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LIFE, IMAGINATION, AND WORK USING METAVERSE PLATFORMS

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Life, imagination, and work using metaverse platforms

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Foreword

By
Ana Boa-Ventura
Texas Advanced Computing Center

Today, text-based communication systems seem to drive most of social media. At the same time, the corporate world gives its first tentative strides with tools such as Twitter, in a search for alternative ways to reach consumers. However, there seems to be a stubbornly faithful community to 3D environments and metaverse platforms, proposing a deep look into what these environments have of new and unique to offer.

Whether these metaverses are proprietary (e.g.: Second Life) or open (e.g.: OpenSimulator and Croquet), business-oriented (e.g. Project Wonderland) or arising from research (e.g. mWorlds and Sirikata) , what arguably distinguishes these environments from the abounding text-intensive social media is the user's embodiment and the opportunities for creation through object modelling, including complex behavior programming. This sophistication has its cost and it is not a small one for the currently 'crisis- hit' academic institution – metaverse platforms are avid environments for both internet and computer processor speeds; and the users' learning curve is significant. However, higher education institutions continue to acquire virtual real estate – notably in Second Life - and to release faculty from other, more conservative, tasks, so they have the time to test new forms of teaching (and, to a lesser extent, research) in these environments.

My colleagues ask me often whether one should consider these technologies a 'hype'… a fad that will soon go away. This is a common question which my fellow organizers of SLACTIONS 2009, Leonel Morgado and Nelson Zagalo, also come accross. The three of us are in agreement when we say that we believe we are witnessing wha is just the shy beginning of the use of metaverse platforms… and that we see the limitations recognized today – resource demanding environments, limited integration of wide-used technologies – as progressively fading away. Hence, we firmly believe from our observation, collaboration with institutions worldwide, of which this conference is the corollary, and our own practice, that metaverse platforms will increasingly offering a parallel or complementary platform for a wide range of activities.

Those platforms that will, if not win the race, at least continue to draw in users, will arguably be those capable of integrating other, emerging technologies ranging from GoogleEarth to RSS. Metaverse platforms such as Second Life have a long way to go as far as interoperability but have nevertheless shown their prowess as cooperative interfaces for applications and systems interaction. Second Life's open source 'sibling', OpenSimulator, may well be a step in the right direction as far as interoperability is concerned. However, 3D worlds that may score higher in the integration with other technologies may lose in critical mass – sheer number of members and developers' communities – to other more popular platforms. Highly interoperable 3D worlds may also be less stable than their popular counterparts. 'Instability' is a real obstacle for the much wanted continued commitment to this area, in the form of resource allocation, whether human or material.

In a global conference involving institutions with recognized work in Second Life and other metaverse platforms, the scenarios are necessarily different depending on where we are in the world, regarding the embracement of these emerging platforms as a research environment. In the US for example, a prestigious Foundation - Mellon - has recently granted resources for a study to leverage use of Second Life by senior faculty, given the acknowledgement that a continued commitment is key to pushing a research agenda in this area forward. In Portugal and Brazil, the environment was historically embraced by scholars in Education, which has explained the use of the environment in the classroom, and this has, in turn, spawn the curiosity of senior faculty.

Still, the experiences involving Second Life and other metaverse platforms lean more towards using the environment for teaching, often as a meeting point and distribution channel, rather than as a research platform. One could argue that using an environment like Second Life for teaching is a proposition with so many new variable in place that it is in itself a research proposition. On the other hand, those of us who hold accounts in these embodied worlds know that rich media environments such as these hold a research premise – and promise – of their own. We feel this research agenda has yet to explored.

Therefore we called this conference a **research** conference in the Second Life@ world: life, imagination, and work using metaverse platforms. The papers proposed push the boundaries and reflect an emerging research agenda that truly explores the importance of user embodiment and programmable 3D objects in areas such as Education, Health, Business, and Computer Science today.

Conference format

By
Leonel Morgado, Nelson Zagalo, and Ana Boa-Ventura

SLACTIONS 2009 was an innovative conference. It was held in the Second Life® virtual world, but also in physical ("real-life") auditoria over 4 continents. It was a mixed event, with diverse modes of participation and involving several communication flows – all the way from the those taking place between participants sitting side-by-side at a real auditorium in real life, to those between audience and speakers in a real or virtual podium, or to the communication between participants attending the conference from the comfort of their offices or homes.

When we set out to organize an international conference on scientific research involving the use of virtual worlds – or metaverse platforms, as this expression renders the concept more precise – our first idea was to hold it traditionally, in a Portuguese academic setting. But why make it so local? Why should we drop a rich online environment where we cooperate with colleagues and partners across the world for one where most people would have to allocate significant budget for participation?

We decided to organize it in Second Life. We were now left with the problems of the much needed interaction during any conference - what about the informal moments of physical proximity, of eye contact, of physical handshakes, and those healthy discussions while sipping coffee or a hearty tea? What about coffee breaks, conference dinners, evening tours, social moments where one can relax and get a more humane feeling of where fellow participants stand on the topic at hand? Sometimes conferences end up being the single moment in a given year where colleagues who cooperate remotely have a chance to meet. Wouldn't we be missing that?

To solve this dilemma, we devised the SLACTIONS 2009 format as we describe next.

The conference would be held on a single location – in Second Life. From here on we will call this the in-world chapter.

Participants and speakers would be able to attend and present their papers from physical rooms across the world. From here on we will call these locations our local chapters.

Presentations taking place in the in-world chapter would be projected on screens at the local chapters, so people could follow the presentations, and still interact with fellow participants attending the same physical location.

And why not let participants at local chapters follow the proceedings with their own computers? Well, they could! But by following a projection, we ensured that a camera operator kept the video flowing from presenter to slideshow to audience, and people could follow proceedings even if they were not acquainted with the Second Life interface. Furthermore, by having less people online, the conference could be enjoyed by many more people than the small crowds typical of Second Life events given the limits imposed by the very technological platform, and local chapters could be held even if their bandwidth allowed only a handful of Second Life avatars.

So a presenter controlling an avatar was seen and heard not only in offices and homes, but also in the local chapters. And when the presenter was at a local chapter, he/she was not only presenting with the avatar internationally but, at the same time, participants in that specific local chapter were seeing him/her in person, on site.

Participants following the proceedings at their homes and offices were able to ask questions using their avatars; participants at a local chapter were able to use a microphone connected to the camera operator's avatar to place questions – and so all were connected and participating in a truly global conference.

10 chapters took up the challenge, albeit only 8 managed to follow through with the logistics of organization all the way to the end. But the Finnish chapter in Jyväskylä and the Spanish chapter in Barcelona (of which we are happy to say that we managed to keep the conference closing concert) are keen about being part of the next edition of SLACTIONS.

The challenge to organize SLACTIONS 2010 was taken by Kathleen Keeling/Manchester Business School, at the closing of the conference. We wish her all the best in this endeavour.

Automatic content generation

ArchHouseGenerator – A Framework for House Generation

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The manual creation of virtual environments is a demanding and costly task. With the increasing demand for more complex models in different areas, such as the design of virtual worlds, video games and computer animated movies the need to generate them automatically has become more necessary than ever.

This paper presents a framework for the automatic generation of houses based on architectural rules. This approach has some innovating features, including the implementation of architectural rules, and produces 2D floor plans as well as complete 3D models, with a high level of detail, in just a few seconds. To evaluate the framework two different applications were developed and the output models were tested for different fields of application (e.g. virtual worlds). The results obtained contain evidences that the proposed framework may lead to the development of several specific applications to produce accurate 3D models of houses representing different realities (e.g. civilizations, epochs, etc.).

Keywords: Procedural Modelling, Virtual Environments, Virtual Worlds, House Generation.

Introduction

In the past few years, the use of algorithms to automatically generate virtual environments has become an area of growing interest for computer scientists and researchers all over the world. In fact, the idea of automatically creating environments with very little modelling effort is a fascinating idea that can lead to several benefits in different areas, such as Architecture, virtual worlds, video games and movies.

The goal is to place all, or most of the effort of creating an environment in computer software. In the context of the examples presented (i.e. Architecture, virtual worlds, video games and movies), the effort required by human resources (architects, computer artists and animators), could be greatly reduced and applied to more useful tasks, thereby leading to the development of more realist models.

This paper describes a framework – ArchHouseGenerator – conceived on the study of real structures, to demonstrate that computer algorithms for house generation can be used, even on areas where there are strict legal rules to be respected. Such is the example of Architecture where all Portuguese projects have to comply with RGEU (*Regulamento Geral das Edificações Urbanas*, General Regulations for Urban Buildings)[1]. This is just one example, since the framework may be used in other areas (e.g. virtual words and video games). Indeed, in this paper we also show some tests where the generated models were imported inside a multiuser virtual world that was built with a Virtual World SDK, OpenCroquet, This raises some interesting possibilities as the generation of *Real Virtual Worlds*, i.e. virtual worlds generated according to authentic Architectural rules. These may be contemporary worlds but also ancient worlds, representing structures lost in time, but where some kind of information about the rules of construction is available. This last reality is demonstrated with the representation of heritage structures.

The proposed framework implements an algorithmic approach for the automatic creation of a multitude of different house geometries in just a few seconds. This includes external geometry as well as interior geometry, with a high level of detail. An application – HouseGen – was developed over the framework which allows the creation of many features present in typical houses including doors, windows, roofs and baseboards. At the same time, the features generated for the different rooms of the house reflect the characteristics of a real house. This stems from the results, where the final models (considering the example of modern houses) present tiles, both in kitchens and bathrooms, and where different kinds of materials are represented for the floors of different rooms (e.g. mosaic for kitchens and bathrooms and wood floors for bedrooms).

The following contributions are presented:

- ArchHouseGenerator produces models according to architectural and legal rules.
- The generation of models that may match different architectural styles, thus allowing the representation of buildings from different civilizations, places and epochs.
- The generation of 2D floor plans as well as complete 3D models, with a high level of detail, in just a few seconds.
- The possibility to define rules that regulate the possible paths between different parts of the house (i.e. define which parts of the house can connect to any other part of the house).
- A dedicated exporter capable of generating 3D models suitable to different types of applications.

[1] RGEU is one of the main documents by which all Portuguese architectural projects have to comply.

Related Work

The reconstruction of urban environments has been a focus of previous work from different areas, spanning several types of data sources (e.g. aerial images, laser scanning data) (Martinez-Fonte et al., 2004; Weidner, 1996) as well as different applications. There are also approaches that attempt to model a particular town or city (Ingram et al., 1996), to those that create purely artificial environments (Urban Simulation Team), as stated by Laycock & Day (2003).

A different method of modelling, entitled Procedural Modelling, relies on algorithms to automatically generate the physical geometry. These algorithms usually aim for the generation of new worlds, rather than the reconstruction of existing worlds. Although they may also be used for the reconstruction of non-existing worlds for which there is some kind of knowledge (e.g. floor plans, photographs) to support the reconstruction of realistic environments (e.g. reconstruction of archaeological sites where only some features about construction techniques related with the site are known).

In the recent past many methods have attempted to address the field of Procedural Modelling in urban environments, where most of them are discussed by Watson et al. (2008) in addition to several other aspects, advantages and practical applications of this promising area. One initial approach to the construction and analysis of architectural design is based on shape grammars, presented by Stiny (1975). These have become the foundation for many applications comprising different architectural styles, e.g. (Koning & Eisenberg, 1981; Knight, 1981; Flemming, 1987; Duarte, 2002). Indeed, most of the related work concerning the generation of urban virtual environments relies on grammars, e.g. L-Systems (Parish & Müller, 2001), split grammars (Müller et al., 2006).

Parish & Müller (2001) presented an approach which uses shape grammars, namely L-Systems to generate large urban environments. Wonka et al. (2003), also used shape grammars, but concentrated however on creating detailed geometric façades on individual buildings. Later, Müller et al. (2006), used the knowledge from the previous mentioned work to propose a new method for addressing the problem based on a mass model technique.

Through a different approach Greuter et al. (2003), focused on optimization techniques to present a framework capable of generating real-time virtual worlds and Finkenzeller et al. (2005), presented a technique for generating floor plans and resulting 3D Geometry based on a decomposition technique.

One common feature among most of these authors' techniques is the fact that only buildings façades are generated, which means that there is a degree of realism lacking. This also means that these approaches are not suitable for some applications (e.g. Architectural applications and some video games) since the generated buildings are not traversable.

Martin (2005) addressed this problem by presenting two different approaches to generate both outer and inner characteristics of houses (instead of skyscrapers). Even though the presented work lacks some realism, an interesting thing to notice is that some architectural issues were taken into account. This can be perceived from the fact that the author makes the distinction between public and private parts of a house, as laid out by Christopher Alexander[2].

Hahn et al. (2006) also address interior generation, in real time, by dividing rectangular floors, corresponding to buildings' interiors, into rectangular rooms and hallways. Although, the divisions are performed randomly and have no architectural patterns into account (which doesn't seem suitable for the representation of real buildings).

The use of real rules to support the generation of virtual environments has been recently explored by the authors of this paper, either on the generation of modern structures (Author, Date) or on the generation of ancient civilizations, e.g. Roman civilization (Author, Date; Author, Date). This is demonstrated in this paper where modern structures as well as heritage structures were generated by the framework. As such, official rules, as laid out by RGEU were codified. This may serve as a basis for the future development of tools, which may aid both Architects and Civil Engineers, in the creation of new building floor plans, as well as 3D models, in a sense that may be considered as artificial creativity.

Likewise, Vitruvius' rules[3] were also taken into account for the generation of Roman structures, and an example of a 3D reconstruction of a Roman House is presented.

Overview

The rest of the paper is structured as follows. "Framework Architecture" section provides a general description of the framework. Examples of applications built over ArchHouseGenerator, as well as experiments are

[2]The distinction between public and private rooms stems from the architectural patterns described in 1977 by Christopher Alexander's in "A Pattern Language" (Alexander et al., 1977). In most of the related literature it is common to find references that acknowledge Alexander's contribution which may serve as a basis to several architectural applications. Nevertheless, a similar distinction has already been made in more ancient civilizations. One example is the Roman civilization where the literature adapted from Vitruvius (Roman Engineer and Architect) "De architectura" refers to the function of a room (Maciel, 2006).

[3] (Marcus Vitruvius Pollio – Roman architect and engineer who lived in the 1st century BC, author of "De architectura")

presented in the "Results" section and the paper concludes with the "Conclusion and Future Work" section.

Framework Architecture

The framework is composed by several modules represented in Figure 1. These are set off by the user design choices which guides each module until the final result is reached. The whole process is demonstrated with the case study of modern Portuguese houses.

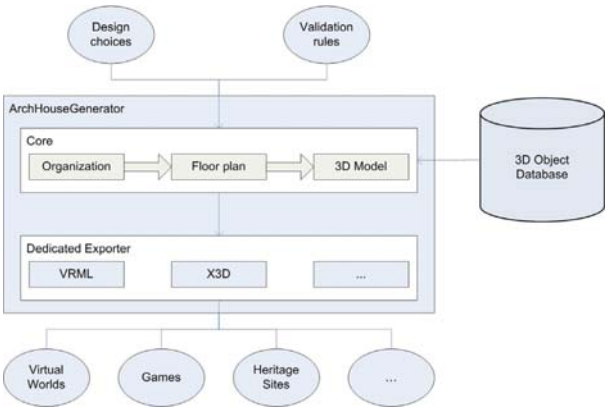

Figure 1: ArchHouseGenerator Architecture.

The design choices may match different architectural styles thus allowing the representation of buildings from different civilizations, places and epochs. The architectural style is enforced by several Validation Rules, coded in the form of a formal grammar. The object database, composed by 3D geometry representing different house features (e.g. ornaments, window styles, etc.), along with the Validation Rules may be used in this fashion to create computer programs using the framework to generate specific house types. This is demonstrated in the "Results" section, where an application – HouseGen – was developed to generate modern single, Portuguese houses.

In the ArchHouseGenerator Core there are three major components: Organization, Floor Plan and 3D Model. These are in charge of the generation of house floor plans and corresponding 3D models according to a specific organization (i.e. room types, connections between rooms, room dimensions, etc.) specified by the user.

The output of the framework is produced by a dedicated exporter module capable of producing several formats according to the purpose of the models. Furthermore this exporter module is more than an all-purpose exporter that simply maps the geometry primitives to a specific format. Indeed, it includes a sub-module for each format which has to be capable of exploiting the optimizations of that specific format. For example if the desired format is VRML or X3D the final model ought to include these format optimization capabilities, e.g. cloning, inlining, billboards, etc. This way the exporter model is a specialized tool, which produces clever models where performance may be a critical issue, making them suitable to different fields of application (e.g. virtual worlds, games and heritage sites).

Organization

The first step performed by the ArchHouseGenerator Core is the definition of the Organization of a house which will guide the generation of the floor plan. This Organization includes the creation (when the rooms are specified by the user) or generation (when the rooms are randomly generated) of the house rooms as well as the way in which they connect to each other.

Room creation and generation

When a new house is to be built there are several issues to account for. These may have a different priority considering the person who is dealing with the problem. On one hand, if we are talking about a common person (e.g. the person who wants to order a project for a new house), the first thing that usually occurs is the determination of the desired rooms. On the other hand if the person is the one who will develop the house project, one of the first things to account for, may be the total area of the house.

In this framework an effort to include the most common choices associated with the creation of a new house was made, considering that there may be different profiles, which may have different goals, relative to the final result. Having this in mind we considered both high level decisions, as well as low level decisions, regarding the options to be chosen on a house. When considering the rooms to be created this resulted in three different modes of creating a house:

1. Constrained Random Creation – in which there is no need to specify any room of the house since they are randomly created.
2. Partial Specification – the user may specify only some of the rooms of the house (e.g. three bedrooms, one living room and a dining room) and the framework will generate a house adding more rooms to the ones already specified.
3. Full Specification – the user specifies all of the rooms of the house. The only additional rooms (beside the ones chosen by the user) may be small add-on rooms to fill small spaces in the house (e.g. closet).

In each of the previous cases the generation will take into account rules which were specified in the framework to prevent the generation of invalid houses (houses where the room lists do not represent common Portuguese houses, in the present case study). This stems from the application of the RGEU rules and rules obtained from the observation of "real" floor plans.

Connecting the rooms

Once all the desired rooms of the house are generated, there is still the need to establish the proper links between them, guaranteeing a valid path, i.e. making sure all the rooms are reachable starting from the front door. This is ensured in this step where one can specify all the valid links between the different rooms of the house. The result of this step is a graph representing the connections between the rooms.

The links may be defined either in a low level kind of way, i.e. defining the rooms which can link together (e.g. "A living room may link to a kitchen") or in a higher level, i.e. defining the room types which can be linked together (e.g. Allowed Links: Public Room, Private Room). The latter allow the creation of rules such as "A private room never serves as a link between two public rooms", meaning that a bedroom could not be used to pass from a dining room to a kitchen, which seems to make sense in today's houses.

Figure 2 represents a connection graph generated for a T2[4] house.

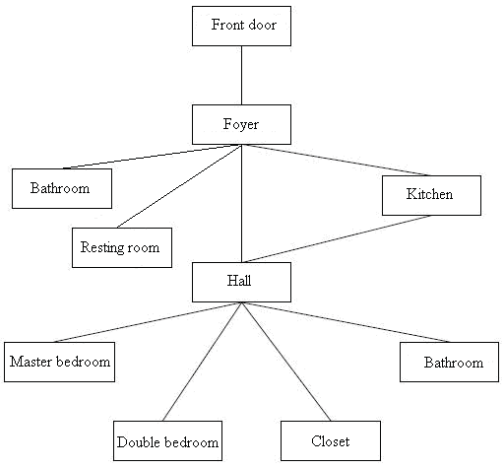

Figure 2: House graph.

It is also possible to generate several graphs until the desired structure is achieved. This step also allows circular connections to be created in the graph (which is actually why the connections are represented in a graph instead of a tree), i.e. connections between rooms which have the same origin (e.g. a foyer which links to a kitchen and to a hall which are also linked between each other – see Figure 2).

[4] The "T" stands for the house type, where the following number represents the number of bedrooms in the house. This number determines most of the legal rules from RGEU in Portuguese architectural projects.

Floor Plan

After all the desired rooms of the house are generated and the links between them established, it is up to the Floor Plan to create a floor plan with all these elements.

For each room of the house, the corresponding 2D polygon is created and the final result assures that the previously established path is respected. The rooms are randomly placed, but in accordance with the links previously established between them. The generated floor plans also respect several rules such as the minimum area of each room and the correct placement of doors (including correct opening directions) and windows. Wall thickness is also taken into account during room placement.

The boundaries of the floor plan are dictated by the position and geometry of the rooms making up the house. The user can also generate several different floor plans. Therefore multiple different geometries can be obtained and the user can choose the one that pleases most. An example of a result from this process is illustrated in Figure 3.

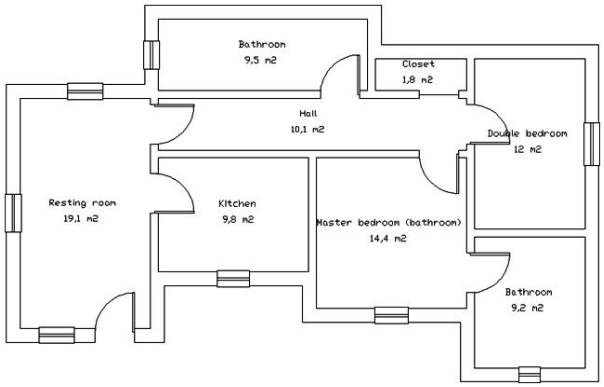

Figure 3: Generated floor plan.

3D Model

The floor plan may serve to illustrate the different parts of the house, the connections between them, the sizes of each one and even the outer geometry, but still does not give a real perspective of the house. This emerges by adding the third dimension into it.

A great deal of features may be specified for the 3D models, although this step is also capable of using appropriate default parameters for each feature of the houses.

To enhance the realism of the scene several aspects were included in the final models, like different light sources, appropriate textures for each part of the house and transparencies to represent glass surfaces (e.g. windows and doors). All of these can be individually specified by the user.

In Figure 4 a generated model representing the exterior of the house may be observed. Figure 5 represents the same house viewed from the inside.

Figure 4: Exterior of the house.

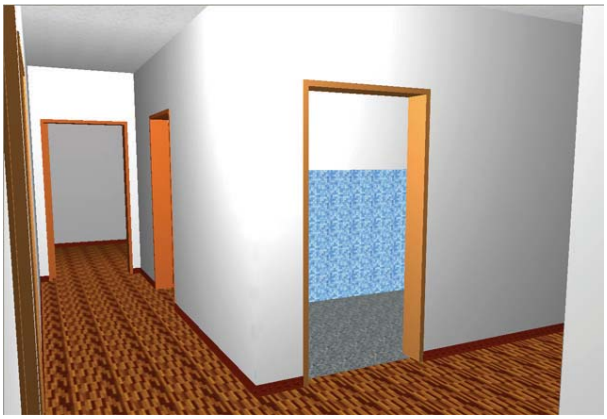

Figure 5: Interior of the house.

To represent the final models any of the Export formats provided by the framework may be used, and in a near future more formats may be added to allow a broader range of applications. Depending of the format used, as well as the goal of the models, different features are also available. For example if the format is VRML or X3D this allows the easy and widespread distribution of the results obtained with the framework over the Internet (see WebHouseGen, described in the "Results" section). Likewise, the VRML/X3D models allow the visualization of all of the elements of the house in a 3D perspective, where the user can navigate through the exterior and interior of the house. The generated models also include transparencies, collision detection, proximity sensors for turning on lights and opening and closing doors, to increase the realism of the scene.

Results

To test the functionality of the framework two applications were developed: HouseGen and WebHouseGen. Both applications have the same general goals, i.e. allowing the user to generate floor plans of houses and their respective 3D models. However the specific goal of each is somewhat the converse, since in one hand HouseGen runs on a Windows operating system and was developed to exploit most of the features of the framework. On the other hand WebHouseGen was developed to allow the widespread divulgation of the framework over the Internet and as such, offers a smaller bundle of functionalities.

