino, 2007). Thus, the envisioned usage for non-entertainment turned out to be utopian. We call this inability to realize a virtual world application as foreseen the *inactualization* problem. Virtual worlds seem powerful innovations that could become an important part of our daily life, but so far the actual usage is rather disappointing. While other causes could be present (Warmelink, Bekebrede, Harteveld & Mayer, 2008), this phenomenon could very well mean that *Second Life* is simply not an appropriate platform for non-entertainment usage. What it actually means to use *Second Life* as a platform for serious activities and how this translates to future virtual world developments is central to this paper.

To understand the usefulness of *Second Life* as a platform for serious activities, we initiated a design-based experiment in *Second Life* for Delft University of Technology. The aim of the experiment was to create a successful – in terms of usage – education, research, communication, and collaboration platform around *concepts* that are of interest to the university. For the experiment to be valid, the sub-objectives were to be innovative, to go beyond the mere virtualization of existing concepts, and to avoid the previously mentioned pitfalls of non-interactivity and non-uniformity. Based on our reflections, we encountered and categorized four types of challenges that need to be overcome to create a successful implementation: Conceptual (Section 2), managerial (Section 3), technical (Section 4), and perceptual (Section 5). Together, these challenges create the image of a virtual world designer as a puppeteer, someone who is trying to bring concepts alive while being constrained by and - at the same time - controlling a number of elements (Section 6).

The Conceptual Challenge

Before anything can be implemented, a conceptual plan is needed. This makes up the first challenge, the conceptual challenge. Although one can conceptualize all sorts of high-quality interactions, such as collaborative design, virtual conferencing, and simulation & gaming, it remains a question of what type of design is needed to achieve a successful implementation in *Second Life*. For the experiment the idea was to develop an education, research, communication, and collaboration platform around concepts that are of interest to Delft University of Technology. To implement this virtual platform an inter-disciplinary team of civil engineers, architecture, policy and computer science students was put together. The initial more specified objective was to design a consistent, modular, and interlinked place that accommodates different concepts.
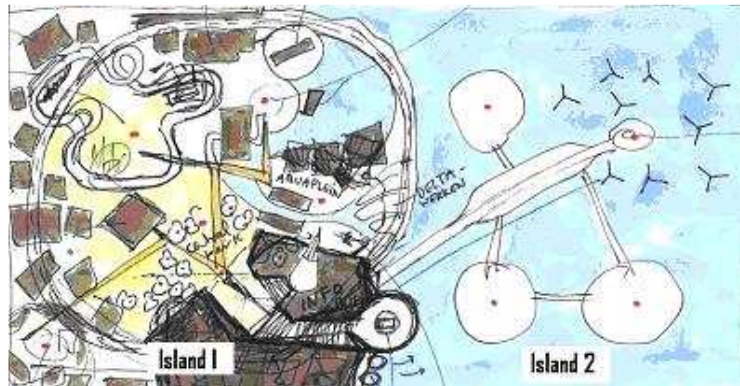
Figure 1: The initial city plan of the virtual campus

At the start, a city plan was developed that indicates what concepts are included, where they are located and how they are connected (see Figure 1). This city plan is composed of two "islands", the virtual land property that can be bought in *Second Life*. We sunk one island to create a sea as we wanted to build a floating city (i.e., island 2). The other island is centered on the Next Generation Infrastructures program, a research program that looks into how our vital infrastructures can be improved. Both islands accommodate several other concepts, such as a sustainable dance floor, a hydro-oxygen kart, and an offshore windmill park. To interlink these concepts they were integrated into an overall game concept. When visitors arrive they can pick up a buddy called the "NextFriend", who guides visitors on the island and enables them to participate in a number of mini-games (see Figure 2). The goal of the overall game is to make the NextFriend who is sick due to pollution (indicated by its red color) better by successfully finishing a number of games that are related to sustainability. If visitors succeed, the NextFriend will turn green and can be freed into a grass-land where NextFriends of previous visitors wander around. The grass-land also includes a board that shows the high scores of the visitors.
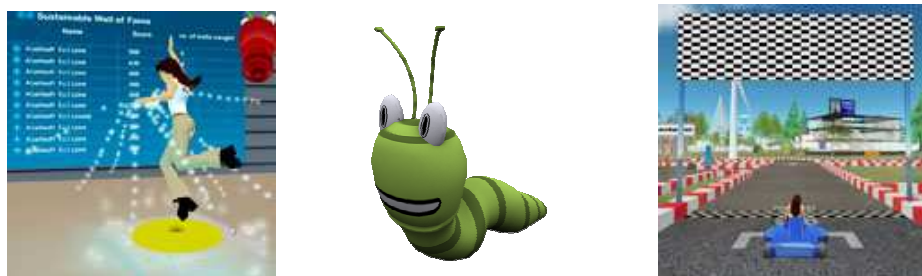

Figure 2: The dance game (left), NextFriend (middle), and kart game (right).