HouseGen

Most of the present framework features were exploited in HouseGen. This application, developed in C#, was used to evaluate the framework usability but also to measure some performance issues.

Even though HouseGen is not a complete production-ready application but merely a prototype, there is still a great deal of options available to the user. Tasks such as defining the total area for the house or for specific rooms, configuring the rooms that will make up the house, generating floor plans which can be exported to some common formats[5] and specifying new types of houses can be performed in the application.

There are also detailed customizations available to the user that enables the configuration of the 3D models. These customizations allow the configuration of both exterior and interior features of the house, such as:

- Material selection.
- Colours.
- Roof types.
- Windows linings.
- Light source positioning.

The interior customizations (e.g. materials, colours, textures) may be applied to either all the rooms of the house or individually.

Figure 6 shows a screenshot of HouseGen, where some of the features available to the user are visible.

[5] Including both raster formats (bmp, jpeg, tiff, gif, png, wmf) as well as vectorial formats (dwg).

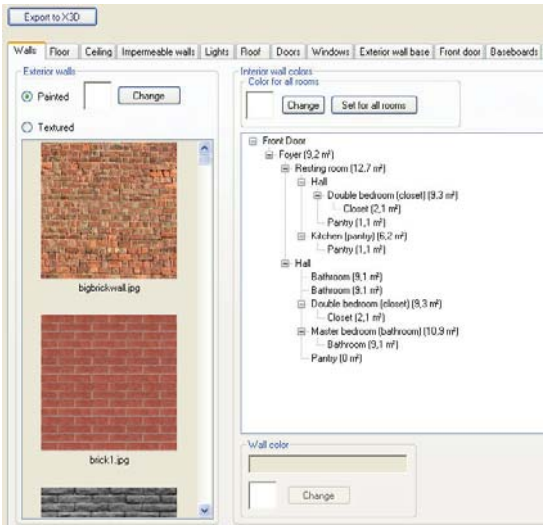

Figure 6: HouseGen.

With this application it is also possible to generate environments composed of multiple houses (whose types can also be selected).

Figure 7 shows a simple virtual city consisting of different types of houses with all of their interior rooms created. The city has 60 different houses and consists of about 170940 polygons generated in about 18 seconds[6]. Note that no performance issues were taken into consideration. The city may be explored from a first person perspective and the houses may be traversed.

Figure 7: Generated city with 60 houses.

Figure 12 at the end of this paper shows some of the infinite different house geometries which may be achieved with the framework.

[6] All tests were conducted on a system equipped with an Intel Pentium 4 running at 3.2 GHz with 1 GB of RAM.

WebHouseGen

In WebHouseGen only a few features of the framework were exploited. This application, developed in ASP.NET, was intended to show the simplicity associated with the generation of a new house, which can be done in only three simple steps: (1) Building type and room list setup, (2) Floor plan setup and (3) 3D model generation. Figure 8 presents the first of these steps.

Figure 8: WebHouseGen.

As outputs the user receives the floor plans as well as the 3D models. The website is available at:

http://www.dei.estg.ipleiria.pt/projectosOnline/geradorEdificios/.

Performance Tests

To measure the performance of the framework, two different tests were conducted. The first test measured the efficiency of the generation of a single house, considering different house types from a T0 to a T6. The generation times range from 0,064 to 2,913 seconds respectively as perceived on Table 1.

Table 1. Generation times for a single house.

House Type	Generation time (s)
T0	0,064
T1	0,211
T2	0,247
T3	0,982
T4	1,785
T5	2,542
T6	2,913

For the second test the goal was to measure the efficiency of the framework in generating virtual environments, i.e. several houses. The selection of houses types to generate

was done randomly (between T0 and T6) and the tests accounted from 10 houses to 100 houses, considering intervals of 10. Test results are presented in Figure 9.

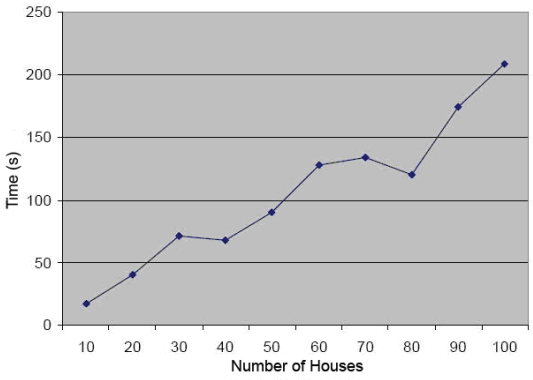

Figure 9: Generation times for multiple houses.

Note that any performance issues were taken into consideration.

Virtual Worlds

In recent years we have been seeing an increase use and academic interest in Virtual Worlds. Virtual Worlds are generally characterized as collaborative virtual environments that give their users the sensation of "being" in a space (generally 3D) and the sense of "co-presence", i.e. "the sense of others" (Bartle, 2003). Their use is consolidated in some areas, as games (where the MMORPG kind is the most common use of these environments (MMOG chart, 2009)), virtual spaces for socializing, collaborating and digital creation (being the Second Life virtual world the most popular example (MMOG chart, 2009)). Likewise, a growing number of SDKs (as OpenCroquet (OpenCroquet, 2009), OpenSimulator (OpenSim, 2009) and Sun's Project Wonderland (Project Wonderland, 2009)) for their creation is arising.

As such there is also an increase demand for tools that can generate "massive" 3D content automatically to quickly populate a virtual world (ex: buildings for a whole city). This requires automatic solutions as manual creation methods are no longer sufficient.

This framework does not intend to replace the work of computer designers or replace the creativity of virtual world users who want to design every single detail of their models. Instead, the goal is to provide means of rapidly and efficiently produce models, which may include user choices and several sets of rules, which may also be enhanced and freely modified by them.

We can foresee a set of contexts where automatic 3D modelling mechanisms based on a set of rules are useful. For example, a virtual city with hundreds or thousands of buildings can be implemented for real life simulations (ex: earthquake damages scenarios) as virtual worlds may also have powerful physics engines integrated. These can also be useful for games and movies as new scenarios could easily be seen and tested since it would only be needed to change the pre-programmed rules for building creation.

Although some worlds give their users tools to develop 3D content (with scripts for behaviour if desired) there are others that rely on 3rd party tools for this task, as Blender or 3D Studio Max, giving the user "import content" tools. As this may be desirable, giving the user the liberty to use its favourite modelling tool, the lack of a common 3D modelling format, for the several virtual worlds, could also be a challenge as some problems of conversion between formats still exist (demonstrated shortly). Due to these issues, some virtual worlds are opening their platforms to more creators by using open-standards. One example is Vivaty, a "web-based virtual world platform that is built entirely on open standards" (Vivaty, 2009). Indeed, Vivaty allows the users to create worlds in standards like X3D and VRML (supported by ArchHouseGenerator), also providing a tool – Vivaty Studio – which allows the user to import several other formats.

We have tested some of our models in a virtual world developed with virtual World SDK, OpenCroquet, a tool that "can be used by experienced software developers to create and deploy deeply collaborative multi-user online virtual world applications on and across multiple operating systems and devices" (OpenCroquet, 2009). As this SDK is still on an early release it does not give great support for the most common 3D formats. Indeed, though this SDK supports some formats provided by ArchHouseGenerator, such as VRML, the authors have experienced some problems in the correct import of the model. This led to rely mainly in the ASE format (3D Studio Max ASCII Scene Export) as this is one of the formats that it is easily imported by this SDK.

Although the ASE models have rendered generally well in the virtual world (see Figures 10 and 11) it was stated that using some of the most common conversion tools available to convert the original model (VRML) to the ASE format (that was imported into the virtual world) would sometimes give unpredictable results as some features of the original format were lost. This is visible in Figure 10 where the columns and flowers, previously formed by billboards and transparent textures in VRML, lost their veracity when converted to the ASE format and imported into the virtual world. The figure shows the rendering of one model using a virtual world developed in OpenCobalt (OpenCobalt is currently being developed by the OpenCroquet community as a future "metaverse browser" (OpenCobalt, 2009)) corresponding to the virtual reconstruction of the "House of the Skeletons", a Roman house, for which presently only the ruins exist at the heritage site of Conimbriga, Portugal.

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Figure 10: House of the Skeletons (in OpenCobalt).

The reconstruction considered rules derived from the knowledge left by Vitruvius, mostly trough the reading of the Portuguese adaptation of "De architectura" from M. Justino Maciel "Tratado de Arquitectura" (Maciel, 2006). A study of Roman Architecture, along with the director of the Monographic Museum of Conimbriga – Dr. Virgílio Hipólito Correia, with the goal of determining several options regarding the reconstruction of the House of the Skeletons, is also responsible for most of the options to produce the results presented. This example also serves the purpose of demonstrating the use of the framework to generate heritage structures.

Figure 11 shows our own designed OpenCroquet virtual world where a house produced with HouseGen was imported and where its multi-user capabilities were also tested.

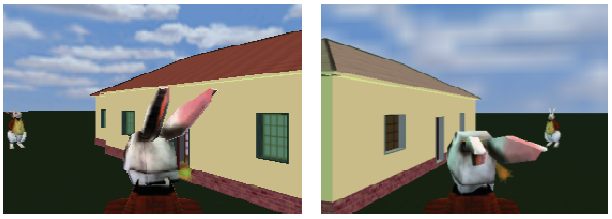

Figure 11: T3 House (in an OpenCroquet multiuser world).

As it can be seen we show how the world was rendered in two different machines synchronously – allowing the simultaneous presence of two users (here represented by rabbits – each one is seeing the other). This is one of the main advantages of shared virtual worlds as by allowing the presence of multiple users they allow a great set of collaborative activities (by the simultaneous presence and interaction of several users).

Conclusion and Future Work

The framework presented in this paper was initially conceived to demonstrate the use of computer algorithms for ruled based house generation. The results achieved are in accordance with the initial goals, whereby most of the 3D models produced present many features, with a high level of detail, comparable to real houses.

ArchHouseGenerator also revealed to be capable of generating several distinct house types, with different characteristics (e.g. rooms, areas, paths), which seem adequate for the creation of virtual environments. Figure 12, at the end of the paper, shows different houses types representing the variety which may be achieved with the proposed framework.

We can conclude that the proposed framework is suitable for some areas of application, where Architecture and virtual worlds were emphasized. Nevertheless it may also be used, in the near future, in other areas where some level of realism is required such as video games and movies.

There are some details which need improvement, and new features to be added, either on the framework itself or the presented applications, such as:

- Allowing different geometries for the rooms of the house (e.g. circular, octagonal).
- Allowing geometric operations (e.g. rotation) on room geometries.
- Extending interactivity by allowing the user to manipulate different characteristics of the house.
- Generation of multi-floor houses.
- Generation of furniture which allows an easier identification of the different rooms of the house.
- Creating enhanced façade features (e.g. balconies, ornaments, porches).
- Add new export formats.

These represent a fraction of the identified future work topics, since from here there are several new features to be added as well as new areas of application for which the framework may be used in a near future.

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Figure 12: House variety.

Behavioural studies in the metaverse

Proposed Theoretical Framework for Virtual World Adoption

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Abstract

Despite the fact that companies are seeking to gain competitive edge by spending on new ventures in Virtual Worlds, they are still unsure about the effective adoption and usage by the intended organizational members. This paper proposes a theoretical framework for user adoption of the three-dimensional (3-D), internet-based simulated virtual space called virtual worlds (VWs). The proposed preliminary model is an extended diffusion of innovations (DOI) model with new constructs deemed significant in the domain of virtual world innovation. Thus, along with the DOI constructs of relative advantage, complexity and compatibility, the factors that emerged as salient predictors of VW adoption are perceived enjoyment, perceived critical mass and trust. The paper contributes to the existing research on VWs and adoption of new technologies by presenting a detailed description of the factors influencing VW adoption and by giving proposition for future research in this emerging area of research.

Key words: virtual worlds, adoption, diffusion of innovations, technology

Introduction

There has been a growing interest in the three-dimensional (3-D), internet-based simulated virtual space called virtual worlds (VWs) where individuals assume an identity of an 'avatar'. Avatars inhabit the VWs and interact with each other using text chat or voice chat. VWs are rapidly emerging as an alternative means to real world for communication and collaboration. This is facilitating growing interest of VWs in business landscape and thus is accelerating beyond gaming and 3-D modeling to business applications, brand building, marketing and customer relationship management.

Organizations can see the potential of VWs for organizational learning and collaboration. Businesses are beginning to sense opportunities in VWs for reaching customers and business partners due to the richness of this communication channel in aspects of informality, openness, and density of communications (Daft and Lengel, 1986; Gupta and Govindrajan, 2000; Jablin, 1979; Tushman, 1977). However, organizations and investors have mixed reactions to VWs where some think it to be the next revolution after Internet while others consider it to be similar to dotcom bubble which can burst any time. Thus, while many companies are seeking to gain competitive edge by spending on new ventures in VWs, they are still unsure about the effective adoption and usage by the intended organizational members. Value for investment in VWs will be realized only when companies' employees and intended users adopt and use this new virtual medium of communication in the most effective manner (Agarwal and Karahanna, 2000). Hence, there is a pressing need to understand the adoption and usage behavior of the emerging VWs since if they are not accepted by their intended users, they will not result in any sought-after benefits (Agarwal and Prasad, 1998).

Information systems (IS) researchers have actively explored the adoption, acceptance and usage of various technologies for more than two decades. A significant portion of IS research has focused on investigating and understanding the determinants of information technology acceptance. Several research models have been proposed to understand the facilitators of technology acceptance by its potential users (Davis, 1989; Davis et al., 1989; Matheison, 1991, Taylor and Todd, 1995).

An important theoretical aspect of research on adoption and acceptance of new information technology is to understand an individual's perceptions of using an innovation which are posited to significantly influence user acceptance (Moore and Benbasat, 1991; Rogers, 1983).

The objective of this paper is to theoretically explore the adoption of VWs by its intended users by examining the determinants specific to VW context. The specific research question addressed in this paper is:

- What are the factors influencing VW adoption by users for collaborative tasks and business purposes?

The paper contributes to the existing research on VWs and adoption of new technologies by presenting a detailed description of the factors influencing VW adoption which can be the basis for future research in

this emerging area of research. This will help the practitioners and businesses to position themselves in this new and immersive medium of communication according to the needs, expectation and perceptions of the users.

Adoption of Virtual Worlds

VWs are defined as the 3-D environment that appears similar to 'real' world. VWs are computer-based simulated immersive environments that offer online entertainment and social networking to its users who inhabit and interact via avatars. In our definition of VWs, we refer to broader VW environments rather than those that exist largely as 'game-oriented environments' such as World of Warcraft and Sims Online (Barnes, 2007). In recent years, VWs have emerged as a powerful new medium for businesses, instruction and training, education and collaborative tasks.

Membership in such VWs has grown to millions. In a recent study, Gartner predicted that by 2012 up to 80% of active Internet users and Fortune 500 enterprises such as Johnson & Johnson, Motorola and Intel will participate online in VWs (Gartner Group, 2007).

The best known of all VWs is Second Life which is a high resolution 3-D VW with fully customizable avatars. In the VW Second Life, more than 50 multinational organizations, such as Adidas, BMW, IBM, Toyota and Coca-Cola have made a substantial presence and are conducting operations. Thus, due to increasing broadband internet access, VWs are rapidly emerging as an alternative means to the real world for communicating, collaborating, and conducting businesses. A few other popular VWs include Haboo, Kaneva, Active Worlds, Moove and CyWorld which have slightly varied features but share the commonality of being highly immersive virtual environments.

All these features of high resolution virtual medium increase the complexity of VWs environments and thus pose challenges for its adoption. This paper analyzes this complex environment and focuses on examining the willingness of the potential adopters to adopt and use VWs as an active platform for collaboration, information sharing and other business activities.

Adoption and Diffusion of Innovations

The significance of the innovations' attributes in influencing the adoption of new technologies had been well documented in the information systems (IS) literature (Rogers, 1983). The theoretical background for this study is drawn from the Diffusion of Innovations Theory (Rogers, 1995) which has been extensively used to understand the adoption and usage of new technologies (Agarwal and Prasad, 1997; Agarwal and Prasad, 1998; Beaty et al., 2001; Chen et al., 2004; Grantham and Tsekouras, 2005; Hung et al., 2003; Liao et al., 1999; Li, 2003; Tan and Teo, 2000; etc.).

Of the proposed factors by Rogers (1983), relative advantage, complexity (ease of use) and compatibility were consistently related to adoption decisions (Tornatzky and Klein, 1982). Past research in innovation adoption in general (Rogers, 1983, Tornatzky and Klein, 1982) and specific to IT adoption (Kwon and Zmud, 1987) identified relative advantage, complexity and compatibility as three major factors influencing innovation adoption diffusion. Meta-analysis of as many as 25 attributes by Tornatzky and Klein (1982) has shown that relative advantage, complexity and compatibility consistently emerged as significant attributes for innovation diffusion. An individual is expected to adopt an innovation only if s/he perceives significant benefits with the innovation as compared to alternative choices. Innovation research has found this perceived relative advantage to be a key and consistent variable positively influencing adoption and diffusion (Tornatzky and Klein, 1982). Complexity of the technology innovation, described as the relative difficulty in understanding and using it has been usually observed to discourage its adoption and further diffusion (Rogers, 1983). Compatibility of the technology innovation with the existing technical systems, values and beliefs of the potential adopters is another key variable favoring the adoption and diffusion of new technology (Cooper and Zmud, 1990).

Preliminary Research Model

VWs are rapidly emerging as a technological innovation for conducting real world tasks such as communicating, collaborating, and organizing economic activity virtually. Thus, relative advantage, complexity and compatibility are deemed as salient predictors for VW adoption as well. To gain further insights into the facilitators influencing VW adoption, previous literature on the adoption of groupware technologies such as internet, e-mail, electronic bulletin boards and social networking sites were reviewed. The three other factors that emerged as salient predictors of VW adoption are perceived enjoyment (Childers et al., 2000; Van der Heijden, 2004), perceived critical mass (Guo and Barnes, 2007; Lou et al., 2000) and Trust (Guo and Barnes, 2007; Junglas et al., 2007).

Relative Advantage

A rationally behaving individual will adopt an innovation only if s/he believes that this prospective innovation is more beneficial as compared to alternative choices. Innovation research refers to this as

relative advantage perception by potential adopters and has found it to be a key and consistent variable positively influencing adoption and diffusion (Rogers, 1983; Tornatzky and Klein, 1982). Relative advantage refers to the degree to which adopting an innovation is perceived as being better than using the practice it supersedes (Rogers, 1983). Research in VWs indicates several major benefits that can accrue to VW users. VWs allow for a cost-effective and 'fun' way of achieving co-location with other users as well as a powerful platform for information dissemination, collaboration and social networking in an enjoyable manner (Goel and Mousavidin, 2007). Thus, the basic advantage of VWs compared with other groupware technologies are time and location independent possibilities to carry out various tasks like communication, collaboration, socializing and even business activities. VWs are helping to bridge time and distance (Jakala and Pekkola, 2007). Further, VWs are making work and training more efficient by providing leisure and pleasure during work (Hindmarsh et al., 2000, Jakala and Pekkola, 2007). Thus, relative advantage should significantly influence behavioral intention to use VWs.

P1: Relative Advantage can influence users' intention to adopt VWs for information sharing and collaborative tasks.

Complexity

Complexity represents the degree to which an innovation is perceived to be difficult to understand, learn or operate (Rogers, 1983). It is inversely analogous to the "ease of use" construct in TAM (Davis, 1989). Complexity is usually observed to discourage its adoption and results in implementation difficulties and further diffusion (Tornatzky and Klein, 1982). VWs are expected to provide convenient solutions to its users by dissolving the boundaries of time and location. However, limitations of the VW features diminish the ease of use of this virtual medium. Typical limitations include network inconsistencies, limited transmission speed and installation of bulky software before use. Thus, complexities of the VWs should negatively influence the behavioral intention to use VWs.

P2: Complexity can inhibit users' intention to adopt VWs for information sharing and collaborative tasks.

Compatibility

Compatibility is the degree to which the innovation is perceived as being consistent with existing values, previous experiences and current needs of the potential adopters (Rogers, 1983). VWs are becoming more and more sophisticated and increasingly immersive, thereby enabling organizations and individuals to "step into the internet." VWs are promising radical changes to the business processes, thereby resulting in business process re-engineering. In addition, VWs are highlighting human factors rather than technical factors and emerging as socially oriented and community-supporting environments (Ramamurthy and Premkumar, 1995). Thus, VWs are compatible with the existing technologies and promise to satisfy current needs of its users. Hence, compatibility of VWs should significantly influence behavioral intention to use VWs.

P3: Compatibility can influence users' intention to adopt VWs for information sharing and collaborative tasks.

Perceived Enjoyment

Motivation is an attribute that explains the behavior of the individuals to use or not to use a new technology. Two fundamental types of motivation playing an important role in user acceptance are extrinsic and intrinsic (Van der Heijden, 2004). Extrinsic motivation is the external benefit or reward the user expects in return to adoption of new technology. This is similar to the perceived usefulness construct in the Technology Acceptance Model (TAM) or the relative advantage construct discussed above (Van der Heijden, 2004). Intrinsic motivation, on the other hand, is driven from the interaction with the system per se (Van der Heijden, 2004). Perceived enjoyment is an intrinsic motivation variable that has shown a significant direct influence on an individual's behavioral intention to use new technologies and information systems (Childers et al., 2000; Van der Heijden, 2004; Moon and Kim, 2001; Cheong and Park, 2005).

In the context of VWs, perceived enjoyment refers to the fun or enjoyment user expects to derive with usage of VWs for business activities and collaboration. We believe that when a user perceives that serious tasks like collaboration, information sharing and other business activities can be a fun-filled and enjoyable experience, s/he would be willing to adopt this new technology for collaborative tasks. Thus, perceived enjoyment should significantly influence behavioral intention to use VWs.

P4: Perceived enjoyment can influence users' intention to adopt VWs for information sharing and collaborative tasks.

Perceived Critical Mass

Previous works have investigated the role of critical mass in the adoption of new technologies (Hsu and Lu, 2004; Lou el al., 2000). Critical mass is defined as "the minimal number of adopters of an

interactive innovation for the further rate of adoption to be self-sustaining" (Mahler and Rogers, 1999: p.721) Thus, critical mass is a basic requirement for group or collective activities.

Markus and Connolly (1990) illustrate that groupware applications like emails, discussion boards and chat rooms might fail without securing a critical mass of users for the technology. They argue that in the absence of critical mass individuals satisfy their personal interest and needs and have the tendency to freeload (Lou et al., 2000). Consequently, few people are willing to contribute to the system and thus collaboration and information sharing will not be possible. Therefore, perception of 'critical mass' of users has been recognised as the key factor for successful adoption and usage of groupware technologies including VWs (Markus, 1990; Markus & Connolly, 1990; Grudin, 1994).

VWs being interactive platforms, the acceptance of this virtual medium for collaborative tasks need participation and collective action by all individuals whose work might be influenced by this new technology. Hence, in this research perceived critical mass is the extent to which individuals believe that most users will adopt this virtual platform for collaboration and communication. In the virtual community, if a member realizes that many members are using this virtual platform for collaboration, information sharing and other business activities, s/he will have a high behavioral intention to adopt this medium for similar tasks. Thus, perceived critical mass should be a strong determinant of behavioral intention to use VWs.

P5: Perceived critical mass can influence users' intention to adopt VWs for information sharing and collaborative tasks.

Trust

The concept of trust has been an important topic of study in information systems research. Trust has been studied extensively in e-commerce (Pavlou, 2003; Pavlou, 2007; Jarvenpaa et al., 2000; Wang and Benbasat, 2008; Lowry et al., 2008) and virtual teams (Jarvenpaa and Leidner, 1999; Piccoli and Ives, 2003). VWs demonstrate various social activities and transactions and thus trust would play an important part in the study of VWs and most of the theories on trust in e-commerce and VWs are likely to be applicable to VWs as well (Junglas et al., 2007). Mayer, Davis and Schoorman (1995) described trust as the belief of the trustor that the trustee will fulfill the truster's expectations and not take advantage of his/her vulnerabilities. However, Lewis and Weigert (1985) describe the need of trust during social interactions and thus trust is an important concept of study in any social system. VW being a highly complex social system, trust is imperative as a complexity reduction tool (Junglas et al., 2007). Thus, trust should strongly facilitate behavioral intention to use VWs.