Despite the initial difficulty to come up with a good conceptual design, the eventual design can be considered innovative. It attempted to avoid the pitfalls of non-interactivity by using games and a buddy to interact with to bring concepts alive, and of non-uniformity by an overall game concept and a city plan to interlink the concepts. However, for a successful implementation other challenges need to be taken into account as well.

The Managerial Challenge

Once we rented two *Second Life* islands, we were confronted with a hierarchical system of rights that affected our collaborative building process. *Second Life*

distinguishes object creators from object owners. Creators have complete control over whether the created object can be moved, manipulated, or copied. By copying an object, someone else becomes owner of that copied object, yet never its creator. As the copied object's properties description still acknowledges the original creator, the new owner is bound by the restrictions the original creator might have imposed on the object. To allow for collaborative building, the development team needed to keep track of the rights constantly by making sure that every team member was allowed to move, manipulate, or copy objects.

The object right management becomes even more important if multiple objects – with each a different creator – are linked together to form a new singular object. Here *Second Life* transfers the rights of the object with the most constricting rights to the newly linked singular object. This means the rights of all the sub-objects need to be consistent. This illustrates how cumbersome object right management in *Second Life* can be. This system undermines the idea of pure "Collaborative Creation" (Linden Research Inc., 2008), in which the goal of building a virtual environment collaboratively is deemed of higher importance than the enforcement of creator- and ownership rights of individual objects. It would seem that collaborative creation is hindered by the paradigm of individual intellectual property rights that is imposed on its users, constituting a managerial challenge.

The Technical Challenge

Second Life is well-known for its user-generated content. Users can create objects, for instance buildings, accessories, vehicles, and couple behavior to these objects. Although an extended set of tools is provided to create 3D-models (objects in the virtual world), 3D-artists find it hard to switch from their known environments to the more restricted in-world designer provided by *Second Life*. To cope with this restriction, we developed a script to import 3D-models made in Autodesk Maya directly into *Second Life*. This script provides the possibility for 3D-artists to work in an environment they are comfortable with while still being able to refine the models with the in-world set of tools. The achieved complexity and level of detail of the imported models can be considered an improvement compared to those originally made with the in-world set of tools.

To add behavior to the 3D-models, the Linden Scripting Language (LSL) needs to be used. Although the syntax should look familiar to C-programmers, LSL is characterized by its event and state oriented nature. Behavior is coupled to specific events (e.g., touch_start, state_entry), which are specific to the current state of the objects (mostly custom defined states). Although LSL is an advanced scripting language, it lacks support for object oriented programming and a proper way of communication between different scripts. This results in an increment of complexity (complexity defined as the difficulty to design and develop the required software) for relatively simple applications. For example, the communication between the checkpoints of the kart game proved to be cumbersome to implement (see Figure 2).

The transition from visions and concepts to an actual implementation constitutes a technical challenge. This transition is characterized by the technical restrictions that the virtual world has. To cope with the restrictions in *Second Life*, we had to reconsider certain decisions to find a better fit between the conceptual design and the tools at hand and find other ways, by for example using an importer, to implement the envisioned design as effectively as possible.

The Perceptual Challenge

Despite that virtual worlds have been around for a much longer time, the use of these worlds for serious purposes is a development that has become more and more evident following the influx of users in *Second Life* in 2006 and 2007, as one small-scale survey among Dutch businesses reveals (De Nood and Attema, 2007). Therefore, many potential users are not acquainted with virtual worlds. They do not see why they should use them. This is a perceptual challenge, as somehow developers need to convince potential users why they should visit their virtual land. Moreover, those who are interested in virtual worlds have a problem understanding what these worlds constitute.

This means that during the development a significant portion of attention has to be devoted to disseminating knowledge about a platform that is about disseminating knowledge. Sounding paradoxical, it is in fact an inescapable truth. During our project we had to give explanations to the people involved in the project, let alone those who were not. So far, both islands have not attracted many visitors, and while this could be a problem that is intrinsic to virtual worlds (Warmelink et al., 2008), it is probably attributable to the project (and its context) as well.
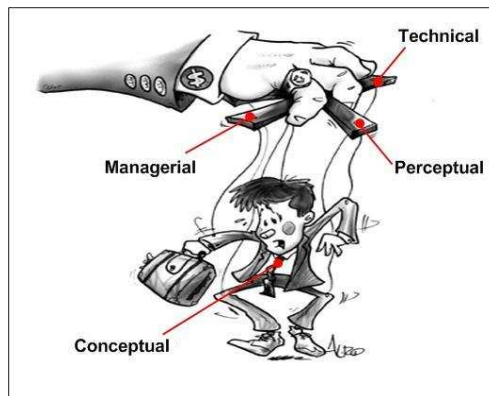

Figure 3: The designer as puppeteer metaphor (adapted from Al Rodriguez).

The Designer as Puppeteer Metaphor

We have attempted to come up with an innovative design, but as we noticed, our conceptual design, which posed a challenge in itself, was constrained and shaped by a number of other challenges; managerial, technical, and perceptual. This means that bringing concepts alive in *Second Life* presupposes more than overcoming the conceptual challenges. Designers have to bring their concepts alive by taking other challenges into account, challenges that constrain, and at the same time shape their concepts into their eventual form. To illustrate this, we would like to use the metaphor of the designer as a puppeteer (see Figure 3). The designer, who creatively dealt with a conceptual challenge, has to implement his idea by taking on the managerial, technical, and perceptual challenges as well. To let it all work, the designer has to work as a puppeteer by pulling and coordinating the right strings to ensure his concept comes alive properly.

Conclusion

Although the added value of virtual worlds like *Second Life* is to create and build communities with new and groundbreaking ways to communicate and interact with each other, the actual usage of *Second Life* for non-entertainment purposes has been

rather disappointing. To understand the usefulness of *Second Life* as a platform for serious activities, we set up a design-based experiment in *Second Life* with the aim of creating a successful implementation. The experience shows that having and implementing an idea is not straightforward. Besides the challenge of creating a good concept, a designer is confronted with a technical, managerial, and perceptual challenge. In our experiment, the technology restricted our design and forced us to reconsider or find other ways to implement it. In addition, the object rights management hindered the collaborative design process. Finally, during the experiment we needed to explain the value of the experiment. So far without success, since until now usage has been limited. Together, these challenges create the image of a virtual world designer as a puppeteer, someone who is trying to bring concepts alive while being constrained by and – at the same time – controlling a number of elements.

Hence, virtual world development in *Second Life* can be characterized as a complex set of interrelated challenges that need to be dealt with. This complexity should not be underestimated as it may be an important cause for the inactualization problem. It could be that this problem is entirely context-specific and as such *Second Life* should be avoided for non-entertainment purposes. However, future research may prove that this problem is actually applicable to other virtual worlds as well. In that case, for the next generation of virtual worlds to be successful, a better understanding is needed of how the constraints and controls can be improved to be able to create a rich and well-established virtual community.

Acknowledgements

References

Bartle, R. A. (2004). *Designing Virtual Worlds*. Berkeley, CA: New Riders.

De Nood, D. & Attema, J. (2007). *Ondernemingen in Second Life*. Den Haag, the Netherlands: EPN/PLEON.

Hendaoui, A., Limayem, M. & Thompson, C. W. (2008). 3D Social Virtual Worlds: Research Issues and Challenges. *IEEE Internet Computing*, *12,* 88-92.

Linden Lab. (2008). Economic Statistics. *What is Second Life?* Retrieved April 2, 2008, from http://secondlife.com/whatis/economy-data.php.

Linden Research Inc. (2008). Building. *What is Second Life?* Retrieved April 21, 2008, from http://secondlife.com/whatis/building.php.

Ludlow, P. & Wallace, M. (2007). *The Second Life Herald. The Virtual Tabloid that Witnessed the Dawn of the Metaverse*. Cambridge, MA: The MIT Press.

Mayer, I., Stegers-Jager, K. & Bekebrede, G. (2007). *Spelend Leren in Virtuele Werelden.* Groningen, the Netherlands: Wolters-Noordhoff.

Meadows, M. S. (2008). *I, Avatar. The Culture and Consequences of Having a Second Life*. Berkeley, CA: New Riders.

Smart, E. J., Cascio, J. & Paffendorf, J. (2007). *Metaverse Roadmap Overview*.

Tateru Nino (2007). Mixed Reality Headcount. *Dwell on it*. Retrieved April 25, 2008, from http://dwellonit.blogspot.com/search/label/statistics.

Warmelink, H., Bekebrede, G., Harteveld, C. & Mayer, I. (2008). Understanding Virtual Worlds: An Infrastructural Perspective. *ISAGA 2008,* Kaunas, Lithuania.