P6: Trust can influence users' intention to adopt VWs for information sharing and collaborative tasks.

A conceptual model of these factors identified from the literature and based on their proposed relationships is shown in Figure 1.

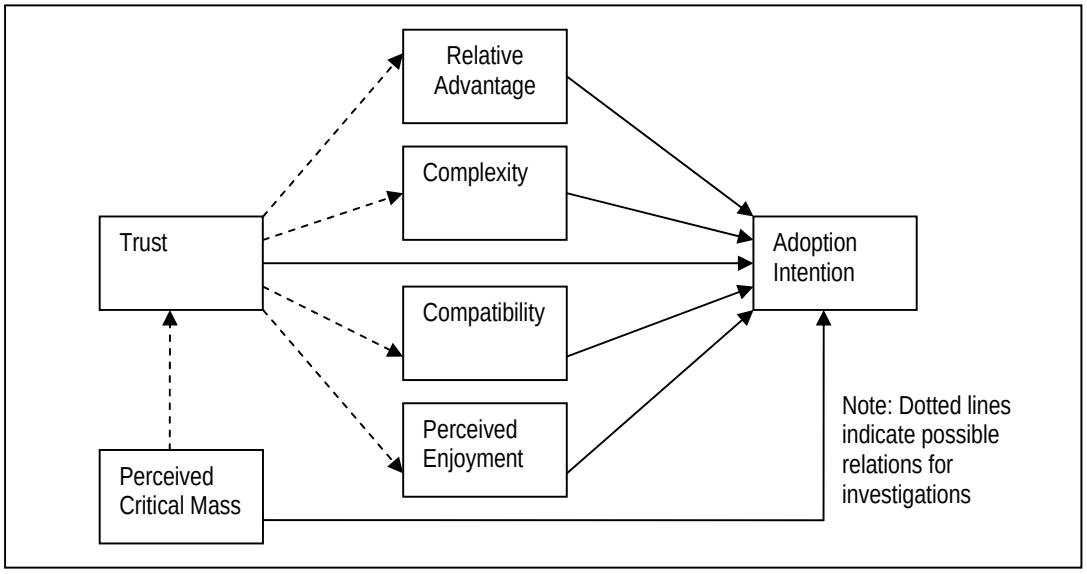

Figure 1: A Preliminary Research Model

Proposed Methodology

We propose to test this research model using a survey method. A survey instrument will be developed by identifying appropriate measurements from a comprehensive literature review. In order to ensure content validity, the scales for various measures from prior studies will be adapted to the context of virtual worlds. The designed questionnaire is proposed to be pilot tested with around five doctoral students whose comments about the readability of the survey items will be incorporated in the final instrument. The sampling frame for this study will be the potential virtual world users in Singapore who are tech-savvy and should be regular internet users. This will be the qualifying criteria to participate in the survey questionnaire.

The proposed theoretical framework will then tested using the partial least squares (PLS) method.

Contributions and Conclusion

The research model aims to explore the factors influencing the intentions to adopt virtual worlds for information sharing and fulfilling other business needs. The expected outcome from testing this preliminary model will be an extended diffusion of innovations model with new constructs deemed significant in the domain of virtual world innovation.

This will help the academicians and practitioners alike in understanding the emerging virtual world dynamics. An understanding would assist businesses and also virtual world operators and designers in creating virtual platforms which will be utilized by the intended users in the most effective manner.

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Who am I - and if so, where? An Experiment on Personality in Online Virtual Realities.

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Abstract

Virtual realities form a new technical platform, raising scientific questions about the human mind, communication and identity (Bainbridge, 2007). In recent studies it appears that users of virtual realities behave closer to their ideal self (Bessiére, Seay & Kiesler, 2007), are more confident in negotiation tasks (Yee & Bailenson, 2007) in comparison to their behavior in real life and that Dutch students keep bigger interpersonal distance towards an Arabic avatar than a Caucasian one (Wigboldus, 2006). Despite the evident difference in behavior in real life versus virtual life, there is hardly any scientific research on the influence of a virtual reality on the identity perception and the personality of a user of these virtual realities. The present study attempts to contribute to filling this gap by assessing the potential difference between real-life personality and the 'virtual' avatar personality using the online 3D world of Second Life. 34 Dutch participants were asked to use their own avatar or create a new avatar within this online virtual reality, to communicate with other avatars and finally to fill in the Big Five personality questionnaire *5 Persoonlijkheids Factoren Test* (5PFT) via a virtual interactive testing screen within Second Life. The virtual 5 PFT scores were compared to pencil and paper scores of the same questionnaire, which was filled in by all 34 participants during a first-year undergraduate test battery, seven months prior to the virtual testing. The results show no difference for any of the five subscales (extraversion, friendliness, conscientiousness, neuroticism, development) between the pencil and paper and the virtual version, implying that users of virtual realities do not create a 'virtual' personality for their avatar. Furthermore, high scores of internal consistency and high test-retest correlations between the two versions were found, which are in turn very similar to the original test-retest scores of the 5PFT (Elshout & Akkerman, 1975). These findings show the potential of virtual realities as new platforms for reliable (psychological) testing and future clinical applications.

Personality in virtual reality

In recent years technological development has enriched our daily lives with a wide range of new possibilities. Personal computers, the internet and other means of information technology are rapidly changing communication and thereby people's lives, maybe even as much as the invention of language, writing and printing did (Baecker, 2007).

One of the most intriguing experiences, and at the same time most controversial discussed topics, is the phenomenon of virtual realities. Second Life

is the biggest free available virtual reality, with 15 million people currently registered, while approximately 500.000 people are online in Second Life at least once during one week (Linden Research, Inc., 20 October, 2008). At any moment somebody with an avatar can join the Second Life world to meet people, build objects and do whatever he/she likes. In fact, in Second Life there is an online world developing that has pretty much the same features as the real world.

One difference important difference between the real world and virtual worlds is that contacts are always established via the technical use of the computer. Avatars approach each other in virtual places, but to disappear it only takes a mouse click. There is for example the possibility to fly and teleport, meaning that at any time the avatar can directly be transferred to any other place within Second Life, except some restricted private areas. By wearing the virtual mask of the avatar and by always having the chance to leave without being known or questioned, a user of the virtual reality finds himself confronted with questions as "what am I going to tell?" and "am I going to tell the truth?". This anonymity can lead to a sense of de-individuation and disclosure, which in turn has influence on the identity perception of the user (McKenna & Bargh, 2000). Users of the online role game 'World of Warcraft' are found to create their avatar more closely related to their ideal self, than to their real self (Bessiére, Seay & Kiesler, 2007). This finding is supported by an experimental study, in which the true self (the inner concept of the participant's self) is found to be more available cognitively during internet interactions, while during face-to-face interaction the actual self (the 'outer' concept of the participants self) shows to be more accessible (Bargh, McKenna & Fitzsimons, 2002). One could argue that people communicating via internet or virtual reality try out behavior which they do not dare to express in real life. The avatar could for example be much more open, telling his deepest thoughts. S/He could also be less friendly, because there is no need of being polite as in the real world, which in turn can also be interpreted as being more honest. In fact, each person could have his/her own differences compared to the real life. It is even possible that one is maintaining several avatars with different personality styles, for example a cute little fox which is friendly and everybody likes and besides that a rough-looking guy being direct and extraverted. In the end, one could also use the avatar just to be as s/he is in real life; all directions of change or no change at all are possible, resulting in a question what the influence of online virtual realities on the user's personality is.

'Personality' is generally defined as the stable and unchangeable concept of the sum of the attributes of a person (Mischel, 1999). The most widely known theory of personality is the so-called 'Big Five', a theory that tries to describe personality by using five basic continuous traits, namely extraversion, openness, conscientiousness, agreeableness and neuroticism. These traits are supposed to be stable across time and situations. Modern theories nevertheless view personality as a whole set of different adaptive modes for different situations (Turkle, 1997). People behave very differently at home, at work or at the first dinner with their new parents-in-law. In other words, people use a variety of different personality-patterns according to a specific situation. Therefore it seems plausible that people may also create a 'special' personality which they use in Second Life. To put it short: Richard David Prechts philosophical question on personality: "Who am I - and if so, how many" expands with virtual realities to: "Who am I – and if so, where?" (Precht, 2007)

Current literature strives the above mentioned question, but has a number of shortcomings.

One first shortcoming is that scientific papers are often more theoretically than empirically oriented. For example the work of Turkle (1997) or McKenna and Bargh (2000) give an overview on the implications of the internet and virtual reality on people's

lives and their personality, though without transcending their theoretical framework to a more experimental level.

Second, a few studies make use of massively multi player online role playing games (MMORPG's) like 'World of Warcraft', in which the main aim is, in contrast to Second Life, to fulfill missions of a preset plot and not on social interaction (Bessiére et al. 2007, Bainbridge, 2007). The emphasis in these studies is on people's personalities in real-life, rather than on how personality undergoes changes during such role-playing games.

Third, a lot of researchers interested in virtual realities are not interested in the aspect of personality in virtual settings (De Nood & Attema 2006). Although they use experimental designs, interest lies on behavioral aspects like virtual distance between avatars (Yee & Bailenson, 2007). A few researchers use reaction time tasks to assess actual and true self in virtual realities, but do not make any claims about the content of these selves and the differences between them (e.g. Yee & Bailenson, 2007; Bargh et al. 2002).

The present study will try to overcome the shortcomings of the mentioned studies by using psychological questionnaires in an experimental-correlation setup and answer the research question: **How stable are personality-traits when entering a virtual reality?**

To assess this potential difference between personality in real life and virtual life, personality is measured twice with the same tool, namely the *5 Persoonlijkheids Factoren Test* (5PFT, Elshout, 1999*)*. This pencil and paper questionnaire is regularly taken by first year undergraduate psychology students during the so-called 'testweek', in which the students have to participate as an obligatory part of their undergraduate program. The 5PFT is supposed to be a fairly stable measurement of the previously mentioned five personality attributes: extraversion, friendliness, conscientiousness, neuroticism and development (Elshout, 1999). In the present study, the 5PFT questionnaire is filled in a second time via an interactive virtual tool in Second Life. The participants use their avatar to approach the testing screen, where all questions of the 5PFT are presented one after another. If the comparison of the two 5PFT versions shows differences for the real life condition and the virtual condition, this can be accounted for by a real difference of how participants experience and act within the two worlds. To control for mediating factors, 'absorption' and 'presence' will be measured. People who are being 'sucked' in or absorbed by all kinds of situations (the plot of a play or a story) might get more involved in their avatar and therefore show different results on 'absorption' than people that keep a distance towards the virtual world. Presence tries to measure whether the participant feels present in the online virtual reality and whether this world appears to the participant as if it was real. Again, it is possible that participants that feel more present in the virtual world (immersion) behave differently from participants who are not feeling present.

With this approach, the present study transcends the discussion about personality in virtual realities from a theoretical level to a scientific level. Using the scientific method, which entails 'blind' participants, a laboratory setting, scientific data analyses et cetera, will make it possible to give an informed answer to hypothetical and non-scientific beliefs on how people 'are' in virtual realities as they circulate in press, internet forums and blogs. Finally, using the platform of Second Life has, in contrast to MMORPG's, the advantage that the emphasis lies on 'virtual', hence relatively 'normal' social contact instead of following a role-play objective.

On the basis of the flexible view on personality it should be expected that a difference between virtual and real life can be identified. On the other hand personality is, in contrast to Turkle (1997), widely seen as a stable concept that does not vary across different situations (Mischel, 1999); from this perspective there is no reason to predict a difference between the real life and the virtual setting. Due to a lack of existing

scientific experimentation, it is not possible to predict an outcome on the question whether there is a difference between virtual personality and real personality, so an explorative setup will be applied.

METHOD

Participants

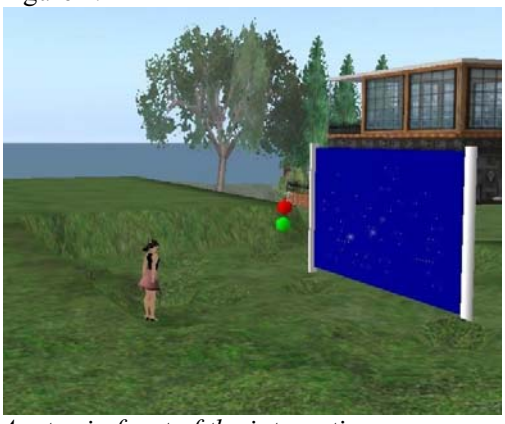
Psychology students of the University of Amsterdam were informed and could register for participation via wallpapers. Potentially, every psychology student who has participated in the 'testweek' could also take part in the study, as during this prior testing correspondent results of the 5PFT had already been produced. As compensation, participants could earn up to 2 ½ 'participation hours' or 17 Euros, depending on whether or not they had a previously existing avatar. Participants flagging not to have taken part in the 'testweek' could not take part.

Materials

5 Persoonlijkheids Factoren Test

To assess the personality structure of the participants the *5 Persoonlijkheids Factoren Test* (5PFT) has been used, which consists of 70 items. This is the first ever produced questionnaire to assess the Big Five personality structure, consisting of the scales extraversion, friendliness/sociability, conscientiousness, neuroticism/emotionality and development (Elshout & Akkerman, 1973; Elshout 1999). This questionnaire is included in 'testweek' tests on a routine basis; therefore, each participant had filled in the 5PFT with pencil and paper before. Between the two versions of the 5PFT ('testweek' and virtual), for each participant there was a delay of at least 6 months for each participant, ensuring that nobody had insight into the real purpose of the study, namely the comparison of the two 5PFT versions. In fact, no participant mentioned recognizing the 5PFT from earlier testing. To measure the avatar's personality, this test was administered in the present study by using a virtual interactive screen within the virtual reality of Second Life, as can be seen in Figure 2. The participant started the questionnaire by clicking on the blue screen. Subsequently, the avatar was welcomed personally by its avatar name and the screen showed the introduction of the 5PFT. Finally, after being introduced, the screen showed each question one by one and the participant could respond by clicking on one of seven 'answer-buttons', ranging from 'helemaal niet van toepassing' ('absolutely not of relevance') until 'helemaal van toepassing' ('absolutely of relevance'). After the participant's response, the next question was loaded. As an example, the first question is as follows: "Spraakzaam. Praat veel, tegen iedereen." ("Talkative. Talks a lot, to everybody").

Figure 2.



Avatar in front of the interactive survey screen

Absorption

The second questionnaire, which was taken as a pencil and paper test after the avatar had been logged out, participants were asked to fill in a questionnaire that tries to measure *Absorption* (Tellegen & Atkinson, 1974). This absorption list is nowadays included as a subscale of the *Multidimensional Personality Questionnaire* (MPQ), which is also taken during the 'testweek' (Tellegen, Lykken, Bouchard, Wilcox, Segal & Rich, 1988). In the present study *Absorption* is measured to control how much participants are open to absorb new situations and are open to self-altering experiences. This test consists of 34 items, each to be answered on a 5 point scale

ranging from “Dit is nauwelijks op mij van toepassing” (“This is barely of relevance”) to “Dit is heel erg op mij van toepassing” (“This is of very high relevance”). The first question is for example: “Soms beleef ik dingen net zoals toen ik een kind was” (“Sometimes I experience things just the way I did as a child”). Furthermore the ‘testweek’ results of the MPQ also yield scores on *time* needed to fill in, as well as two validity scales, namely the *Variable Response Inconsistency* (VRIN) and the *True Response Inconsistency* (TRIN) (Patrick, Curtin & Tellegen, 2002). The VRIN controls whether participants fill in the MPQ “randomly”, while the TRIN flags participants’ tendency to have a specific positive or negative answering style, respectively. These three scales are used in the present study to exclude participants that filled in the ‘testweek’-MPQ too fast, too randomly or with a too strong specific answering pattern.

Igroup Presence Questionnaire

To control the manner in which participants experienced a sense of presence in the virtual reality, the *Igroup Presence Questionnaire* (IPQ) was used (Schubert et al., 1999, 2001). In this 14 item strong test, which was taken as a pencil and paper questionnaire, participants answered questions on a 7 point Likert-scale, ranging from -3 to +3 (“Helamaal niet” to “Heel erg”; “absolutely not” to “very strongly”), like: “Ik had het gevoel aanwezig te zijn in de computerwereld” (“I had the feeling of being present in the virtual reality”). The IPQ subdivides into the three subscales of spatial presence, involvement and experienced realism.

Computer competence

Finally, another 5 self produced pencil and paper questions on *computer competence* were administered. The answer possibilities ranged from “heel slecht of nooit” (“very bad or never”) to “heel goed of dagelijks of vaak” (“very good or daily or often”). Questions were for example: “Hoe vaak gebruikt U een computer?” (“How often do you use a PC?”).

Procedure

Participants were first asked, whether they had previously been participating in the ‘testweek’. The laboratory itself is based at the psychology faculty of the University of Amsterdam and consists of 5 working places. Each working place was equipped with a PC on which the computer program Second Life, version 1.19.1, was already installed (Linden Research, Inc., April 2, 2008). In case of technical problems the instructor, who was situated in the same room, could be asked for help. If participants agreed to sign an informed consent, they were asked whether they already owned an avatar in Second Life. If they did **not** have an avatar yet, participants were asked to open the website of Second Life and create their own avatar. Participants then logged in to Second Life with their new avatar and ran the Second Life tutorial, which took about 60 minutes. In this tutorial provided by Second Life, participants learned how to move, communicate and change the appearance of their avatar. After finishing the tutorial a new appointment was scheduled with the participant, taking place one week after the first use of Second Life.

In the second session both groups of participants, namely those who had created their avatar one week earlier in the first session, as well as those who had an avatar already before starting the experiment, had to follow the following procedure: First, the participant was asked to log in to Second Life and teleport to ‘Groningen’ via the Second Life search option. Then the participants were asked to walk around and talk to at least two random avatars and find as much as possible out about these avatars. By communicating with other avatars it was supposed that participants identified with their own avatar more and in a short period of time. When walking around in the virtual world, the avatar might be used as a mere tool for navigation. The introduced processes of trying out new ways of being oneself and being approached by somebody else through the virtual appearance come the most into play in communication with others. After 30 minutes of conversation, the

participants were told to teleport from Groningen to the area where the testing screen was situated (Monowai 111/207/62) and follow the instructions written on the screen, starting with welcoming the participant by the avatar name. After finishing the virtual 5PFT questionnaire, the participants were asked to log out of Second Life and fill in the questionnaires 'Absorption', 'IPQ' and 'computer competence'. Finally, some questions concerning demographic data (age, gender et cetera) had to be filled in. The participants were then asked to sign an allowance form to couple the results of the Second Life study to the 'testweek' results and were then debriefed about the real purpose of the study. After signing the debriefing the compensation was given to the participant of the study.

RESULTS

Participants and exclusions

In total, 57 persons (30 women/ 27 men) intended to take part in the study, two of whom had their own pre-existing avatar. Due to not being psychology students and therefore not having taken part in 'testweek', seven persons could not take part in the study. Another four participants had to be excluded, because no matching 5PFT 'testweek' results could be found. Due to technical problems of the website www.secondlife.com, four participants could not create an avatar. From the 42 remaining participants the results of two persons could not be included in the analyses due to a too big number of missing values in the Second Life 5PFT version. When participants had more then seven missing values, which was calculated by 1/10 of the total 70 questions, they were excluded. The missing values of the remaining 40 participants (M = 1.94; 2.7% of 70 5PFT answers per participant) were replaced by the calculated mean of the group on the respective question.

On basis of the 'testweek' MPQ results, participants were controlled for time, TRIN and VRIN scores. According to Patrick et al. (2002), an exclusion criteria of two standard deviations above and below mean was used. On the basis of time scores two participants had to be excluded (M = 1269, SD = 338), whereas VRIN (M = 10.7, SD = 2.4) and TRIN (M = -1.14, SD = 3.86); each led to exclude one participant.

Two more participants were taken out of the statistical analysis due to corresponding low scores on the conscientiousness scale of the 5PFT in both versions. It is possible that participants with low scores on this trait do not seriously participate in experiments in general, so they were excluded from data analyses. Finally, 34 datasets were included in the statistical analyses.

Reliability

The present study used *Cronbach's α* to assess the internal consistency of the different scales of the 5PFT. In fact, all scales reached acceptable *Cronbach's α* in both, 'testweek' and virtual settings, as can be seen in Table 1. Both settings managed to yield reliable results for the 5PFT. Furthermore, *Cronbach's α*s are highly similar to the *Cronbach's α*s found in the original version (Elshout & Akkerman, 1975).

Tabel 1
Cronbach's α reliability coefficients for 'testweek'-,virtual and original version of the 5PFT per subscale (Elshout & Akkerman, 1975)

Subscale	Testweek[1]	Virtual[1]	Original[2]
Extraversion	.80	.76	.85
Friendliness	.76	.69	.77
Conscientiousness	.76	.67	.80
Neuroticism	.83	.87	.87
Development	.73	.74	.82

[1] N = 34; [2] N = 37

Exploratory results

Using *paired-samples t-tests*, significant differences were **not** found for any pair of the corresponding scales of the 5PFT 'testweek-' and the virtual-version, as

Table 2
Mean, standard deviation and t-test results for the 'testweek'- and virtual version of the 5PFT

N = 34	Testweek		Virtual		t-test		
Subscale	*Mean*	*SD*	*Mean*	*SD*	*t*	*df*	*p*
Extraversion	61.5	9.5	59.8	9.3	1.72	33	.10
Friendliness	69.0	8.1	70.6	7.2	-1.36	33	.18
Conscientiousness	60.5	8.9	60.8	7.7	-.33	33	.75
Neuroticism	47.6	9.8	47.3	11.9	.27	33	.79
Development	65.6	7.8	66.7	8.1	-1.08	33	.29

can be seen in Table 2. The notion that there is no difference between the virtual and the paper and pencil 5PFT scores is further supported by the fact that among all participants the difference between the total score per subscale of the virtual version subtracted by the 'testweek' total score per subscale is close to zero (difference-extraversion: M = 1.74, SD = 5.90; difference-friendliness: M = 1.61, SD = 6.904; difference-conscientiousness: M = 0.35, SD = 6.201; difference-neuroticism: M = 0.31, SD = 6.50; difference-development: M = 1.12, SD = 6.04). These difference

scores are all (except neuroticism) normally distributed according to *Kolmogorov-Smirnov tests* (difference-extraversion: $D(34) = .121$, $p > .2$; difference-friendliness: $D(34) = .071$, $p > .2$; difference-conscientiousness: $D(34) = .126$, $p = .185$; difference-neuroticism: $D(34) = .158$, $p = .031$; difference-development: $D(34) = .103$, $p > .2$). Even the absolute difference for each participant across the whole test does not exceed a mean of 24.81 (SD = 7.802) with a maximum of 45.16, which are both very low with regard to the fact that the 5PFT consists of 70 questions with a range of 1 to 7. In other words, the mean participant (avatar) filled in a mean question only about 0.35 points different compared to the first time as subject in the context of the test week.

Very high *Pearson Correlation coefficients* were found for all couples of the virtual versus real setting scales, meaning that there is a positive relationship between the scores obtained in the 'testweek' and scores obtained in Second Life for the five scales respectively.

All other possible combinations of subscales for both versions showed no significant correlations, except the correlation between neuroticism and friendliness scores of the 'testweek' (r = -.35, p = .043). These test-retest reliability results are in fact similar to the results Elshout and Akkerman find in their original test-retest analyses for the 5PFT, which had a delay of one year between the two test sessions, as shown in Table 3 (1975). Only the correlation for the subscale of neuroticism differs substantially between the present study and the original results (neuroticism: present study: r = .84; Elshout & Akkerman, 1975: r = . 37).

Table 3
Test-retest correlations per subscale of the 5 PFT for the 'testweek' vs. virtual version and as tested by Elshout and Akkerman (1975)

Subscale	Testweek vs. virtual version* (N=34)	Elshout & Akkerman (1975)** (N=37)
Extraversion	.81	.73
Friendliness	.61	.52
Conscientiousness	.73	.76
Neuroticism	.84	.37
Development	.72	.72

*: 7 month between test and retest; **: 12 month between test and retest

In order to control the influence of absorption and presence on the virtual 5PFT scores, difference scores between 'testweek' and virtual 5PFT scores were calculated and correlated with absorption and presence scores. There were no correlations found, neither for the subscales spatial presence, involvement and experienced realism of the IPQ presence measure, nor for the absorption questionnaire, meaning that the way a participant absorbs and feels present in the virtual reality does not predict a difference in personality scores. Computer competence was not a moderating factor either.

DISCUSSION

The main intention of the present study was to explore the stability of personality-traits when entering a virtual reality. With respect to the 5 Persoonlijkheids Factoren Test, results are stable when the version completed in the test week and the version completed seven month later by the avatar in Second Life are compared. High correlations of the personality traits extraversion, friendliness, conscientiousness, neuroticism and development are found for each subscale of the two versions respectively. In other words, the personality traits of participants do not differ between the real world setting and the virtual world setting. In light of these results the answer for the research question (How stable are personality-traits when entering a virtual reality?) seems to be that the usage of virtual environments does not have an influence on the personality traits of the user; people do not create a special 'virtual' personality for their avatar. Also, strong correlations between the real life setting and the virtual setting on the one hand and the similarity of these correlations compared to the test-retest correlation attained by Elshout and Akkerman (1975) on the other hand, can be interpreted as supporting evidence that questionnaires can be administered in virtual settings as reliable as in real life settings. Furthermore, neither presence, the feeling of being present in the virtual reality, nor absorption, the tendency to completely absorb and being 'sucked' in by new situations, has-moderating influence on the personality measure.

These findings support the notion that personality can be seen as a very stable concept that is not disturbed when entering a 'new' world such as Second Life. This sheds rather critical light on some blogs on the internet, which are trying to detect the difference between avatars' and peoples' personality. The differences in personality found by these must be accounted for by the poor operationalization of asking participants directly whether they perceive a difference, and not by a real difference in personality-style.

In psychological research one big problem is to find participants for experiments. It is common use to make participation in psychological research an obligatory part of undergraduate psychology programs. This group is very specific in age, interests, educational level etc., all flaws to the validity and generalizability of scientific experimentation. Besides that, the costs of running laboratories are immense, need supervision and are mostly situated at universities, which are not easily accessible for everyone. A virtual laboratory, in contrast, could run 24 hours a day without any supervision needed and assess people from all around the world (Bainbridge, 2007). This virtual group is not a heterogeneous group representing the whole population either (PC, internet and a program for running the virtual world are necessary), but as a recent study on the demographics among Dutch users of Second Life shows, this group has a big variance in age, education, gender and financial background (de Nood & Attema, 2006). The fact that high reliability scores are found for the real life version and the virtual version as well and that these are very similar to the original reliability scores (Elshout & Akkerman, 1975), shows that virtual realities could function as new reliable platforms to assess participants for psychological research. The mere fact that it was possible to run the present study within

a virtual reality, without having too much dropout, running at low expenses and yielding reliable results, shows the high potential and usability of virtual laboratories.

Although the present study yields promising findings, there are clearly some shortcomings at hand. First, the fact that no difference in personality is found might be due to the stability of the questionnaire that has been used. Being built on the idea of a stable personality within the tradition of the Big Five personality theory, the 5PFT instrument might be un-useful to detect differences of personality within the participants. Second, the stability of personality itself could be the reason for the stability in scores. It might be that less stable psychological aspects like self-concept, mood or emotions function differently, when entering a virtual environment. Third, this study can be viewed as a pseudo experiment, while personality is the dependent variable and real/virtual setting the independent. This operationalization has its shortcomings in having no control group. Fourth, most participants (except two) of the present study are not in possession of an avatar beforehand. It can be hypothesized that it takes quite some time to develop a 'virtual' personality, which might be found in people using virtual realities on a regular basis. Some participants asked the instructor, if they were supposed to fill in the personality questionnaire as themselves or as their avatar, which was answered by advising to carefully read the instruction. Apparently, some participants perceived their avatar as partly distinct from themselves, otherwise they would not have asked how to fill in the questionnaire.

Future research should try to overcome these shortcomings to enable future applications of virtual realities for clinical psychological interventions (Westerhoff, 2007). Classically, therapy takes place in a therapist-client(s) setting, in which direct contact is an essential part of the therapy. Nevertheless, new technologies present new methods even in this field. Interapy, for example, uses the internet to give writing therapy without face to face contact between therapist and client, showing promising results (Wagner & Lange, 2008). One could think of expanding classical therapy into virtual realities and by doing so, ease the first step to start therapy. Thinking one step further one could try to implement 3-D worlds in therapeutic avenues that use exposure techniques, as first pilot studies, approaching the use of virtual worlds in the therapy of specific phobias, have been taken (Powers & Emmelkamp, 2008). In this study, fear is induced by wearing a 3-D toggle and virtually walking up a skyscraper or virtually sitting in an airplane. Even though people know that they are not on a skyscraper and in no danger of falling, they do experience symptoms of fear. These symptoms can form the starting point of different ways of therapy, like gradual exposure in vivo, where people are step by step confronted with stronger fear stimuli. Subsequently they learn to handle the fear. Patients with post traumatic stress disorders e.g. are being helped by using their imagination to relive the traumatic event. In virtual worlds this reliving could be brought on a 'virtually' real yet still controllable level and thus give a new technique to help patients. Even in more complex anxieties, like social fear or agoraphobia, virtual realities like Second Life could be used (Gallego, Botella, Banos & Guillen, 2008). People e.g. experience virtual realities as being freer to begin and end conversations with others (McKenna & Bargh, 2000). A socially phobic patient could, as a first step of intervention, step into Second Life and experience social situations behind his/her PC. The experience of communication and the training of social skills could then subsequently transfer to real life. Knowing that people show no difference in personality, psychologists could develop specific intervention programs within virtual settings.

Against the background of the present study, there is reason to believe that the client is 'him-/herself' in the virtual world, so the intervention is not applied to a

'virtually' influenced client, but to the 'normal' client in a virtual world, a process termed augmentation (Boelstorff, 2008, Turkle, 1997). The psychologist not only has control over the virtual environment, which helps to find out which part of an intervention is most helpful and makes it possible to personalize the setting for each patient. It is also possible to compose virtual settings that are too expensive in real life, like getting on a plane to fight fear of flying, or that are not possible at all, like the reliving of a traumatic event, as it is used in treatment of post-traumatic stress disorder.

One possibility of future research would be to use other realms of human psychology. Personality is, as shown, a fairly stable concept even across virtual worlds. In contrast, emotional processing is a more flexible concept that could react on virtual realities much more than personality. Classical experiments within the field of social identity theory manipulate mood or emotion rather than that they assess personality. If it was possible to find participants that use virtual realities and their avatar on a regular basis and administer them to a mood changing manipulation in real life and/or in virtual life, the differences between these two groups could much more thoroughly answer the question, whether people 'are' different in real world compared to virtual worlds.

REVIEWS

Review 1
Overall rating: 3 (strong accept)
Confidence: 2 (medium)
Relevance to the conference: 5 (excellent)
Importance/Originality of topic(s): 4 (good)
Significance of conclusions: 4 (good)
Quality and depth of research: 5 (excellent)
Paper presentation, organization, and writing quality: 5 (excellent)
Review:

The paper focus on the analysis of differences between real-life and virtual-life personalities. The author describes his work and presents it in a rigorous way. The paper is well written and the conclusions are supported with the data from the field study.
It delivers important conclusions regarding the differences in personality.
But, as the author refers, a limitation of the conclusions is related with the fact that most of the participants where not regular SL users, therefore some limitations must be addressed.
It would be interesting to see a similar study applied to regular SL users.

Review 2
Overall rating: 0 (borderline paper)
Confidence: 2 (medium)
Relevance to the conference: 4 (interesting)
Importance/Originality of topic(s): 4 (good)
Significance of conclusions: 2 (poor)
Quality and depth of research: 3 (fair)
Paper presentation, organization, and writing quality: 5 (excellent)
Review:

The question of the research is interesting, the focus is new, and a good starting point for the research on psychology on virtual worlds.
However, the method seems not to be accurate with the research question, and there are very few persons for a quantitative research. The application of the same test on paper and then in-world is just a change of the format, but its the same person answering, so the results show the same personality.
That's why there are no differences in the results. The method doesnt allow to find the "virtual" personality of the avatar, maybe other tests or a qualitative methodology would help better.

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Combination of metaverse platforms with external systems

Exploring Second Life® for online role-playing training

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This paper is based on the work of the research project 3D Virtual Classroom, a joint research initiative between the Department of Communication and Art (DeCA) of the University of Aveiro (UA) and PT Inovação (PTIn), the research company of Portugal Telecom, one of the leading providers of online training solutions, supported on the platform FORMARE. The goal of this research project is to enrich FORMARE, PTIn's proprietary knowledge management system, providing a set of Multi-User Virtual Environments (MUVE) tools where trainees can put in practice their recent acknowledged skills by the use of role-playing techniques. The new opportunities and benefits in training provided by multi-user virtual environment platforms, in general and particularly as far as Second Life® (SL) is concerned, are addressed in this paper as well as its integration with the FORMARE training program.

1. Introduction

In order to succeed in today's fast paced and ever evolving economy, companies must invest heavily in technological and human resources development, namely through training activities. The introduction of Learning Management Systems (LMS) in companies' training courses was a major breakthrough. The need for employees to leave their working place to follow training activities was reduced, the company saved time and money in logistics and the workflow could be less affected. However, most of the common LMS based training courses are best suited for theoretical aspects of the training program. Practical training contents, however, tend to have more difficulties in being adapted to LMS based courses.

2. Role-playing in Second Life® - A new world of possibilities

SL offers a range of possibilities for training courses as an extension of the typical LMS platforms. SL provides its users an immersive experience allowing the chance for simulating real life and role-playing activities. The possibility to recreate virtual environments close to real life and the ability users have to quickly change their identity allows simulating real life situations and immersive experience. This can potentially increase concentration and commitment levels (Robbins, 2008).

The role-playing features of MUVEs open enormous potential in educational scenarios and training programs in particular (Robbins, 2008; Ford & Miller, 2008, de Freitas, 2008). By using role-playing techniques, the learning-curve in online training programs may be reduced in time. Trainees can return to their professional roles sooner and probably with more confidence in their abilities to perform their jobs. They have already played and therefore experienced their new professional role; experienced mistakes without endangering the workflow; shared experiences with fellow colleagues with similar knowledge or working experience in a particular area of expertise.

According to the aforementioned authors some of the potential benefits for the learning process within SL include: i) *collaboration*, users collaborate with each other in order to achieve a shared goal; ii) *creativity,* the ability to create content and to express in several ways unleashes the individual creativity; iii) *authenticity,* trainees are "hidden" behind a virtual identity (avatar) which allows them to freely express themselves in a less restricted way; iv) *community,* strengthens group relationships and sense of community due to the level of proximity that SL allows; v) *engagement,* high level of engagement in a SL learning environment is reported.

These benefits stress the involvement of the learner/trainee with the content and with the learning community, potentially allowing deeper cognitive development and also a deeper sense of negotiation, presence and connection with content, trainer and co-trainees.

More than simple evaluation of the procedures needed to complete a determined task, role-playing in SL, allows the evaluation of the students' ability to make decisions, to manage conflicts, to engage in problem solving and train reaction to stress situations (Miller, 2008). SL can be an interesting laboratory to test human behaviour as far as labour relationships are concerned.

3. Limitations of LMS

In recent years we have witnessed the growth of LMS, Personal Learning Environments (PLE) and Virtual Learning Environments (VLE). However we have also witnessed a major boom in social networking applications. Millions of users now use these applications on a daily basis and are familiar to their cutting edge interface design, functionalities and user interaction. Their demand for high quality web applications has grown and by inheritance the users expectations on what interface design and functionality in these systems should be (Robbins, 2008). The differences in interface design, usability and functionality between the typical LMS and Web 2.0 social networking applications might be the reason behind the apparent reluctance of LMS users to communicate between them through LMS's embedded communication tools.

It seems fair to assume that LMS and PLE need to integrate new features and tools that will allow them to come closer to nowadays user's experience expectations. Multi-user virtual environments such as SL provide the users with a set of tools that allow them to take computer interaction experience to another level.

4. Examples of usage of SL in training

Some of the biggest corporations in the world have already realized the potential of virtual learning environments in training programs. NASA and IBM are among them. Smaller companies, organizations and universities are also contributing to the research and development of virtual learning environments. From all the analysed projects it is important to highlight the following three projects, due to their relevance to this research.

NESIM - Nursing Education in Second Life®, is a training simulation for students attending to become registered nurses. Headed by Professor John Miller from Tahoma Nursing College, Tahoma, USA, the NESIM lets students simulate patient treatment, performing surgeries and controlling hospital appliances in SL. This project uses a customized HUD (Heads Up Display) to control all variables of the simulation environment. With this tool the tutor can change at any time the difficulty level of the task or create new and unexpected problems for the student to solve. The student uses a HUD to interact with the environment, choosing the different set of options he needs to complete his task (Miller, 2008).

LOYALIST COLLEGE Canadian border simulation - Considering role-playing training activities this is the analysed example with more in common with 3D Virtual Classroom project final goals. Loyalist College has built a replica of a real Canadian border and simulates every task that is usually performed, from traveller's support; enquiries; checking documents; searching vehicles and people; checking goods transportation; among others.

The users that play a part in this simulation are physically in the same space in a face-to-face environment. Although they all have their own computer, the room is equipped with a large display where, from an outsider's point of view, the simulation is projected (Infinite Spaces, 2008).

SLOODLE - Sloodle is an open-source project whose goal is to develop educational tools for SL that can work as an extension to the open-source LMS, Moodle (Sloodle, 2008). Its ability to communicate with the LMS database makes it an important example for this research, as it is intended by this project to allow restricting access to certain areas, submitting grades and controlling trainees' presence, through the integration with the LMS.

5. Using SL in an online training program

Considering the upper mentioned analyses of similar projects and studies, a set of best practices for SL use in an e-learning training program can be identified:

a) The introduction of SL in an e-learning training program should be done in a step-by-step way instead of introducing SL straight away. The learner should start by experimenting SL's tools some time before the role-playing session takes place so that the unfamiliarity with the application does not disturb learner performance in the simulation. This could be done, for instance, by scheduling discussion meetings within the SL at the end of the classes;

b) If possible, new users with no experience with SL should skip the "Welcoming Island". They should instead be redirected to the training course provider's virtual space where they should have specific newcomer's tutorials at their disposal, along with the guidance of a trainer. These first lessons should take place in a face-to-face mode (Ford & Miller, 2008).

c) The virtual learning spaces should not be completely restricted and trainees should be allowed to explore other SL locations. The exploration of other locations in SL should be considered as a benefit for the learning process instead of a threat;

d) The use of *machinima* for recording sessions gives the trainees a chance to watch their performance and learn from their own mistakes.

6. Banking Training Course – a case study

PTIn has already developed an online training course available to the trainees of a major Bank in Portugal through PTIn's LMS, FORMARE. The content available through the LMS is a Flash-based application containing text, images, animations, flash-video and small quizzes at the end of each lesson. The actual course, however, only fulfils the theoretical needs of the training program. Therefore the need to complement with a more practical approach, giving the trainees a chance to test their acquired skills was confirmed. Usually this practical stage of training takes place in a real life working scenario but that costs time and money to business companies. So the purpose of the 3D Virtual Classroom project is to develop a

virtual training place in SL where trainees can simulate, by means of role-playing activities, their real working scenarios.

After the analysis of the aforementioned online training program and its content, the research team concluded that it was important to evaluate the decision making skills of the trainees, their reaction to stress, conflict and problem solving and the interaction with other agents involved in the training process. The procedures required to complete the tasks are part of the role-playing session although it is not what is intended to be central issues to evaluate. The team considers that quizzes available through FORMARE already fulfil the quantitative evaluation required.

6.1 Scenario and special requirements

The role-playing scenario consists of a common bank agency where employees perform specific client-facing tasks taught in the online training course. Several customers come to the store to deposit money on their bank accounts; the employee will then have to follow a set of protocol procedures. Some of these procedures lead to confrontation between the bank employee (trainee) and the bank customer. It is the way the trainee handles this confrontation and his relationship with the customer that is intended to be trained and evaluated.

One important identified requirement was the need to keep track of the trainee's performances, in order to enable future evaluation of the trainee's progress. Another requirement is related with the need to restrict to authorized users the access to private training areas. These functionalities must be integrated with the existing FORMARE database, therefore, retrieval and submission of relevant data (e.g. user credentials, trainee's grades) from/to the FORMARE database is being provided.

7 3D Virtual Classroom

From the information gathered in the early stage of this research and by the study of the bank's online training course the team developed the 3D Virtual Classroom training space, a circular suspended platform. Its concentric architectural structure enables the concentration of all the training facilities in a small parcel of SL virtual land. This building structure has two major benefits: i) *proximity*, as all the training areas are close to each other, allowing the trainer to control multiple activities simultaneously and quickly move himself from one area to another if a trainee is in need of assistance; ii) *restrict access*, as one of the ways to restrict access to a particularly area within SL is to close the access to the land parcel where the construction is build upon (Salvado et al., 2008). By choosing this circular building structure it is possible to constrain the entire structure into one area restricting access to all facilities.

7.1 Topology of the virtual training space

The circular platform mentioned above is divided into four distinct areas: i) *welcome area*, it is the entrance to the virtual training facilities. Placed in the centre of the building, this is the area where users arrive when they are teleported. Here users can find useful information concerning the ongoing training course and teleport links to other training rooms and to other PTin SL locations; ii) *tutorials' circuit*, it is the catwalk ring that surrounds the central training rooms. In this area users with none or little experience with the SL environment have at their disposal a set of introductory tutorials, specially developed considering the training session's specific needs. iii) *Role-playing room*, a wide area where the role-playing sessions take place, in which a replica of the bank's agency was built; iv) *meeting and conference area*, a room with a display for slide and video presentations, where trainees can attend inWorld classes prior to role-playing sessions.

Figure 1 – The prototype of the virtual training space.

7.2 Role-Playing training sessions

Each of the role-playing session involves the following participants:

a) The trainee under evaluation performs the role of the bank's employee. He/she provides customer support for bank deposits;

b) The customers role is played by the other trainees;

c) The trainer plays the character of the bank manager or someone who by his/her position has the authority to quickly interfere if necessary;

d) A forth category of characters is required. This particular character has the responsibility to record the session for later analysis by using *machinima*.

7.3 Heads Up Display

The HUD is one of the most important tools in this training scenario. Both the trainer and the trainee can use this tool. The trainer's HUD allows him/her to control all environment variables that can, in some way, change or affect the role-playing session. The trainer can also use it to send instructions to the trainees, who are performing the role of customers, providing them with guidelines about the way they should behave. As an example the trainer can order one trainee to put more pressure on the trainee under evaluation by asking a series of difficult questions or complaining about something. The last functionality on the trainer's HUD is the ability to submit the results of the

trainee's performance. He/she can also visualize in real time his and the students' HUD but he can only control his own. This enables the trainer to have a complete perspective of the trainees' performance.

Figure 2 – The trainee (left) and trainer's (right) HUD.

The trainee's HUD allows him/her to answer to the solicitations of the simulation environment. The HUD has all the functions the trainee needs to perform his task in the role-playing sessions. A "panic button" is provided, which can be used to ask for the trainer intervention if the trainee feels the situation is out of control.

Data retrieved from trainee's evaluation are not automatically updated on the FORMARE database. In fact, the trainer needs to manually grade the trainees and upload the information through a function on his HUD to the LMS database. The main reason for this option is due to the fact that the goal of the project is to perform a qualitative evaluation instead of a quantitative one. It is the responsibility of the trainer to judge the trainee's performance on the different requested tasks and grade it. That can not be done by a mathematical calculation.

7.4 Accessing the platform - security issues

Following one of the best practices mentioned earlier, users with no experience on the use of SL are directed, on their first login, to the FORMARE welcome area, skipping the regular welcoming island. There they have tutorials specially developed considering the training session's specific needs and the guidance of an experienced trainer.

On the other hand, security issues are very important for companies. Some of the topics taught and discussed on these training sessions are highly confidential and cannot, by all means, be available for the general public or industry rivals. Considering this requirement, research is also under development for constraining access only to registered users from the FORMARE learning platform (Salvado et al., 2008).

8. Preliminary conclusions

Virtual Worlds are demonstrating their potential to become an important ally for online training courses on a complementary basis with other solutions. The low training costs and limited logistic requirements make them relatively easy to implement and, at the same time, promise successful training results. However, there are still some problems that need to be solved and more experiences to be carried before business companies totally embrace MUVE as online training tools. These problems are related to company's security issues (e.g. access restriction), trainees' participation and interoperability between virtual worlds. Collaboration between universities and business companies is being of greater importance to achieve the required technological and pedagogical validation of these tools, and consequently allow the full use of these new tools for online training courses (see also the work of Sara de Freitas, 2008).

Second Life®, the MUVE adopted in this research project, has proved, in a technical perspective, to be a suitable environment to implement all the previously identified functionalities. However, work is still in progress and the research team will now have the opportunity to test and evaluate the 3D Virtual Classroom in a real training program, enabling the validation of the theoretical principles and practical issues addressed in this paper.

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3D3C Identity: A Key Force in Theory, Practice, and Infrastructure

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This paper presents the concept of "3D3C Identity" as a linchpin to harnessing the value of virtual worlds. It is assumed that virtual worlds as a new communication medium – in due course – is destined to influence our lives as much as the internet, and even more. As a background, virtual worlds are defined as the integration of four factors: a 3D world, Community, Creation and Commerce (AKA 3D3C). 3D3C Identity is defined as the unifying concept encompassing terms like privacy, authentication, trust, rights, tracking, security, and other associated terms. Specific challenges related to 3D3C Identity are presented: Security of Audience, Anonymity, Virtual Goods, Scams and the enterprise take. The conclusion section lists in brief some of the criticism to the thrust of 3D3C Identity and general ramification for theory, practice, and infrastructure.

INTRODUCTION

Virtual worlds are an emerging medium that is constantly creeping into our lives.[1] Following the huge success of such gaming worlds as World of Warcraft, The Sims, and others, terms like 3D, avatars, chat, and real money are rising. Individually new forms of interactive, mostly social, entertainment are pushing virtual worlds. In the enterprise, the drive to save travel costs and the need to gain new customers and retain current ones push this trend even further.

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Before I proceed, I should explain what I mean by virtual worlds. To distinguish between virtual worlds and gaming worlds, I use the adjective "real," which hints at a much more far-reaching potential. I've also coined the term "3D3C," to indicate that a real virtual world is an aggregate of four factors:[2]

1. **A 3D World**. A virtual world is a dynamic world, where viewers see objects like avatars, houses, and cars. The world has land, a sky, a sun (or maybe more than one), wind, gravity, water, and fire. Avatars move around freely, and the user can examine the world from different points of view.
2. **Community**. Virtual worlds allow users (via their avatars) to meet, chat, shop, watch performances, hang out with friends, team up to fight bad guys, go clubbing ... in other words, to interact in countless ways. Within "community," I include related concepts such as groups, permissions, rights, and roles.
3. **Creation**. Second Life's (SL - a leading virtual world) greatest technological achievement was giving users the capability to develop their own objects in-world interactively. Users can simply move preconstructed objects from one place to another (say, to furnish a home or set up a nightclub), or they may assemble an object (e.g., a house) from basic components, such as walls and ceilings, and then "paint" them with various textures. SL's programming language, Linden Script Language, even allows users to program behavioral attributes for their objects, so that fish can swim in schools, golf balls can arc through the air, guns can shoot, and people can dance.
4. **Commerce**. SL's maker, Linden Lab, has created the Linden Dollar (L$), which has a defined exchange rate with the US dollar (one US$ fluctuates around L$260). The economics of the SL world is based on this currency. You can exchange L$ to US$ immediately and at any time at the Linden Dollar Exchange. For instance, if you earn L$2,600 from tips, you could exchange them for about US$10, which would be immediately transferred to your real PayPal or bank account. Going the other way, if you need L$5,200 for a new car, you could immediately buy them for about US$20. SL is not the only virtual world with a thriving "real" economy. The Entropia Universe also has a cash-based economy (with a fixed rate of 10 "PED" to one US$), and its maker, MindArk PE AB, has even received preliminary approval for an actual banking license by the Swedish Finance Supervisory. This would allow its users to conduct real-world banking transactions from within the Entropia Universe.[3]

IDENTITY IS THE KEY

The security and privacy issues raised by virtual worlds revolve around one key factor: identity. Over the last few

years, it has been my good fortune to initiate and participate in several efforts to develop standards for 3D3C virtual worlds.[4] Repeatedly during these efforts, words like privacy, authentication, trust, rights, tracking, security, and other related ideas came up as a necessary core to virtual worlds. For the sake of brevity, my colleagues and I chose "identity" as the term to designate these concepts.

Both individual and enterprise use of virtual worlds raise many identity issues. But while individual users, who use virtual worlds mostly for entertainment, may ignore lack of identity for a while, real organizations and virtual emerging businesses may not (due, in part, to various regulatory issues.) Thus, a good start in defining 3D3C Identity is to look at it from the point of view of enterprise IT.

Initial enterprise uses of virtual worlds include collaboration (internally and externally), product design and feedback, marketing of products, participation in virtual shows and exhibitions, and — with growing intensity — general experimentation. But while virtual worlds present new business opportunities, they also pose new IT threats:

- For faster access, virtual worlds use different ports and protocols than Web sites and thus present firewall issues.
- Some worlds allow code to run in them, which raises the risks of malicious code.
- When customers "chat" with an enterprise rep, they may reveal private information. Who stores this information, and how?
- Some worlds allow video to be broadcast inside the world. Cameras left on can transmit to the outside world.
- Your brand and corporate image can spread virtually. Who will protect it?

As we began surveying these identity-related terms, we looked at the current state of IT in general and the Internet industry in particular. For example, the Internet Society's *Trust and the Future of the Internet* report[5] defined trust as a combination of reliability, security, privacy, and liberty, while the Center for Democracy & Technology outlined several privacy principles for identity in the digital age.[6] In this article, I would like to share my own excitement about the societal value of well-governed identity.

There is good news and bad news. First, the good news. A lot of research, work, analyses, ideas, and even standards regarding identity is being done. Now the bad news: in most cases, we are still struggling with competing nonstandard systems in this field. Or, to put it bluntly, as users we still have too many passwords, our data is lost from time to time, and we are besieged with spam (although this has diminished lately, thanks to smart social antispam managers like the ones Google mail employs). The current combined IT and Internet system lacks a comprehensive system of identity.

In the remainder of the article, I will discuss some of the challenges that call for a systemic approach to 3D3C Identity. My goal is to expose some of the problems we face with respect to identity and, I hope, to drive people to action. I do not claim to present a complete or even a balanced approach to identity, but I do claim — emphatically — that we need to think about identity and build it into the next set of Internet standards. Future virtual worlds (when they arrive) and worlds that are based on current Internet and IT technologies will benefit from such a systemic approach to identity.

IDENTITY CHALLENGES IN VIRTUAL WORLDS

SECURITY OF AUDIENCE

One of the common things you do in virtual worlds is talk with other avatars. Talking ranges from the simple and textual to the visual and vocal. Textual talk include instant messages (IMs), much like the ones we are familiar with in services like Yahoo Messenger, ICQ, Microsoft Messenger, and many others. You could also use chat, which is an extension of IM. With chat, many avatars can gather around the fire, in a classroom, or in a meeting room and talk together about their favorite topic. Some virtual worlds also add voice, allowing several avatars to sit in a meeting room and talk to each other in both text and voice. With some advance setup, video could be added too.

These meetings are touted as the next collaborative environment. Note that in SL, after you rent a US$5/month parcel of land, such conversations are free to as many as 40 avatars — in theory, anyhow. In practice, more than 25 avatars often stall the system. Still, having audio conferences with projections of 2D and 3D models for such a low cost seems valuable.

The problem is that such discussions are far from secure. Today, if an avatar wants to sneak in and listen to a discussion (text or voice), he can simply do so. Let's assume that the authentication is solved and each avatar has an authenticated person behind it. Nevertheless, it is possible to view public chats with relative ease (even if they take place in a closed meeting room); to listen to public voice chats; and to peek behind walls (you can act as a peeping Tom). The physical space gives you an illusion of privacy, which is often not the case. Only with a relatively complex setup could you block other users from your meeting place — and in most cases, you would need a larger landmass to do so (and it would cost you around US$300/month).

Even if you block the interlopers from accessing the area (called "red tape" in SL lingo), other avatars can still hear or see. This is a classic case where the links between permissions, authentication, and services were not built into the system. A better design (or perhaps simply paying attention to identity) would build a solution into the communication stack of the platform. I believe Wonderland, Sun's supported open virtual world, does solve this by linking chat and voice protocols directly to identity.

ANONYMITY

One of the key drivers of virtual worlds today — and I emphasize *today* — is the ability to act anonymously. Since most worlds are currently used for entertainment, such worlds really act as extensions of games. In fact, until recently, SL's makers glorified anonymity with statements like "life beyond reality, where imagination knows no bounds ... tempt fate without inhibition and court danger without fear."

However, at times we need to cross into reality. In May 2008, federal prosecutors in Los Angeles charged a Missouri mother with fraudulently creating a MySpace account and using it to "cyber-bully" a 13-year-old girl who later committed suicide. The girl, Megan Meier, hanged herself in her upstairs bedroom two years ago, shortly after being jilted by an Internet suitor she thought was a 16-year-old boy. The case caused a furor in the US when it was alleged that the "boy" was actually Lori Drew, the mother of one of Megan's former friends. As this case shows, virtual worlds can be painfully real.[7] As more of these worlds become part of our lives, we need to educate ourselves about the darker sides of anonymity. Real virtual worlds are not a fictions game — they are another part of life, entailing all the good and the bad.

Another angle to the matter involves actual work, training, support, and medical treatment in virtual worlds. All have legal ramifications that call for identity. Teaching a course in SL, taking a test, and doing a joint project mean course credit and grades. Treating someone with Parkinson's or a stroke in the virtual world calls for insurance billing and medical records (which, in turn, means that personal information, medical records, and federal HIPAA regulations are added to the headache).

Another side of anonymity is money laundering. Say you gained US$100 illegally. You distribute it to 10 avatars. These avatars buy a virtual car from you for US$10 each. You consequently report an income of $100. It's that simple. You can even script the entire process and use programmable avatars to save you time.

We must also remember that some countries are not as free as others. If we kill anonymity, we kill the very limited freedom people in such countries may have. Virtual worlds affect the real world, and the real world affects virtual worlds. The famous case of Google altering search results to satisfy Chinese authorities is an example.[8] The challenge is in determining how to preserve the value of anonymity while preventing its perils.

VIRTUAL GOODS

The gaming industry has had virtual goods for ages — all those swords, potions, ships, and houses you gain in the game and store in your inventory. Then we were able to put money into the game and buy even more goods, yet the flow of money was always from the real world into the virtual worlds. With the advent of SL (and later worlds like IMVU and Entropia), we can now take money out. Let's say Dera creates a nice pirate ship (see Figure 1). He puts it up for sale. Jane likes it. She charges her credit card US$1 and she gets about L$260. She transfers the money by selecting "buy" on the ship. The money is transferred to Dera. After Dera requests to withdraw the money, it is transferred to his bank account in a matter of days.

Figure 1: A sample Pirate Ship
© Copyright 2008. Dera Carter.

Today in SL each object has an owner and a creator. The creator selects a few parameters for each object: Copy (allow owner to create copies), Transfer (allow owner to transfer ownership), Modify (allow owner to change the object). But in fact, the story is more complex, as each object may contain several other objects that could have their own parameters. For example, a modifiable object may include a scripted object that is not modifiable.

I distinctly remember one of my students submitting an amazing motorcycle as a final project. This was a masterpiece — so much so that I suspected it was copied.

Because SL stores both the creator of the objects (which can never change) and the owner of the object (which changes when you sell or give the object away), my teaching assistant and I were able to look at the creator field and discover that the student was indeed the creator. But a few weeks later, we reflected further — could we *really* be sure he created the motorcycle? He could have given his password to another user. He could have used SL to add one more object (which he had indeed created) to an existing motorcycle, and then linked it again to "stamp" his name into the creator field. Now we were entering the field of copyright and ownership.

Rights (and more specifically, copyrights) of virtual goods are a hot topic. Hackers have circumvented SL's internal clients to make illegal copies of objects and textures. One virtual goods merchant, Stroker Serpentine (Kevin Alderman in real life), decided to act and sued a thief (Leatherwood) who was appropriating his objects. Here's what Stroker says in one blog post in March 2008:[9]

> When Leatherwood was first confronted and served a cease and desist, he made it very clear that he was not going to stop because he felt that his anonymity would protect him. was also painfully apparent that Linden Lab's [makers and managers of SL] activities. Given the fact that he cherry picked our most popular and profitable product, we had to make a decision. Ignore it or address it legally.
>
> Leatherwood made mention in a well-publicized interview that he would never be found. He tried to throw us off his trail by giving false accounts. When he was confronted with the cease and desist in real life, he denied knowing anything about the matter. However, his real life friends were willing to testify to the contrary, since he had run to their home and used their IP addresses to continue his activities when the story broke. They were [angry].
>
> This issue came to light by the various IP addresses he had used to connect to Second Life. These friends were also willing to testify that Leatherwood carried a notebook of dozens of credit card numbers with him everywhere and used them to make online purchases.
>
> When Leatherwood refused to answer the claims against him, we were faced with the decision to mount a full case in federal court. A case that included transaction histories, both real life and Second Life eyewitnesses (many Second Life residents who were willing to testify in person btw [by the way]). The statement of the Private Investigator would also have been included, where in one conversation he denied being Catteneo [his Second Life identity] and retracted it in another. Leatherwood's computer would have been impounded by the FBI and a subsequent examination would have been done by a forensic examiner.

This case, which was settled in a US District Court, involved two important issues: (1) protecting the rights of owners of virtual goods, and (2) making Linden Lab lift the anonymity shield.[10]

Protecting rights becomes even a bigger issue when we think about moving the pirate ship Jane purchased from Dera from one world to another: Can Jane store the ship in her local machine or on another machine? How can this be done while not allowing multiple copies of the same ship? To protect the creator's rights, can we store a user "token" in the ship (with expiration)? Can we demand "always-on" operation to enforce digital rights management? Is this another parameter creators should/could/need to worry about?

Let's extend the realm of virtual goods to the area of multilayered marketing. In my opinion, one of the potential key features of future virtual worlds is allowing people to resell derivatives of virtual goods. In fact, IMVU has a structure for that. For example, you can buy mesh for a dress, then color it and resell it. The revenues from the sale will be split between you and the manufacturer of the mesh.

Finally, dealing with virtual money is a new challenge to the enterprise. Imagine doing a purchase order for virtual land (are we in the real estate business?), renting models as salespersons (should HR be involved in this?), or buying skin (why do you need to pay for a skin?). Clearly virtual world commerce will raise a host of issues for the enterprise to consider. Virtual goods propel identity into a new domain that mixes anonymity, rights, ownership, and freedom to move objects from one place to another.

SCAMS

SL avatar Prad Prathivil[11] has demonstrated how a classic scam can work in virtual worlds:

> [10:39] Imas Cammer: Hey baby! How was your day today?
>
> [10:40] Gull Libel: It was tiring, sweetie ... but I'm glad to be home and on Second Life with you :)
>
> [10:40] Gull Libel: And how are you, sweets?
>
> [10:41] Imas Cammer: Hmmm ... I have an RL problem. :(
>
> [10:42] Gull Libel: Oh, what's up?
>
> [10:42] Imas Cammer: You remember how I told you a few months back that my father died a few years ago, and that my mom still lives in Nigeria?
>
> [10:43] Gull Libel: I remember, baby. You've had it rough :(
>
> [10:44] Imas Cammer: Yeah :(Well, you remember when you told me how it's good for people to help people less fortunate than themselves?
>
> [10:45] Gull Libel: I remember baby ... and I'd do anything to help you :)
>
> [10:46] Imas Cammer: :)
>
> [10:46] Imas Cammer: When my dad left the bank he ran, he left quite a lot of money in a bank account in Nigeria, but my mom says she can't touch it unless she gets some help ... we'd be happy to share some of it with you if you can....

In SL, instead of some suspect e-mail landing straight in your junk folder, the scam presents itself in the form of an avatar. Someone has put work into making the avatar look pretty, and she starts up a relationship with a potential victim, grooming him over several weeks or months until a trust develops between them. The intensity of the interaction in virtual worlds enables users to build their reputations. One truly sees the person, her house, and her actions. One is temped to trust.

And the scammers aren't always after your money. Sometimes, information is just as valuable to them:

> [07:21] Imas Cammer: I really feel a strong connection with you, baby — I'd love to call you sometime. What's your phone number?
>
> [21:32] Imas Cammer: Your Second Life name is nice, but I was wondering today what's your real name, baby?
>
> [16:01] Imas Cammer: I found something beautiful in a store today, and I'd love to send it you for your birthday, baby! What's your address?

For starters, people tend to be nice in virtual worlds, and often they encourage real-life courtesy. Imagine a bank teller getting some personal information from an avatar that is being escorted by another avatar — his or her friend. That's one potential leak. Or consider an avatar that keeps her bag in the office — a bag that was given as a present by a friend. This bag could be a listener that hears everything being said in the virtual office.

THE ENTERPRISE TAKE

Virtual worlds are gradually entering the enterprise scene. They serve as a place for collaborating inside the enterprise or with outside suppliers and customers, a place to try out new designs, a place to market goods and services, and even a place to sell them. Banks can start to offer services, hospitals can start to treat people, and firms may present their products and allow users to try them.

We are in the initial phase of virtual worlds, and the following identity-related issues require attention *now*, because they may have regulatory, technical, and/or legal ramifications:

- **Networks.** Currently, worlds like SL call for non-standard network ports. Often, SL will not work behind firewalls. Some people overcome this block with tools that allow limited Web-based access to SL for presence and messages.
- **Code.** Advanced virtual worlds allow code to run, which also means viruses, bots, and other hazards.
- **Group identity.** Is the fact that you are a member of a group considered private or not? Can other members of the group know about your membership? What about people who are not in the group or people that left or were kicked out? Since many firms start to manage virtual groups, personal information needs to be managed.
- **Tracking.** Imagine you have a virtual bank with a virtual semi-human/semi-automatic teller. It is in contact with a well-authenticated client avatar. Now you need to be able to get instructions from this avatar. She may chat in these instructions, she may send you an IM message, and she may voice these instructions. The teller avatar (or avatars) will need to store and track these instructions.
- **Doing business.** Even more issues emerge when it comes to business relations in virtual worlds. Identity is necessary when it comes to common business requirements such as contract enforcement, insufficient tax documentation, copyright/IP prosecution and defense, and nondisclosure.[12]

Now that we have presented several virtual worlds with 3D3C Identity challenges, we can turn to a discussion about this term. Whereas the previous challenges of Security of Audience, Anonymity, Virtual Goods, Scams, and the Enterprise Take were concrete and specific, the next section takes a more reflective approach to the term 3D3C Identity.

Criticism, Impact and Conclusion

CRITICISM

Earlier versions of the general 3D3C framework and the specific 3D3C Identity in particular, raised several questions and concerns. Let me summarize them for the benefit of future works.

1. **It is too early** to think about such things – the thrust of this claim is that virtual worlds are still very early in their development cycle and early standardization work may stifle innovation. My own take is that it is never too early to think about the future. Different parts of the industry should focus on various short-, mid-, and long-term issues. I do concur, however, with the general notion that early standardization may hamper innovation. On the other hand, belated standards may kill markets.
2. **We have seen these 3D3C factors already. What is new about that?** We have seen real money in some other worlds. Creation may be done with standard tools like Blender, and community is clearly present with Facebook, Twitter and the like. My answer is simple: while each of the factors exists in its own right, the integration of the factors into one system is new. For me, such 3D3C integration, which we did not achieve in the

Internet, is the key to the immense value of virtual worlds.

3. **3D3C definition misses the real world**. Since much of the value of virtual worlds stems from connecting the virtual and the real world in terms of sensors and actuators, the core, the very definition, should also hint at the real world. I agree. As my writing states (with the term "real virtual worlds"), I'm a great believer in virtual-real connections. Indeed, "Realness" is a strong factor that may extend the 3D3C framework – perhaps into R3D3C notation. This could be done in some future work.
4. **Identity is not the right term**. The essence of this claim is that the term "identity" itself is too limited or conversely too general. I would agree with any other term provided it is clear that we are talking about the amalgam of all the previously related issues like privacy, security, permissions, etc. Any ideas?
5. **We need to attack each issue independently**. The sheer complexity and interdependence of 3D3C Identity do, indeed, present a conceptual and engineering challenge. Practical, time-to-market and other engineering concerns, *do* call for slicing the problem into specific parts, dealing individually with each issue: one subsystem for authentication, another subsystem for tracking, and a third subsystem for rights, etc. This factoring approach into subsystems is often needed to unpack a complex issue. Yet, as we have seen with SL, there are benefits to a coherent systematic approach. In SL, the concepts of groups, authentication, and rights are well integrated. While not complete, such a coherent system does demonstrate the possibility and value of a systemic approach.
6. **What about this or that issue**. As the nature of 3D3C Identity reveals itself, additional issues are needed to be included in the discussion. I agree with this notion. These new issues should be examined, and their relative impact on 3D3C Identity should be assessed. Nevertheless, we cannot wait for *all* the issues to be dealt with. My suggested credo: it is better to have an adequate standard at the right time than to wait for the perfect standard that is too late.

IMPACT

The nascent nature of the field of virtual worlds has different impacts on actors in the field. Each actor, be it a world developer, a virtual merchant, a researcher, or a user should examine his actions according to his goals. Each should consider the impact of 3D3C Identity on his current and future actions.

For presentation purposes let me summarize the potential impact viewed through theory, practice, and infrastructure, as defined here:

- "Theory" means long term (4-5 years and more into the future). Theoretical actors often choose to delve into issues and describe, analyze, and synthesize very specific angles of 3D3C Identity.
- "Practice" means now. The immediate present impact of identity in the way we use virtual worlds.
- "Infrastructure" is about the intermediate time period. It is for people who have to build the systems and subsystems of virtual worlds. Such infrastructure actors need to balance practical considerations of here and now against future theoretical insights and concerns. Infrastructure teams include the R&D teams of Linden Labs (makers of Second Life), IMVU, and Oracle/SUN Wonderland, as well as related technology teams that deal with specific issues like Collada, OpenSim, and the latest Google Led O3D (these are just examples of teams that deal with infrastructure.)

Theory. My initial review of relevant theoretical works that may relate to 3D3C Identity reveals many resources, including related issues such as authentication, permissions, and privacy, to name a few. What is missing is a systemic approach– which may be difficult to attain due to the multidisciplinary nature of 3D3C Identity. One potential direction toward a systemic approach could be the connecting of just two concepts; i.e., theoretical research on groups with virtual goods permissions, or level of adultness (how do you mark adult content in virtual worlds?).

Practice. Practitioners also face identity issues today. Many of the earlier challenges portray immediate, here and now, issues for individuals and organization. After just few hours in virtual worlds, one meets issues of anonymity, trust, and copyright ("why can't I give this car to my friend?"). Practical actors in virtual worlds could adopt a dual approach of learning and common sense. On the learning side, users should have a deep grasp of current aspects of identity in their virtual worlds (for example, in SL this would mean understanding groups, object permissions, island permissions, etc.). On the common sense side, especially when projects become bigger and more complex, an "identity" attitude should be adopted, asking questions like: with whom do I do business in virtual worlds, who owns the rights for the land or creations, to whom do I give "free" copies of creations, and

how do I protect my rights, and respect the rights of others?

Infrastructure. Lastly, infrastructure teams should pay special attention to identity issues. While sometimes difficult and less glitzy, identity issues should get higher priority with infrastructure teams (as a new 3D shadow model, or some other visual effect is more visible than an in-depth identity angle). One often sees bugs (things that where not fixed) or small additions (new features) in identity related issues. SL is rife with examples of things that do not work according to design when it comes to groups and object permissions. Here are some technical identity related examples:

- How come I can only have 25 groups?
- How come I cannot create an object in some places, but I can move objects into those places.
- How come "scripts" can be locked as sub-objects and "textures" cannot.
- How come one can have only one partner?
- How come "reply to IM that arrived in email" is limited to just a few days?

These technical examples demonstrate local specific places where identity should and could call for infrastructure work. I admit that these issues are presented from the users' point of view, not accounting for the various interdependencies within them. For example, having more than 25 groups, may call for changes to the simulator that may affect performance – as a car owned by one group travels from one area to another. Such interdependencies are the core of the infrastructure challenge for 3D3C Identity.

CONCLUSION: THE VALUE OF A SYSTEMIC APPROACH TO IDENTITY

As we think about virtual worlds and their future uses, it becomes ever clearer that we need a systemic approach to identity. This is hard work and a moving target. However, such an approach *is* possible — large-scale systems like the Internet, credit cards, and the GSM system for mobile phones have proved that. A systemic approach to identity will also facilitate many new products and services, as innovators will be able to focus on innovation, and "outsource" the complex issue of identity. Enormous social and monetary value will be created for both users and service providers.

The build up of 3D3C identity principles can be enhanced by a joint academic/industry partnership. All of us can help by developing relevant theories, use cases, and technical solutions. As researchers, we could contribute by both suggesting new methods, and testing them in limited sense. Often such academic experimentation will lead to industrial larger testing and dissimination.

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Creativity, design, and arts on the metaverse

Democratization of Creativity and Cultural Production in Virtual Worlds: A New Challenge for Regulation and Cultural Management

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Abstract: This paper examines the use of online, three-dimensional, immersive virtual worlds, such as Second Life®, as an interesting platform and tool for cultural management, artistic development, knowledge exchange and cultural business. These contemporary computer technologies provide a new showcase for cultural promotion and creative production, as they connect artists and producers with an audience around the world, who, in turn, can access in real time a great variety of cultural content through just a few clicks.
The various features of this emerging phenomenon all help to democratize culture, the arts and education, as they bring creations closer to consumers, thus reducing the need for intermediaries and breaking down social, economic and political barriers; this offers benefits to cultural industries, non-profit organizations, governments, collective and individual creators and artists.
However, the numerous possibilities ushered in over the last few years not only bring benefits but also pose new challenges in terms of regulation. Indeed, this new stage for cultural and artistic expression and management may require new paradigms of control with a different focus, ones which can provide an alternative understanding of online cultural exchange in real time.
Virtual worlds make culture more democratic, as it can be reached for free by a wider range of people in real time; furthermore, artists and creators are provided with an accessible showcase in which they can become better known and where they can interact more directly, immediately and closely with their audience. The possibility and ease with which anyone can create original content in the metaverse is an incentive for creativity, because it allows people to express themselves in original ways that enhance the contents of virtual life. Art thus finds new and different formats, and cultural management discovers new spaces to break into.
At the same time, anonymity, privacy and intellectual property are all issues that need to be addressed. The regulation of virtual worlds may require different ways of thinking and the adoption of new paradigms which consider exchange, democratization, cooperation and sharing as essential ingredients of these new sets; as such, any rules must control but not restrict, thus avoiding anarchy at the same time as keeping interaction levels high.
In the European Year of Creativity and Innovation it is important to consider the opportunities being opened up by these new technologies in the world of culture and education, as well as the possibilities that are emerging and which remain to be researched.

Keywords: virtual worlds, cultural management, virtual art, creativity, regulation, fair use

1. Introduction

Recently, the development of multimedia formats and graphics in conjunction with the World Wide Web has also enabled the development of animated, multi-user, three-dimensional (3D) immersive environments with sound that are connected in real time, thus increasing the possibilities of communication, socialization, education and many other applications. These new virtual platforms are also known as *"metaverses"* because they tend to be *metaphors* of the *real universe*. Drawn by increasingly better-quality computer graphics, they enable people to interact in many ways, for example, socially or economically (see García and Martínez 2008, Carr and Pond 2007, Senges 2007, among many others).
Although there are currently many *metaverses* in cyberspace, by far the most popular is *Second Life*[1], a three-dimensional online platform developed in 2003 by *Linden Research, Inc.* (commonly known as *Linden Lab*®); the company has its headquarters in San Francisco (CA, USA) and offices in other US cities, as well as in Brighton (UK) and Singapore. This virtual environment has the largest and most diverse community in the world, and is growing at a considerable rate. According to Linden Lab statistics they reached one million accounts in October 2006 (Linden, P. 2006) and this number has since increased significantly, such that by April 2009 there were about 16.8 million registered signups (Linden Lab 2009b).

[1] Second Life®, Linden®, and Linden Lab® are trademarks of Linden Research, Inc. This work is not affiliated with nor sponsored in any way by Linden Research, Inc.

2. The Features of a Metaverse

The users, or *residents,* can, via the digital representations of themselves, known as *avatars*, interact in real time with other users by written chat or voice. In Second Life, Linden Lab is merely the service provider, just as they specify in their *Terms of Service*, and it is the residents who are continually creating the contents of the virtual environment (Linden Lab 2009c). The Second Life code and programming are open and free, which enable residents to decide and modify absolutely every aspect of their character and environment. Furthermore, the intellectual property of the elements created remains in the hands of the resident who made them. This allows a commercial trade system for almost any goods or service, including the sale of land, real estate, objects and employment. This business is conducted using a local currency called *Linden® dollars (L$)*, which can be exchanged for money from the "real world" such as US dollars (at a rate of about L$270 for $1 USD), euro, pounds, yen, and currency from many other of the world's countries.

3. Cultural and Artistic Faces of Second Life

The fact that everyone can make and customize any kind of product, and edit every aspect of his or her world with the features that the virtual environment provides, constitutes a genuine incentive for creativity and artistic production, and means that virtual spaces and the environment become filled with all kinds of cultural content.

3.1 Plastic and graphic arts

Hanging a virtual picture in Second Life is as easy as uploading into the metaverse a previously digitalized image, which is then attached to an object placed on the wall. The cost of this upload is L$10, the equivalent of four cents of a US dollar. Thus, hosting a graphic arts exhibition is quite inexpensive, and saves on many of the costs of a real-life exhibition. As a result, professional artists from the real world sometimes show their work alongside upcoming or amateur artists, all of whom therefore have the same opportunities to be seen, thus democratizing these spaces. In this regard, each artist has the same likelihood of being known for his or her work, which is what matters most, regardless of his or her real-life background.

3.2 Music

Music has made a big impact in Second Life because it is easier than in real life for musicians to play their tunes and be heard by lots of people from around the world in real time. Using specific software that can be obtained for free (although there are also payment options with better features), musicians can send the audio signal from their local PC to a server (commonly called *stream*), which is used to distribute the signal to connected users. Every place in Second Life allows its owner to define the audio set-up of the land and there play the content of a *stream* server in real time. The owners can even give set-up permission to other people, such as managers, assistants or musicians themselves. With a few exceptions, all the concerts hosted in Second Life are free to the public.

Stream servers can easily be lent or rented from other residents, and there are also specific enterprises that offer this service. Most venues which hire musicians or let them play there for free have rented a *stream* server and provide the musicians with the information that allows them to login into the server and send their audio signal into cyberspace. However, everybody, whether or not they are musicians, can rent a *stream* server.

Musicians can also play a previously-recorded audio and host a "playback" concert. The same method is used by DJs who mix recorded music for a dance party or other kind of event. However, there is also the possibility of performing live and being heard in real time around the world. Singers and instrumentalists can plug a microphone or instrument into their local PC and then perform in order to generate an audio signal that will be sent through the *stream* server to the audience in the virtual venue. They can also interact with the audience, receive applause, get immediate reaction to their performance and adapt the show to the taste of those in attendance.

3.3 Design and Architecture

Design and architecture also have a special place in the metaverse through the elaboration of all the avatars' components (body shape; skin; formal, casual and sportswear; underwear; costumes; footwear; and hairstyle, etc.), as well as the spaces that can be occupied (houses, buildings, squares, streets, landscapes, hills, valleys, rivers, seas, oceans, etc.). The creation of these elements illustrates the creativity of the artists who made them by using specialized graphic design software and then imported them into Second Life. This is currently the main source of business and trade in this environment.

3.4 Audiovisual

Movies and television have their counterpart in the virtual world through what are known as *"machinima"*, which are animation videos made with digital 3D images. These are a widely-used resource for virtual TV channels, as well as for promotional videos, short films and even music video clips, among many other applications.

3.5 Publicizing Events

Every artistic production, once it has been made public, is available to any resident in Second Life. All they need do is login and know the time and virtual address of the event. This metaverse includes many forms of communication for advertising the events occurring in Second Life, and not only artistic ones. Indeed, the Second Life official website includes a section that hosts announcements about events being organized anywhere in the world. Avatars can also subscribe to different groups within Second Life that are created and managed by residents with the aim of bringing together people with common interests. However, the number of groups that each avatar can join in Second Life is limited to 25, so it is necessary to find alternative ways of receiving news. Some applications and programmers have integrated into Second Life the family of web-feed formats coded with XML language, such as RSS, in order to create a sort of alternative group for sending updated one-way information to residents without the need to occupy a slot in the avatar's group allowance.

3.6 Virtual Cultural Industries

The production, display and exchange of artistic content enable the creation of cultural enterprises dedicated to a wide range of disciplines. Many such businesses not only obtain regular work and income, but also become serious enterprises with a structure, a budget and a team; examples include the management of music groups, artists, venues, concert halls and theaters; recording studios; TV channels; radio stations; and publishing houses, etc. Some of these industries exist solely in Second Life and only manage content of this virtual world. However, others are offices or extensions of real life enterprises that use cyberspace as an additional tool for their business.

3.7 Virtual Cultural Tourism

Metaverses are used to create three-dimensional replicas of the most representative content and heritage of a real place in the world with which users can then interact. The realism that some of these replicas achieve is impressive. Some of them have been carefully made to scale with rich details and original textures taken from the real place, and thus the feeling of "being there" is easy to achieve. The initiative behind these projects comes from a variety of sources. Some are unintentional — or at least non-explicit — cultural tourism plans, which means that their creators were motivated simply by their own attachment to the place in question (even though they might not be natives themselves). Thus, some of these exhibitions were developed by private individuals who dedicated their time, effort and land in order to recreate a place they love and to share it with other people. However, there are also institutions or organizations (public or private) that have chosen to develop a formal project for promoting cultural tourism in their respective regions.

One such example is the case of Mexico, and Second Life includes many islands that aim to show representative items of Mexican culture. Some of them have a more commercial objective as they present buildings, monuments and squares, sometimes accompanied by information and explanations, that are surrounded by large malls and billboards of real-world businesses.

On the other hand, there are three islands that have been created by a direct initiative of the Mexican government, and which are supported entirely by it. In June 2007 the Mexican government contracted Linden Lab to build on a new island a replica of the archeological site of *Chichén Itzá*, the objective being to promote it as a New World Wonder. Due to the success of this initiative they decided to develop the project by buying another two islands on which to include the regions that form part of the "Mayan World", replicating other archeological sites such as *Palenque* and *Las Ventas*, natural environments like the *Misol-Ha* waterfall and lake, and the colonial city of Campeche. All of these sites are to be found in the southeastern states of Chiapas, Tabasco, Campeche and Quintana Roo.

According to public information, the Mexican government spent during the period June 2007 to December 2008 about US$117,000 on the whole project, including the island fees, builds, musical background, management and promotion of these places. They also have a budget of US$30,000 for 2009 for the maintenance of the three islands. All these places offer residents free guided tours around the islands, as well as explanations of their content (Consejo de Promoción Turística de México 2009).

There are also other kinds of projects supported by private non-profit organizations, for example, the island *Opera Joven*, where a Mexican association developed a project to promote cultural tourism in the state of Jalisco; this included representations of the Tequila Landscape (a UNESCO world heritage site), Chapala Lake, emblematic buildings and monuments from the city of Guadalajara, and mariachi music, as well as handicrafts, traditional clothing and gastronomy in the market of Tlaquepaque.
In addition, many other places have virtual replicas in Second Life, for instance, New York, Havana, Milan, Turin, Assisi, Santorini, Barcelona, Pamplona, Seville, Moscow, Jerusalem and Beijing, among many others.

4. How Far Away From Real Life?

Anonymity and privacy are two key issues in Second Life. The ease of creating an account, the minimal requirements for real data and the non-existent (or, rarely, subsequent) confirmation by Linden Lab of the information given by users when subscribing allow each user to determine the extent to which his or her real and virtual life resemble one another. This anonymity offers some people the chance to adopt an appearance, gender, clothing, attitudes, behavior and personality that are very different from their own in the real world. However, Second Life (despite its name) is not just a place for those who want to "escape" from their own life and real circumstances and lead an "alternative life" in cyberspace. On the contrary, it is also used by many people as an extension of their real life (the so-called "first life"), as they give their avatars similar characteristics and relate them to the activities, likes, ways of being and profession they usually have in real life. This is especially the case with professionals, entrepreneurs, academics and artists. Nevertheless, in most cases each avatar constitutes an undetermined hybrid of real life, real wishes and virtual accomplishment. In other words, the user's ideal *self* is reflected in his or her virtual representation with a mixture of his or her real experience. The line between real and virtual life and their degree of separation have different levels and are always a personal decision of users. In addition, the ease of creating alternative accounts, which means that many avatars can belong to one person, enables that person to assume as many roles and "personalities" as he or she has avatars, thus increasing the variability of mixtures between real and virtual life. At present, there is no reliable way of relating and proving the relationship between the avatar and the user unless that information comes directly from the person behind the avatar, and even then it is difficult to demonstrate that the handler is telling the truth.

4.1 Real Artists, Virtual Artists

Professional artists in real life can enter Second Life, bring their creations to the virtual world and boost their work in other parts of the world. Thus, there may be a close link between a real life artist and his or her avatar (the virtual artist). Indeed, a real artistic résumé may provide a good background to the virtual artist so that he or she gains greater recognition in Second Life, as well as further promoting his or her work in real life. Many artists have found this virtual environment to be an inspiration for their work in the real world, and real-world creations have also been sold in Second Life formats, thus providing income for the artists. An example of this can be found in the New York Times article published on 31 March 2009 (Corbett 2009).

4.2 Real Incomes

Most of the time, artists are paid for their works or performances. Thus, photographers and video makers, as well as graphic, plastic and virtual artists can all show and sell their work or services, with the costs and conditions being negotiated directly with the purchaser. The range of prices to be found in Second Life is very wide, and the most common arguments used to justify the high fees are quality and a solid professional background. However, no matter how expensive a work may be, prices are always much lower than in real life. This is why making a living from a Second Life business is, at present, only viable in a few cases.
The most common way for musicians, dancers and performers to obtain an income is by receiving tips from the audience during their performances. However, there are many venues which offer a fixed fee to performers and also allow them to receive tips, so the overall profit depends on how much the audience enjoyed the performance and their inclination to tip. Good advance publicity is therefore important, as is a good reputation for the artist. Some artists also have managers who help them find new venues, obtain bookings and promote their work; for this, just as in real life, they take a percentage of any income. However, having a manager is not a requirement and negotiations are always made more directly.

4.3 Close to the Artist

In the virtual world, artists and their audience can interact directly and immediately, something which is not often possible in the real world, and this breaks down the barriers of time and distance. The absence of physical obstacles in the virtual world makes it possible for anyone to communicate directly with artists, managers or venue owners. Anyone, whether a newcomer, artist, owner, entrepreneur or simply a fan, can contact the performer or creator and add him or her to their list of friends, thus enabling closer communication. This, of course, is not possible outside the virtual world and it thus brings audience and artist closer together.

5. Virtual World and Real Regulation

All the features and possibilities offered by virtual worlds bring not only advantages and benefits, but also challenge some aspects of real life such as regulation. Linden Lab has sought to exercise only limited control over the Second Life activity of residents and aims to adopt a *laissez faire* approach as regards the virtual experience of users. What they have done is establish a set of indispensable behavioral guidelines known as *"Community Standards"*, which are based on what they refer to as the *"Big Six"*: intolerance, harassment, assault, disclosure, indecency and disturbing the peace (Linden Lab 2009a). Residents must report any violation of Community Standards they witness by using a tool included in the Second Life Viewer application (the *"Abuse Report"* in the Help menu). All reports are investigated by Linden Lab and if the violation is proven, the account in question may be suspended or removed.

However, this is the extent of the policing conducted by Linden Lab, and they do not intervene in controversies between users that are unrelated to the Community Standards. The owner of a piece of land has the full right to rule, govern and control his or her property. Linden Lab simply recognizes as the landowner the person who buys it directly from them. As such, land "sales" or "rents" between users mean only giving permission (following payment) to another resident to use the land. However, the final owner (the one who bought directly from Linden Lab) is able at any time to reclaim ownership of the land and eject the occupants without any consequence; it should be noted here that the owner is never able to take or keep the tenant's objects, and must return them. In practice, however, owners rarely exercise this right because their main business depends on the trust given to renters or buyers. Thus, most of the time the real estate business works, although it is always better not to disagree or disappoint the owner, since the tenant has more to lose.

5.1 Breaking Controls

Intellectual property protection is not included in the Community Standards of Second Life. However, its infringement is policed by Linden Lab as it is understood to be a violation of the Terms of Service (Linden Lab 2009c). What Linden Lab does monitor is the use of hacker software, such as *Copybot*, which breaks the Second Life blocks with which residents can control their intellectual property and enables the hacker to make exact copies of other users' objects without their authorization, as well as erasing the credits and acknowledgements of the original creators. Linden Lab takes this aspect seriously because the basis of the economy in Second Life is intellectual property protection.

5.2 Fair Use of Cultural Contents

For many people, internet and its many resources pose a serious threat to copyright and intellectual property, and the same can be said of virtual worlds. Indeed, these worlds offer a free way of copying and sharing content without the need for permission or authorization, thus facilitating piracy. The digital recording of images, audio and texts can no longer be controlled. In theory none of the content in Second Life can be copied and reproduced without the authorization of its creator or owner, whether inside or outside Second Life. In practice, however, the images and textures that a graphic, plastic or audiovisual artist may exhibit in virtual galleries can easily be copied, just as the tunes a musician plays and streams throughout Second Life can easily be recorded without the permission of the author or performer. Indeed, there are thousands of ways of making unauthorized copies of Second Life content with varying degrees of programming knowledge, and the infringer does not need to be an experienced and cunning hacker.

However, there is also a common concept in intellectual property law known as *fair use*, which means that although someone's permission is not required, an acknowledgement of the work must be made.

If *"piracy"* is understood as taking and using content without permission from the owner of the corresponding rights, it should be remembered, following Lessig (2004), that the history of the content industry is also a history of piracy, and all sectors of the "big media" (film, records, radio, and cable TV) were born of a kind of piracy so defined. Computer technologies advance faster than do laws, and obviously there are no local or global rules which protect creators against unauthorized copies or use. Lessig (2004) argues that in recent decades, copyright and intellectual property laws have

developed not to protect creators but, rather, to look after the interests of certain forms of business. In other words, these laws protect *"commercial culture"*, the one that is produced and sold or made to be sold, rather than *"noncommercial culture"*, which is the rest.
Lessig is not arguing against control or the existence of intellectual property laws, and he is not an advocate of piracy. What he propounds is *free* culture. This is not a call for anarchy or to stop paying the artist. For him *free culture*, like the free market, is based on property. However, as he says, a free market is perverted if its property becomes feudal, as does culture if it falls into extremism as regards the property rights that define it. Thus, if internet and virtual worlds are not yet completely regulated, this means, according to Lessig, that the *"permission culture"* (which he defines as a culture in which creators only get to create with the permission of the powerful, or of creators from the past) has not yet reached cyberspace and, as such, the culture there still remains free. This should not be taken to mean that it is necessarily preferable to keep cyberspace uncontrolled or anarchic. Indeed, it must be regulated, but perhaps it requires different paradigms of control that are more appropriate to this new context, and which care more about creators and artists and that are able to enforce the tradition of *fair use*.
Culture that is created or placed in the metaverse is there for the enjoyment of residents and, in most cases, it is not designed to make a profit, at least not on the scale of the large media. This does not mean that artists cannot be paid or receive an income for their creations. However, the goal is to share forms of expression in a more democratic platform, one which offers ready access both to exhibition spaces and to potential audiences who might receive and enjoy the work.
It could therefore be argued that if there a restrictive policy regarding the sharing of cultural content and creations in cyberspace had been already in place, it may have prevented the emergence of the rich content and diversity of products and options to be found in the metaverse.

6. Conclusions

Virtual worlds make culture more democratic, as it can be reached for free by a wider range of people in real time; furthermore, artists and creators are provided with an accessible showcase in which they can become better known and where they can interact more directly, immediately and closely with their audience. The possibility and ease with which anyone can create original content in the metaverse is an incentive for creativity, because it allows people to express themselves in original ways that enhance the contents of virtual life. Art thus finds new and different formats, and cultural management discovers new spaces to break into.
At the same time, anonymity, privacy and intellectual property are all issues that need to be addressed. The internet and metaverses are yet to be fully regulated, and there are some aspects of cyberspace than remain ungoverned. However, the regulation of virtual worlds may require different ways of thinking and the adoption of new paradigms which consider exchange, democratization, cooperation and sharing as essential ingredients of these new sets; as such, any rules must control but not restrict, thus avoiding anarchy at the same time as keeping interaction levels high.
A *fair use* of contents, especially cultural and artistic ones, could offer a good approach to shared intellectual property in cyberspace, and any laws that are developed must enshrine respect for free culture and the right of authors to receive acknowledgements for their work. As such, regulation must promote creativity and the innovation of platforms, as well as their contents, so as to boost their singularity and originality, the overall aim being to improve and enrich both virtual and real lives.

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Weathering In / Com Tempo: An intervention towards embodying multi-modal self-organizing environments

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We discuss Weathering In/Com Tempo, a dance-technology project that questions reductions of our corporeal intelligence, presenting initial (concept and interface design) work towards a hybrid embodied environment, where participants (5) are invited to playfully interact physically and virtually with one another as hybrid embodied entities. An intelligent physical-virtual networked environment acts like another player, interacting with the participants through related flow of sensed aspects.

Weathering In intervenes through cross-disciplinary theory on corporeality, dance/performance art practice, and computing engineering with the goal to develop more inclusive, integrated and connected interfaces for human-environment hybrid living systems.

Corporeality related knowledge (performance, dance, dance-technology, cybernetics, HMI, philosophy, techno-culture studies) directs the work, providing approaches as discussed in hybrid concepts towards a corporeality matrix.

Inclusive modes of human-self, human-human, and human-environment engagement are investigated, by circulating and spreading intra and inter-corporeal data with the environment through non-intrusive non-restrictive technology adapted to participants' subjective way of moving/relating.

From the engineering perspective, the participants' and environment's motion, location, biometric, and meteorological data is creatively tracked and monitored with well-understood techniques. We also investigate pragmatic application of self-organizing information systems theory to feature recognition from multi-modal data streams and to the automatic determination of system control.

Introduction

What are we missing? Encapsulated in crowded cities, following the consumption driven "modernist=technical" standard of living, we become disconnected from sensing ourselves, one another, and the earth's living system of which we depend for survival. We lose embodiment in exchange for communication and knowledge improvement, utilizing awesome though restricted, excluding, and un-integrated technologies. We continue tied up seated at the computer staring at the screen, with keyboard and mouse. Instead of the, so-called, inclusive embodiment where physicality is expanded, in this extreme stillness physicality is instrumentalized to serve solely as support for intellectual activity.

Multi, inter and trans-disciplinary practices became a must to reverse such narrow technological specialization and its devastating consequences to human beings and the earth's wellbeing.

How is Second Life becoming an ideal and accessible network platform for hybrid multi-participant embodied interaction?

How can we share our corporeality like we do with text and video, and to be able to interact with our avatars and virtual environments through various modes, including our fully embodied motion?

Living under the consequences of rapid spread and massive accessibility to personal computers, PDAs, game consoles and cell phones, pushed by the economic pressure for technological production and consumption in the spread of multinational corporativism, we are changing, mutating too rapidly who we are. In accelerated orientation towards always better modes of actualizing our virtualities, and visa-versa, we are now able to communicate techno-semio-phenomenologically through (textual, numerical, visual, movement, and audio) digital media languages. However, we are still attached to boxed interfaces, reduced to minimal eye-hand body movement coordination, even

when interacting with virtual characters in MUVES, such as Second Life.

The industry is capitalizing on this corporeal restraint, starting to offer new devices that are drastically reversing this but, again, being exclusive and reductive, towards isolating the body in naive game engagements. That is, instrumentalizing it, thus maintaining fixed hierarchies and, with it, the Cartesian body/mind split mentality. Living in ever more real virtualities, detaches us from our physical realities, urged to control and adapt to the interfacing behaviors imposed by always newer seductive gadgets.

Looking for ways of estranging and transcending in order to perceive the familiar a new, yet, we keep encumbering our physical body, relating to it as a mechanical thing we need to keep fit, independent from an assumed superior logic-rational thinking activity, construed as the Liberal Humanist Post-human Subject (Hayles, 1999).

For instance, despite deployed videoconferencing telematic possibilities, if not for mating purposes, people mostly use these systems in a talking head mode. Exceptions to this state of things has been fostered by media artists, such as Paul Sermon, and by performance art and dance-technology choreographers, such as, Company in Space, and corpos informáticos. We want to contribute to get out of the box bringing the image back to the physical body and world (Norman, 1998). Projected on to the wall, ceiling or floor, through movable screens, different surfaces and sizes, and, with novel 3D simulations and video broadcast, we can really exist right there in a virtual environment, as augmented virtuality.

Alternatives to keyboard and mouse controlled interaction are also being developed, by moving in front or touching the screen. Using motion recognition and visualization at life size, we can build a simulated mirror, or embody our virtual character, and interact with others physically distant in a shared remote Second Life space.

But, most important, these innovative experiments need to go together with a reorientation of kinesthesia, so we can fully engage through all senses. We believe these will be much convincing apparatuses in which we can really find ourselves gaining a new awareness through embodiment and expand our corporeal mind being. Although disorienting at first, with our capacity for dual-adaptation as described Harm, Deborah L., et al. 2007, these new interfaces will become familiar and be truly transformative, reversing the instrumentalization and numbing of our bodies ourselves.

Artistic Vision

Anticipating the near future of multiple modes of embodied networked communication, particularly through avatar simulated interaction in MUVEs, such as Second Life, Weathering In is not only a creative proposal towards an inclusive integration of fully embodied inter-subjective and subject-environment interaction possibilities. The project also wants to contribute to intervene in the deployment of access to the prototypes resulting from this project or similar embodied interfaces, and, overall, claim the urgent agency for a post-human corporeality.

Weathering In commitment to develop an interface/system of interfaces that synergetically links and converges participants and environments, follows hybrid concepts, gathered within a corporality matrix (Valverde, 2004). These figures intertwine what are conventionally separated entities regarding human embodied mind beings, towards flexible hierarchies amongst senses, as well as connecting micro and macro systems and dimensions. These concepts are, cyborg (Haraway, 1997), post-human (Hayles, 1999), mobiüs strip (Grosz, 1994), quiasm (Merleau-Ponty, 1969), rhizome (Deleuze, 1976).

Haraway's blasphemic cyborg approach is implicit in the project's attitude, taken as a way to intervene, enmeshing bodies and technologies in order to give them agency not only having bodies included, but specially, to have their live somatic and bio-mechanic action shape the interfaces' technological development, pushing it to adapt to embodied interaction rather than the opposite.

A reminder of Hayles' claim for an embodied approach to the post-human, Weathering In rescues bodies from devoted un-acknowledgment and disappearance by early cybernetic transcendental theory. Here, bodies again were merely instrumentalized, keeping numbness or over use without notice, because the focus is away from the subjects upon the simulated object or task on the screen. What Hayles argues with her notion of post-human embodiment is not only the recognition of the body and technology interdependency, but principally, the needed acknowledgment and inclusivity, up to un-differentiation, of the old paradigm of analogical human subtracts: presence/absence and the new paradigm of digital functioning: pattern / randomness, instead of a substitution of paradigms (Hayles, 1999).

Weathering In fosters a highly kinesthetic sensitive and perceptive, experiential awareness, open and receptive to the circulating energy and affects within self and in/with the group, between micro and macro systems, between in and out of cells and hybrid environments. This relates to Grosz (1994)'s notion of mobiüs strip as a two dimensional stripped figure which becomes tridimensional through a eight, where the inside becomes the outside and vices versa, representing the un-separation of body and mind.

The project wants to bring attention back to the participants' and avatars' embodied interaction with and through their environments. How do they engage in a mediation of affect, where phenomena changes according to a synergetic combination of factors taking place

in/between physical and virtual participants and environments.

On a phenomenological register, the work implies or addresses the quiasm (Merleau-Ponty,1969), as the space in between participants and environments through which they connect and are expanded. However, rather than being only a reflex of ourselves, the other participants and environments also affect us; a reminder of our existing relational and in between attitude in life, shaped by our human age, gender, ethnicity, and social-economic-political and geographical frame..

The rhizome (Deleuze & Guatarri, 1976) is also expressed here, by the interaction design of intertwined planes, where a multiplicity of signals of different natures, orders, and dimensions, circulates, being exchanged and transformed into each other in a non-hierarchical mode.

How can we benefit from embodied mirroring and partnering with avatars and environments?

Through this corporeality matrix, we argue that only with a much sensible awareness/experience of our bodies and ways of engaging, can we relate and have interfaces relate to our somatic workings, through capting and mediating the functioning of inner systems/biofeedback. Rather than only using these signals for medical purposes, and this way objectifying the body, by learning to listen and dig into embodiment, we can, instead, witness our functioning and notice how we do everything so automatically and yet able to be fully aware.

Thus, Weathering In researches the semiotic and phenomenological implications of embodied engagement in this complex, reflexive, and cross-modal integration of experience. We do understand the challenges from not only creatively adapting each of the existing interface software and hardware we will be altering. By combining several of these altered gadgets/devices, the intent is also to estrange participants from their common specialized use, having them experiment with bolder (creative) potentials of multidimensional embodied modes of interaction.

Much like Hayles' posthuman claim for embodiment, we deconstruct the so-called intelligent multimodal interfacing or intelligent user interfaces (IUI), realizing their typical restraining and alienating audiovisual and touch sensing/perceptive experience. True, for physically disabled people this is a means of inclusion. But, for subjects that can interact with their whole body and senses, electing these modes implied numbing the rest of the body. Thus, Western mentality has not changed. Even acknowledging this handicapped over specialized mode of interfacing, there continues to be a privileging of fixed hierarchies and false separation amongst perceptions. Even after recognizing the terrible implications for humans' wellbeing, these are the commonly accepted and deployed modes of interaction. Innovating through body movement oriented interfaces, alternatives to restrictive videogame interfaces are totally geared to the player's physicality. These, however, keep numbing the mind through Pavlovian or muscle building behavior, blocking the possibility for any intelligent embodied engagement.

With Weathering In's inclusive approach, we assemble various sorts of signals. Physical and virtual proximity is monitored to modulate aspects of the intelligent system, based on the presence, type of movement patterns and space-time relation between participants (physical and/or avatars). Regarding the somatic dimensions, there will be biofeedback, following the blood stream, breathing, muscle tone, temperature and humidity. These inputs are networked to affect the physical and virtual environment. Other events in these environments such as participants' or avatars getting close or touching each other or objects, will also affect these and them in return. The affects happen in the form of environment climate changes of temperature, humidity, light, color, image and sound variations, or directly on the participants' body (tithing their bellies)..

The specific aspects of movement and type of connections we want to emphasize are not visual nor audio patterns as we commonly relate to dance or interactive environments/installations. The experience is based on a kinesthetic attention to common action, the pedestrian and casual behavior patterns amongst a group of people, as well as their somatic functioning, making certain aspects of their engagement perceptible. We propose a multimodal experience, inviting the participants to listen to themselves and move in relation to each other and the environment. The participants' movement and bio-data affect the environments, which in return affects their physical bodies.

Adding to this data crossover, there is yet data input coming from two geographical places located at earth's exact opposites, New Zealand and Portugal. Meteorological, sound and visual data are collected and monitored in RT, projected in both physical and virtual environments. Although in both environments the expression of these data is modulated by the participants, the projection of images occurs differently in each site. In SL, the images, map the two half spheres slightly separated, that constitute the virtual environment, along with the screen between them at the center. At the physical site the two RT images are projected separately though towards the center of the space onto two semitransparent screens/curtains. These layered screens generate a third image from the two images/sites juxtaposition.

Weathering In invites a different state of awareness, where interaction with others and the hybrid environment happens on subliminal, somatic, social, cultural, ethnic, gender dimensions, which is suggested by the very environment's mutable characteristics. Playing with stereotypes and deviations, these expressions come to life in the physical or virtual environment, as cold, bright, windy, or dark, humid, warm weather, enhancing sensing

and associative perceptions/synesthesia. The possibility to affect independently of the nature and source of signals converges and intertwines different dimensions of physicality and virtuality. How cold does it sound? How humid does it look? How blue does it feel?An expression of a rhizomatic entity?

Through a process of relaxed though open and attentive engagement, focusing on how the very senses interact with the environment, here is what the interaction could be:

- Participant 1 - There is heat coming from there but it is also humid.
- Participant 2 - Over here feels cool and windy, like at that beach on the screen.
- Participant 1 - Oh, no, it's becoming foggy and dark as we seat. But the blue is cool.
- Participant 3 - Come over here. Let's move together, see what that does.
- Participant 4 - Going where?
- Participant 3 - Over that corner, there is a SL screen. Look, we are also in that virtual environment as a video image that avatars look and relate to.
- Participant 4 - What? We are also embodying the avatars?
- Participant 5 - Hey, they are responding differently now, no longer mimicking us!!! Is it because of the sudden stormy sound?

It is important to learn how to perceive, how to bring our attention, inward as much as we do outward, learning how to travel through the body, between tissues and systems to become more interconnected and ready to fly.

How do we behave in such a sensitive environment? What is socially acceptable in a public physical-virtual place? Do you act or observe others? Do you move to the center or wander around? Do you avoid proximity or initiate it? Do you touch or stay at a comfortable distance? Does anything happen by chance? What are you aware of? What is your state of awareness in action? As Bonnie Bainbridge Cohen (1993) states, "we perceive in action and perceiving is an action".

As the participants walk in the environment in relation to other participants, the physical space and avatars on a SL site, they realize how the avatars interact with them. They might disappear or start to move if the participants stop or move. Not always mirroring, the avatars have their own 'life', being more like partners, either human, animal or plant like.

This sensing and interaction will be enhanced through a jacket like costume with wearables (microcontroller, sensors & actuators) which the participants wear during the experience and will enable the tracking of their body movement and data. Instead of a cumbersome piece, the wired garment will facilitate participants' inner body focus and its role in the interaction with other participants and environments.

With a critical postcolonial and intercultural intervention, we want to contribute to alter the substitution state, wrongly called extension or expansion, to which bodies have been relegated to in Western culture, and contribute towards what corporeality can really mean across culture, ethnicity, gender, and embodied practice.

We need to bring more inclusive modes visible, by assigning agency to all embodied senses and modes of perceiving, thinking, and interacting, instead of only through audiovisual and verbal interfacings. But, first, we need to learn to relate corporeally with ourselves and our avatars, through bio-analog-digital domains. Only then will we be able to meet and share who we are becoming, inventing ourselves and our relations with one another, in the the worlds we create and its interlinked languages, cultures, peoples, and places.

Acknowledging the loosing connection with ourselves and our environments, distanced from nature with the digital kicking technoculture mode of living, Weathering In aims to raise agency, recognizing the importance of our corporeality to the development of human based interfaces, in order to finally start to profiting from embodied connections through inter-connected modalities of mediated interactions.

The work is also an alternative for the unconscious, instinct based automatized Pavlovian modes of interfacing and how they have been shaping subjects' experience and life in the (Westernized) world, across time and space, constructing new stereotyped characters, and cultures.

Technical Vision

The project Weathering In (WI) proposes an immersive embodied environment where participants (5) are invited to playfully interact with one another physically and virtually as hybrid embodied entities within intelligent physical and virtual sites. Participants become attentive to the environment's intense synergetic enactments in relation, or not, to their interaction in it. Real-time visual, physical and physiological corporeal input of each participant and their or other avatars moves connect these behavior/data with that of the climatic conditions, audio-visual geographical and cultural aspects of two sites within a multi-user virtual environment (MUVE/Second Life) site.

Existing clothing is enhanced to provide collection and expression of physiological data through wearable sensor devices (including ECG, EMG, Temperature, GSR), embedded in fabric. A motion capture system complements the physiological data.

Weathering In will particularly capitalize on taken for granted inter-corporeal spatial-temporal physical and virtual interaction (including proximity, orientation, space

level, touch, movement, action, gesture, gender and voice), and the multidimensional influence of environment variables (including temperature, light, smell/odor, acoustics, air, humidity, and visuals). Haptic, visual, temperature, humidity and water feedback is given to the participants alerting them to the consequences of their play.

An emergent structure of a self-organizing system undergoing "non-equilibrium phase transition" as described by Haken (2006)] is to be developed that leads to recognition of human-human and human-environment relationships. In a sense, the software system developed to support Weathering In (WI) produces a form of artificial intelligence by being self-organizing; the system reflects on its microscopic parameters adjusting them for a macroscopic outcome. Being reflective means that the system can examine itself and adjust its own parameters and is able to undergo reification to produce higher levels of observer abstractions. Friedman and Wand (1984) describe how the data structures of a program being run by an interpreter system can be made available to the interpreter; similarly, the WI system reflects on the structuring of data as it interprets.

The space

WI takes place in a large indoor space that includes a digital bridge to and from a virtual environment. The physical space contains: human participants who wear clothing with embedded servos and sensors that communicate via a wireless communication protocol Bluetooth; and Environmental items such as: curtains, fans, a smoke machine, sprinklers, seating, video projectors, video cameras on camera stands, computers, power cables and network cables and a wireless network access point.

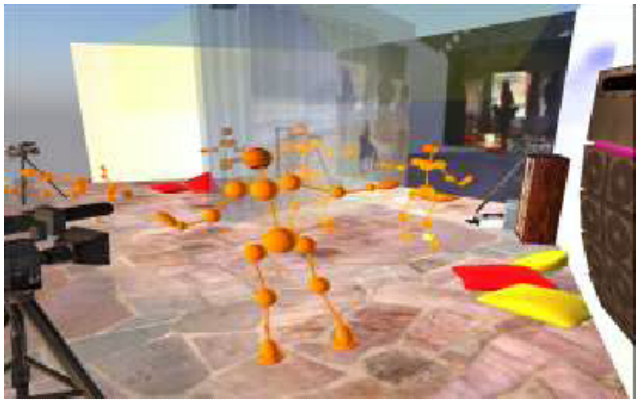

Figure 1: *WI* physical environment mock-up (in progress)

The virtual space contains: Avatars, one for each of the participants in the physical space, other avatars of those attending at a distance, simulated weather conditions and effects such as virtual pushing and bumping.

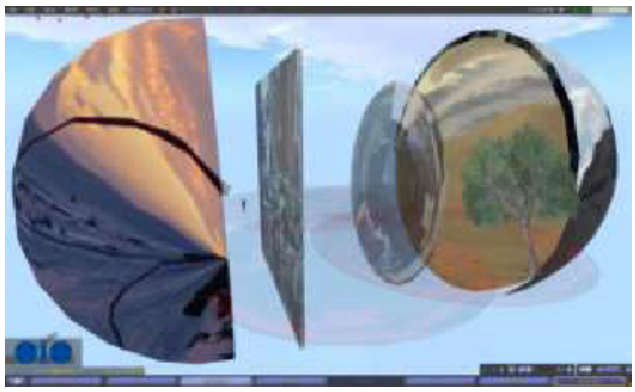

Figure 2: *WI* virtual environment in Second Life (in progress)

Bridging between physical and virtual

Bridging to the physical environment from the virtual environment is through audio and video projection of the virtual space into the physical space, and via data transmitted to micro-controller actuated servos embedded in clothing or micro-controller mediated switches that control a smoke machine, fans and sprinklers.

Bridging to the virtual environment is through live data transmitted from: micro-controller monitored sensors embedded in clothing, weather data and 3D motion capture data, and stereo audio and video streams taken from the physical environment into SL screens.

Motion, haptic and weather data

Sensing of participants´ motion and motion in the environment is to be undertaken using the augmented reality toolkit. WI is to reproduce and enhance the motion capture system that uses passive markers (tags) described by Sementille et al. (2004). The work undertaken by Sementille is enhanced by the application of image processing techniques as described for example by Toriwaki and Mori (2001). Participants will wear clothes that facilitate the capture of motion data and provide haptic feedback. WI haptic feedback in the clothes is to be created using a micro-controller and a set of servos. Weather sensing data comes from web sources and from standard weather data sensing equipment in weather balloons. Remote video comes webcam video streams.

Software systems

Development of the software systems starts from physical data collection and finishes with the development of self-organization based reflection. For the software systems an N-Tier service oriented architecture will be identified and used for their development. Tiers will provide a separation of concerns and a service layer to tiers above and below. The functionality provided in a tier will be implemented using components. Each component acts as a pluggable module for a particular aspect of the service.

Project Outcomes

WI produces a series of outcomes although also highlighting the work process. At the initial phases the expected outcomes are, a) the development of a grammar of personal and relational movement (through performative and choreographic research in particular site-specific space/time frames); b) the development of an electronic Corporeal Network (that senses corporeal data and actuates haptic feedback through the internet into and out of a MUVE/SL); and c) the development of performance technologies (through hybrid modes of practice, based on contemporary dance, Movement Therapy forms, Contact Improvisation, Yoga, and Tai Chi). Throughout the whole process , the choreographic approach works with architectural design of sensor technology and interface design, towards accessing movement, physiological, computer vision, and motion-capture data, as modes of thinking and knowing. Movement and somatic systems patterns, from intentional to automatic interactions will also be explored towards the creation and implementation of the interactive software system. These direct the development of self-organizing systems that creatively affect the environments, providing an automatic intervention in the perceived corporeal embodiment. Ultimately, the development of a WI interface prototype will be the embodiment of a theory of corporeality for the post-human era.

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Universidade do Brasil Virtual – The use of Second Life to share knowledge in Graphic Design, Game Design and Visual Arts classrooms

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Abstract

This article aims to present the work in progress about the use of virtual worlds to share knowledge, enhance learning quality and the stimulus of creating virtual environments linked in projects from Graphic Design, Game Design and Visual Arts.

Keywords: design teaching, game teaching, visual arts teaching, edutainment, virtual worlds

Introduction

In my career as Graphic Design and Game Design professor, I could identify, between 2000 and 2007, patterns of behavior that create difficulties in the learning process, such as low commitment, problems in oral and written presentations, and collaborative work in classrooms.

Identified that the coexistence in the classroom aroused little interest in students to acquire knowledge and do experiments, because of the contrast between the existing educational practices and the world system in which they occur naturally and in a language that has practiced in the diverse institutions of education.

In order to stimulate the cooperative work, creativity and learning to my students, I start an educational project using Second Life. In this article we present some of these activities, that will be appliend in my PhD about the use of Virtual Reality in Education.

Metodology

The methodology focused literature on the use of simulations and didactic education for the preparation of exercises and theoretical foundation. The target audience of this study was composed about 70 people of both genders and ages ranging between 19 and 35 years. The experiment was conducted with the students in graphic design labs and auditorium, where the Second Life was presented and explained, and also activities in the field that had redundancy within the virtual environment. The activities were divided into two genera: workshops on creativity, which worked directly in the creative process through different types of stimuli, and implementation of projects where, after the results obtained in previous workshops, the students developed a project directed graph to a product previously specified by the contact with a virtual world, where the Second Life.

Simulations teaching

According to Vicente (1999), the ability to make connections between concepts and ideas can be extended through the pleasure in learning, which makes easier the process of assimilation of information and knowledge. The author also states that the conventional models of education cause precisely the opposite effect, or associated in the unconscious of the students the use of evidence to the act of learning. This combination creates the perception that the process of learning is necessarily intertwined with the experience with be put on trial. As currently a large portion of jobs are in the third sector, need of entrepreneurs with creativity and initiative to take decisions, the current model is no longer useful. A new model is needed, to creating a perception between the act of learning and stimulation pleasurable.

The contact with news, movies, books, newspapers, conversations, events, travel, work, TV and Internet, even if it is intended for pure entertainment, contains information that may raise or process thoughts and views on certain topics. However, the ideal is that the individual in their process of education, has developed a critical literacy that enables you to further readings of what surrounds it.

When applying playing in Education we can make use of simulations, which allow us to live in virtual form, a lot of experiences and solutions. Simulations can help to overcome emotional blocks of individuals and facilitate their relationship with the rest of the group and society. The work of Gardner (1995) "Multiple Intelligences" has to

understand that people are different from each other, and from this point, the teacher must accept these differences as something natural, avoiding the mistake of believing in the existence of a intelligence only in terms of which all should be compared. The games, in general, can sharpen skills and sensitivities as the thinking, creating, touch, see and move on.

Edutainment

According Cotton and Oliver (1994), Edutainment is a neologism composed of the words education and entertainment, also known as "educational entertainment". The Edutainment has its origins based on printed media, such as encyclopedias, illustrated Atlas, textbooks and children's books, which offer a combination of textual information and images in order to better illustrate the matter presented.

Based on the changes caused by information technology, the authors argue that educators now have a new role to play and that education is becoming a part of the virtual business.

About Second Life

It is a virtual world in 3 dimensions, developed by American company Linden Lab, of San Franscico, California, launched commercially in 2003 and that in recent years experienced an exponential growth through the creation of content by users, whose authorship is recognized and protected.

To perform the interaction with the environment, you need to create an "avatar", a three-dimensional graphic representation, usually in human form, but not limited to this option. Through the use of your avatar, you can build objects, buildings and vegetation, move and talk (through the use of text chat or voice) with other avatars. You can also participate in events such as festivals, lectures and classes, interacting almost as you would in a physical location.

Among the most common activities in this metaverse is the distance education, with participation of hundreds of learning institutions in the United States, Europe and Brazil, where the experience is in the initial phase. In this country, the more important projects are “Vestibular Garcia”, from Mauricio Garcia, DSc, who aims to concentrate the brazilian universities in the same region and to provide virtual future that the students know and participate in educational activities developed by them.

The use of Second Life in the classrooms

The experience of navigation and interaction in a virtual world made in the classroom (computer lab) aroused the interest of students. Common shares as parallel to the main topic conversations in class, visit the various websites and lack of attention have been replaced by an active participation and desire to explore and better understand where the avatars of the students were. Despite the learning curve cause difficulties for students to carry out simple tasks such as move, go indoors or you teleport to other regions, they have been superseded by interest in discovering more about the possibilities that Second Life offers, both for the implementation of projects and for activities of pure entertainment.

In the virtual environment, we used two types of enviroments:
• Universidade do Brasil Virtual – UBV (The Virtual University of Brazil), an educational space created especially to support activities and belonging to the author of this article.

• various thematic areas, based on different historical periods, used as show-room of the business world and those whose physical appearance and functionality are related directly to a work of fiction.

The Virtual University of Brazil was in two points of metaverse: Vestibular Brasil W island (Black Pearl campus) and Fortes Perez Cultural island, on Giramundos Virtual Cultural Center (Giramundos campus), was set to present the appearance of a disabled former factory that was converted into a universtity. In its dependencies are:
• Chancellor’s office: area where the chancellor of the university (Archanjo Arcadia) meets with other avatars to present and discuss educational projects.

• Black Pearl Gallery and Fortes Perez Gallery: created to exhibitions of visual arts.

• Multigame Center: Dedicated to exhibitions and activities targeted at digital games.

• Rachel Luzes Theater: created for lectures, classes and related activities.

• Avatar Bossa Nova & Jazz Lounge: a social club to receive avatars to shows and other activities, like meeting the team of “Avatar Mundos Virtuais”, first brazilian online magazine about virtual worlds.

Case: Universidade do Brasil Virtual

The research on the use of Second Life as educational environment was carried out during the years 2007 and 2008. The target audience was composed of students of Graphic Design, Game Design and Visual Arts. For students of Graphic Design and Game Design, were transmitted knowledge of the research, creation and project development, made with the use of computer graphics, the end result should be submitted as graphic printed pieces (covers of magazines, posters and signaling), which would be subsequently applied in a virtual environment within Second Life. The students of Visual Arts made your painting, photograph and build an virtual exhibition.

To demonstrate the practical applications of the use of this metaverse, Ricardo Newton, MSc., a professor of painting, made a simultaneous exhibition of his works in RL (Real Life) and SL (Second Life), for the first time in Brazil.

This event was composed of two phases: the first, held in "Centro Cultural dos Correios", in Rio de Janeiro, Brazil, the students of the Games Design and Visual Arts had a direct contact with the works exhibited and the artist, who was on the place during the Vernissage. The second phase occurred within the Black Pearl Gallery, which a virtual visitation supervised by avatar of the artist, MasterRicky Enoch, explained that, for nearly two hours, the stories behind the creation of each painting

Although the dependencies of the Universidade do Brasil Virtual was held another exhibition, the "Fantapunk" scenario, whose theme was related to an environment designed to fictional literature, RPG and MMOG.

In the panels, in addition to maps of the areas of play, were also the characters (avatars) of the scenario, constructed with the modeling tool of Second Life and customized clothing with acquired at different points of metaverse.

From this point, the students were instructed to create their projects envisaging their use in graphical virtual environments presented. The final phase of this research, with the presentation of recent work done at the end of June 2009 and subsequent application in the virtual environment the following week.

In the first week of July 2009, an exhibition will be openened to show the best projects, with the release of the magazine Avatar Mundos Virtuais and blogs on Second Life and other virtual worlds.

Conclusion

Although the process was not completed before the preparation of this article, we noticed that the use of recreational activities and collaborative work in the classroom provided an increase in the interest of students in search of information and subsequent processing of the knowledge through practical experience . Furthermore, a better understanding of the advantages of sharing knowledge, increasing the working group through the use of new methods of learning.

This experiment was able to break the limits imposed by the standard classroom and expand it to a virtual environment, the innovative feature enriched learning, both individual and collective, making room for the view that the adoption of a collaborative culture can help in decision-making, encouraging self-reflection and self-awareness.

We believe that in situations where the flexibility to make this type of approach might, if combined different types of recreational activities and the adoption of virtual environments to complement the classroom, we need a new methodology with an infinite potential teaching.

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METAVERSE – Building Affective Systems and its Digital Morphologies in Virtual Environments

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This essay reflects about the metaverse as a virtual reality created by information processing among virtual constructions and physical buildings, through artificial intelligence systems coined concepts such as affective computing, aesthetic computing and its digital morphology. An appropriate system and its structures can move, changing their shapes as a whole, and produce responsive 3D assemblages answering in simple ways to emotions. The study of behavior and cognition in virtual environments, and to interact with them as a collaborator, is nice, but we need also someone who gets right into the code and see how it all works and how it may be adapted to his own worlds. Cognitive Scientists, Mathematicians and Physicists are studying the necessity to organize the known geometries in systematized morphological sets to apply them for the creation of affective and aesthetic systems for virtual worlds in 3D platforms, which change and grow becoming symbiotic assemblages. Certainly, there is a long journey to go on to investigating conditions and evolutionary iterations which may assist the affective computing to approximate to the real world, to go ahead and conquer more and more ambitious digital architectural spaces, but it all are like vectors pointing to such direction.

Introduction

The present paper is an attempt to begin to point the key issues necessary for the development of metaverse as a virtual reality system through affective computing and its digital morphology. The information science studies, among others, how physical properties like space, time, light, matter and movement could derive from information processing. That is the virtual reality concept for the development of geometric structural organizations in 3D space which are able to grow for visual education. The cognitive neuroscience has shown that perception may be modified by emotional involvement and may also be tricked by illusions.

Nowadays, to accept or not the metaverse environments in the formal education and training doesn´t seem to be a choice anymore, do no to study and know this kind of learning technology is a social irresponsibility. (Gardner, 2007)

Through the history we can see the Descartes' conception of time and space that reflects this primacy of the mind. First of all, Descartes maintains that space is infinite and unlimited, and that time is the meaning in with which the human mind accounts for duration (Trusted, 19091, pp. 69-70). Scientist Isaac Newton's (1642-1727) theories of mechanics are postulated on the ideals of absolute space and time. Due to instabilities in the earth's movement, human beings necessarily depend on "relative time," although an absolute time outside of this relativity exists. Likewise, absolute space exists because, while objects may be moved in relation to each other, space itself cannot be moved (Trusted, 1991, pp. 98-100).

In 1992, Michael Heim was discussing about people building computer systems and those becoming increasingly alienated by computer technology. Heim decided to address the problem of the growing divide. In Virtual Realism book he develops the idea of a middle path between the utopian network idealists and the reactionary naïve realists. (Heim, 1998)

The research of digital morphologies for the construction of behavior structures through affective computing, exploiting the fabric of morphological growth to be able to change dynamically their forms in a responsive way, may allow mixing virtual and physical realities in social symbiotic ways. It's the reflection of Marshall McLuhan in "Understanding Media", who described a similar process as "implosion" as people are more closely unified through networks in the electronic age. This unification through implosion, for McLuhan, produces a positive sensory connection that allows for a "global village" to emerge. For instance, we have know as mind perceives that the conception of a perceptual

accommodations of space and time in several medias. In this way, we have that the period of the late twentieth and early twenty-first centuries postulating that experiences of time and space outside individual media have become increasingly compressed. "The immediate prospect for literate, fragmented Western man encountering the electric implosion within his own culture is his steady and rapid transformation into a complex and depth-structured person emotionally aware of his total interdependence with the rest of human society" (McLuhan, 1964, p. 50). To illustrate the depth of contrast, consider the primary axiom of Lee Smolin's book: "There is nothing outside the universe" (McLuhan, 1964, p. 17). The edifice of science itself is often assumed to rest upon this apparently self-evident statement, yet it is precisely this statement that virtual reality theory contradicts. Indeed the prime axiom of virtual reality theory can be obtained by reversing Smolin's axiom, namely: *There is nothing in our universe that exists of or by itself*. This axiom arises because a virtual reality processor cannot itself, logically, exist within the virtual reality its processing creates. A processor cannot create itself because the virtual world creation could not start if a processor did not initially exist outside it. Hence any virtual reality world, by definition, *must* have existence dimensions outside itself. Many physics theories, like string theory, already suggest that our world has additional dimensions, yet these are, for some reason, still assumed to be in the world, but just "curled up" to be invisible to us. In contrast, virtual reality theory's additional dimension(s) must be outside the virtual reality world. Yet what is the difference between an unknowable dimension that is "in the world" and one that is "outside the world"? Since both are untestable science favors neither view. To postulate that the world is virtual does not contradict science, but rather engages its spirit of questioning. Science is a method of asking questions, not a set of reality assumptions. Science does not require an objective world, only information to test theories against, which a virtual reality can easily provide. Not only can science accommodate the virtual world concept, a virtual world could also sustain science.

As Louro and Fraga wrote about a russian mathematician called Kolmogorov who developed an additive procedure to evaluate the dimension of sets of points. Such procedure let to the future the development of the concept of fractal by Benoit Mandelbrot, allowing the knowledge that sets of similar objects with fractal dimensions seams to better explain many natural processes. At the same time the British zoologist D´Arcy Thompson applied well-known mathematical concepts to study morphologies for the growth of forms in nature. The usefulness of Thompson´ studies for architects and computer artists creating 3D physical structures is mainly his approach based on geometry and Newtonian mechanics. Also, his focus on the Fibonnacci series, the Miraldi angle, the logarithmic spiral, and the golden ratio puts him in line with advanced studies in neuro and cognitive sciences, which are arriving at the hypothesis that there is a logarithmic order imbedded in the neuronal circuits of our brain. (Louro and Fraga, 2008) We have also to consider the proposes in the current physics that seems to approach virtual reality theory as our physical reality can be simulated by information processing which is calculable. In the other hand, that our physical reality uses information processing in its operation to some degree and about our physical reality is created by information processing based outside the physical world we register.

Yoshikawa and Ueda describes in "The *calculable universe hypothesis states* that physical reality can be simulated by information processing. Calculable here does not mean deterministic, as processing can be probabilistic, nor does it mean mathematically definable, as not all definable mathematics is calculable, e.g. an infinite series. Many scientists accept that the universe is calculable in theory, as the Church-Turing thesis states that for any specifiable output there is a finite program capable of simulating it. If our universe is lawfully specifiable, even probabilistically then, in theory, a program could simulate it (though this universal program might be bigger than the universe itself)." This hypothesis does not say the universe is a computer, but that it could be simulated by one, i.e. it does not contradict objective reality. In other hand, "The *calculating universe hypothesis* states that the universe uses information processing algorithms to create reality, e.g. quantum mechanical formulae. Supporters of this view are a minority, but include mainstream physicists like John Wheeler, whose phrase "*It from Bit*" suggests that objects ("it") somehow derive from information ("bit"). Now information processing does not just *model* the universe, it *explains* it. While a computer simulation *compares* its output to the physical world, in a computer explanation the information processing *creates* reality, i.e. the latter is a theory about how the world actually works. Now the world is not just *like* a computer, it is a computer". (Yoshikawa and Ueda, 2007)

In this way, after our initial consideration, the dynamical images describe the building of digital morphologies to metaverse as a rich opportunity to present some creative process in the thought of computational artists who plan before virtual worlds constructs. Therefore, in order to artificial intelligence to equally deal with interactions in the symbiotic assemblages between virtual environment, between a user and a virtual environment, and between users, we regard each of the elements - virtual environments, users, and so on. We let these elements form independent modules, and also let the interactions between them form modules connecting them. In other hand, in the same direction, let's remember what was explained by biologist Humberto Maturana (1980, p. 5), that "Living systems are units of interactions; they exist in an environment. From a purely biological point of view, they cannot be understood independently of the part of the environment with which they interact, the niche; nor can the niche be denned independently of the living system that occupies it." Moreover, "when an observer

claims that an organism exhibits perception, what he or she beholds is an organism that brings forth a world of actions through sensory motor correlations congruent with perturbation of the environment in which he or she sees it [the organism] to conserve its adaption (Maturana, 1986:60).

Inside digital's heart

The environments of 3D platforms in the virtual worlds with physical realm of buildings/objects may allow the development of symbiotic constructions that can be explored in order to discover new shapes for affective computing and its digital morphology. "Computing technology is becoming pervasive in our environments. It is a well-known fact that human perception of space and time is determined by culture and change with new inventions. Psychological and neural cognitive sciences have shown that perception may be modified by emotional involvement tricking illusions. It is a challenge for cognitive scientists, computer artists, designers, architects and physical-mathematicians to conceive digital morphologies to be applied in responsive buildings/objects, which, associated with affective interfaces, may create unfathomable qualities for future built immersive environments and artworks." (Louro and Fraga, 2008)

To build and discover new shapes for affective computing in virtual worlds, the mathematics is the most important tool, to simple or complex worlds. Actually the Geometry is the key for these immersive environments which unite creation and algorithmic development for education through affective computing. Immersive Education, today, combines applied cognitive sciences, interactive 3D graphics, 3D platforms, trade and technology in simulation games, digital cinema, and visual poetry, augmented reality, mixed reality, artificial life, and teletransport, among others. As Santiago says "Mathematics is the language of science, and anything we do with a computer must have a mathematical construct on which it is based. To understand the concepts behind computer graphics and most effectively use software to create effects, it is important to know basic algebra, trigonometry, geometry, calculus, and linear algebra. I know many artists who are unfamiliar with these subjects, and, although many of them are talented artists and produce excellent work, they are, with few exceptions, not as so productive as they could be. Math is the language of science, and many effects are based on the scientific reality we experience every day. Applying the mathematically correct solution the first time is much more effective. I know many artists who are unfamiliar with these subjects, and, although many of them are talented artists and produce excellent work, they are, with few exceptions, not as so productive as they could be. Math is the language of science, and many effects are based on the scientific reality we experience every day. Applying the mathematically correct solution the first time is much more effective than finding an acceptable solution by trial and error. Many artists have learned much of the relevant mathematics on the job, which has helped them immensely." (Santiago, 2005, p. 10)

Paul Fishwick (2003), in his paper called *Exploring Multiple Visualization Perspectives* with *Aesthetic Computing*, says: "In computing, the finite state machine (FSM) is ubiquitous, found in lexical scanners for language parsers and scripting languages, and in behavior encodings for artificial agents in interactive games. Let's consider the following Moore machine M:

- M =< Q, I,O, _, _ >
- Q = {S1, S2, S3}
- _ : Q × I ! Q, _(Si, 0) = Si for n 2 {1, 2, 3}, _(S1, 1) = S2, _(S2, 1) = S3, _(S3, 1) = S2
- I = {0, 1}
- _ : Q ! O, _(Sn) = Sn, n 2 {1, 2, 3}

The machine has 3 states (S1, S2, and S3) with an input value of 1 achieving a change in state. An input of 0 leaves the machine in the same state. The machine oscillates between two states S2 and S3 after it gets a jump start from S1, and a subsequent stream of ones. This definition is compact and has a typographic presentation, which is an amenable to most input and output device. It has the distinct advantage of having been formulated centuries ago, first with wooden matrices, and then with metal, and more recently with computer typesetting hardware and software. An important aspect to visual computing is that we need not toss out one representation to make way for another. We recognize the power of the typographic notation, while at the same time recognizing that notation is largely at the mercy of whatever technologies exist to support it. Without the technology for making paper or parchment, one is limited to scratching marks on surfaces." (Fishwick, 2003)

All of these aspects and relevant procedures to build a responsive virtual environments with high technologies in modeling and characters development most have to work closed to exactly planning for affective computing in its applications. To illustrate the influence of social relationships on emotions, Picard describes: "One of the newest appraisal theories, wich shows promise for computer implementation of cognitive emotions, is that of Ira Roseman, at Rugers University. Roseman has developed a categorization of the appraisal people make about events that cause emotions. Roseman and his colleagues have run a series of studies in which subjects either recalled emotional experiences and answered questions designed to measure the appraisals leading up to the emotions, in which subjects read brief stories of situations happening to protagonist would feel, and its intensity. From these studies, Roseman and his colleagues constructed a model in which a small number of appraisals interact to give rise to seventeen emotions, (Roseman, Antoniou, and Jose 1996)." (Picard, 2000, p. 206)

Our studies allow thinking a new form to consider technical images inside virtual environments, through visual mathematics in the creative process, numeric-topological expressions, describing all the morphologies that are working on the aesthetical computing. Santaella wrote "Conceived as a "science of knowledge of how a sensitive issue, as we recall Sodré (2006: 45), Baumgarten, the founder of aesthetics is not confined to what has been understood the art of speech ("the art of beauty ","fine arts"), but to understand how knowledge of aesthesis to study gnoseologia a feeling or perception of sensible, logical knowing the inevitable. Therefore, aesthetics, I'm calling the technology, focuses on the potential technological devices to create aesthetic effects, ie, effects capable of triggering a network of perceptions of the sensitivity of the receiver, feedback and more subtle power of his apprehension of the qualities of what is presented to the senses." (Santaella, 2007). In this way, Paul Fishwick wrote about a new area that is called *aesthetic computing*. "Within this area, there is an attempt to balance qualitative with quantitative representational aspects of visual computing, recognizing that *aesthetics* creates a dimension that is consistent with supporting numerous visual perspectives." (Fishwick, 2003)

Affective Computing – Keep Walking

Actually the latest studies in the virtual world have to consider artificial intelligence as a mix between digital games and digital cinema through emergent technologies and digital Medias. For this environments, virtual platforms with high quality of graphics and a good HCI (human-computer interaction), must reflect a dynamical repertoire of procedures aggregating mathematical concepts such as self-similarity, fractal dimension, quaternion algebra, geometric systems allowing growth, and maximum movement with the use of minimum forces which have not, yet, taken shape. Such set of procedures may become a very useful tool for educational computer and training, exploring new affective images and characters for architectural design processes and for industrial advertisement initiatives. The research of mathematical morphologies to build structures (Peirce, 1990; Serra, 1988), using the fabric of morphological growth and also allowing them to change dynamically their forms in responsive ways, may mix virtual and physical realities in symbiotic constructs.

Such repertoire will be of great help to systematize the huge amount of possibilities emerged after many years looking for mathematical morphologies that would be appropriate to build dynamical physical and virtual structures. To research changeable morphologies for dynamic spatial 3D structures, it is necessary to explore algorithms for growing structural shapes, using random and automated processes, and for the development of kinetic systems to provide the movements of their physical parts.

This paper may make difference in how to use potential improvements to researchers and developers, in ways to involve a given technique, focusing on how they might create and constructing up the affective and aesthetic computing in their own virtual environments.

To building up metaverse through digital morphologies, it seems to us that to use techniques of artificial intelligence on affective and aesthetic computing, as it does the "person's avatars" belief in the scenarios and characters inside the worlds, creating behaviors and different perceptions. In such case we can suggest a specific attention on affective planning for the environment. We have to consider that a beneficial emotional effect can occur in people who engage in role-playing-scenarios during the "surfing on", where a person acts out an emotional situation. As Rosalind Picard wrote, "Many people have been greatly influenced by a special teacher, one who engaged them with creative and clear explanations, who showed special empathy and offered extra help during a time of distress, or who, simply by his own enthusiasm, transmitted a love for a topic."

Joe Bates works with emotions and moods for animated characters, in his communication at ACM, he describes how to make agents believable giving them the illusion of life, and designing them to be able to influence their audience as deeply as they would if they were real (Bates, 1994). There are a lot of signals representing Emotion and Moods inside virtual environments, describing some of the pieces of an affective system. Picard related, theorists tell us that emotions usually last for less than a minute or two, while moods can last much longer. However, a typical person might say: "It was days before he stopped being angry as emotions could last much putter can represent? (Picard, 2000, p. 145) Cognitive expectation is important in these constructions on architectural planning for signal representations in virtual environments. To Picard all these influences can be represented by a simple nonlinear function applied to the inputs of an emotional system. The proposed function is a "sigmoidal nonlinearity" described by the equation:

$$y = \frac{g}{1 + e^{-(x - x_o)\,/\,s}} + y_o$$

Finally, let "f" be a function that controls the temporal decay of on emotion intensity, and let "g" be a function that constrains the emotion intensity to lie between zero and its saturation value. The new intensity is then a function of its decayed previous value, its elicitors, and influence from other emotion intensities:

$$I_p(-1) = g\left(f\left(I_p\,(t-1)\right) + \sum_{l+1}^{4} \varepsilon_{p,l} + \sum_{m=1}^{p} (\,\alpha_{p,m} - \beta_{p,m}\,)\,I_m\,(t)\right)$$

To create, developing or to constructing up emotion and behavior with scenarios and characters in metaverse, and to bring them to life, is necessary to keep focus on affective and aesthetic computing and its mathematical morphologies based on cognitive reasoning within a social context. The visual dimension of artificial

intelligence through affective procedures in the virtual environments is not only guaranteed to engage the surfer but also, if carefully constructed, it can demonstrate, inform and arise interest, motivation, and so on, inside environment, where from a world of reality or fantasy the categories and strategies for develop the effects will remain essentially the same, even as technology moves forward, providing new and better tools and systems to implement them.

In the other hand we have to consider that affectivity can happens by dynamical effects in our vision systems. At this point the affective and aesthetic computing can be implemented through emotion and behavior based on the devices of the project. The research developed by Louro, D. (2007), about the applied cognitive science with emotion and behavior in immersive games, digital cinema and visual poetry, as metaverse, have demonstrated the fundamental importance field in creative process. The study of Mutable Architectures has aroused possibilities to constructing up interaction with emotion and behavior through mathematical morphology of digital animation by numeric-topological systems. Before describing applications in the next point, there is an important distinction to be made regarding the scope of digital morphology in the metaverse, otherwise, in the visual mathematics and physics inside them, that is presented by quaternion`s algebra theory, who decides affectivity, aesthetics, movement and complex dynamics systems, through rules and principles from code computing emerged by numeric-topological expression behind the creative process in the project, as a computational intelligence become highly associative and intertwined with affective design. One of other important application that involving an affective computing require attention to the following issue in how can be recognized/expressed/developed the best visual system.

Consider the image bellow that is generates affectives states which include social rules of interaction developed by studies on creative process. Let`s look at a frozen images of a Metaverse where we can interact with the virtual environment called: Mutable Architectures and Caracolomobilis.

Figure 01: Mutable Architectures

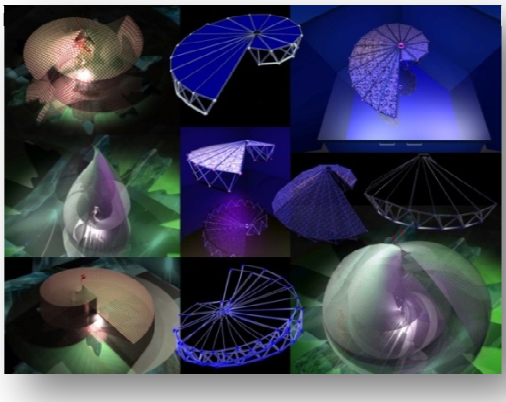


Figure 02: Caracolomobile and Nanoshelters

The Caracolomobile's structure is composed by a set of varied pyramids that unfolds forming a logarithmic curve.

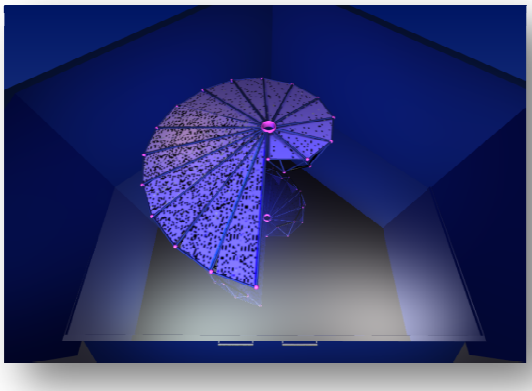


Figure 03: Caracolomobile: simulation of the open shape, view from above

Metaverse as Dynamical Repertoires

Meanwhile, as I described in this paper, the cognitive expectation is important in these virtual constructions planning because the dynamical effects will be designed by imagetic perceptual analyses. The study from Piccard (1997) focused on affective computing through signal

representations in virtual environments was an important contribution to the applied cognitive science. An effort towards the development of characters and scenarios for metaverse that I will demonstrate ahead, morphologies allowing moving parts of buildings to change elements of their physical structures themselves have not begun to be addressed yet. The hypothesis we work with is that it is possible to use mathematical morphologies for generating affective and aesthetical forms and procedures for the design of dynamic and flexible assembled spatial 3D structures as parts of responsive symbiotic artworks in metaverse. A dynamical modular repertoire of procedures includes:

- The study of possible new materials to replace mechanical devices in built spatial 3D structures;
- And the search for patterns for growth, extension, development and expansion of such structures.

Such repertoire will be of greater help to systematize the huge amount of possibilities emerged after many years looking for mathematical morphologies that would be appropriate to build dynamical physical and virtual structures.

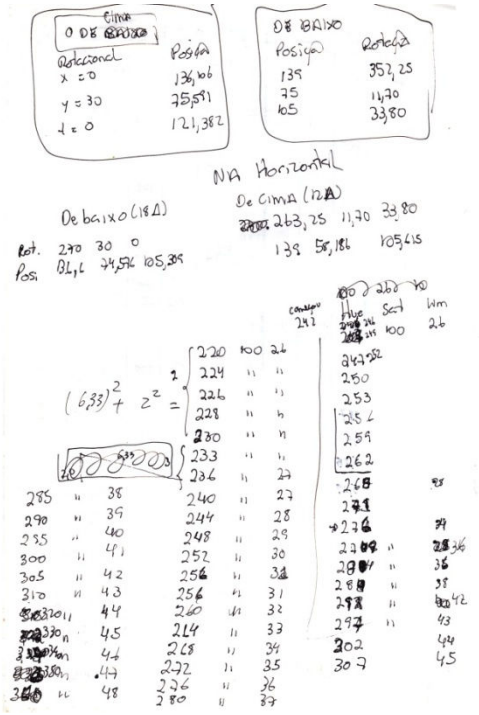
Patterns for growth may be based on the proliferation of similar modules creating 3D lattices by packing polyhedron (Williams, 1979) in similar ways to crystals and also looking for similar structures at the natural world around us. To develop repertoires based on the latter it is necessary to look for:

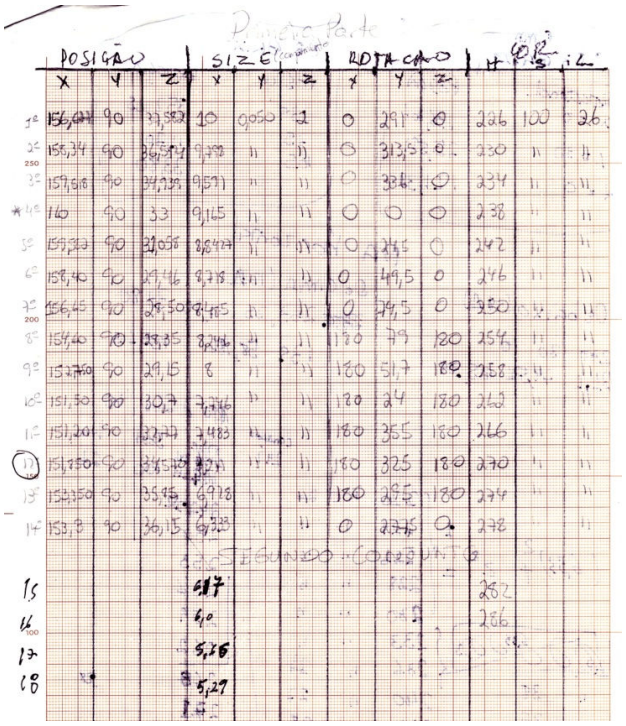
- Sets developed by repeating variations of basic configurations which will create articulated shells and cocoons;
- Geometrical configurations which allow movement provoked by minimum forces;
- Ways to use gravity as part of the process of moving things for energy savings;
- The creation of systems based on the repetition of slightly varied objects forming logarithmic configurations usually known as spirals.

For dynamic growing spatial 3D structures to be used as parts of architectural spaces it is very important to study patterns for their extension in the three dimensions of space. The structure final shape may be more opened or closed, sparsely or densely spiraled. It will characterize the development of the automation procedures used in the construction of the structure's constitutive elements. The problem of structural extension is related to the common mathematical problem, so prevailing in building engineers practice, connected with the increase of the surface as the square and the volume as the cube of their linear dimensions. This behavior becomes a very big physical problem for builders since they have to deal with another powerful force: the gravity. This problem increases when movement is added to the structure itself. Therefore, the larger the structures the bigger are the tensions the sections of structural elements are subjected to. As Galileo stated more than 400 years ago, for an ant to become the size of an elephant it would also need to lose its morphological characteristics becoming heavier and bulkier. The same problem has hunted architects and engineers for ages and has defined all the technologies developed until today.

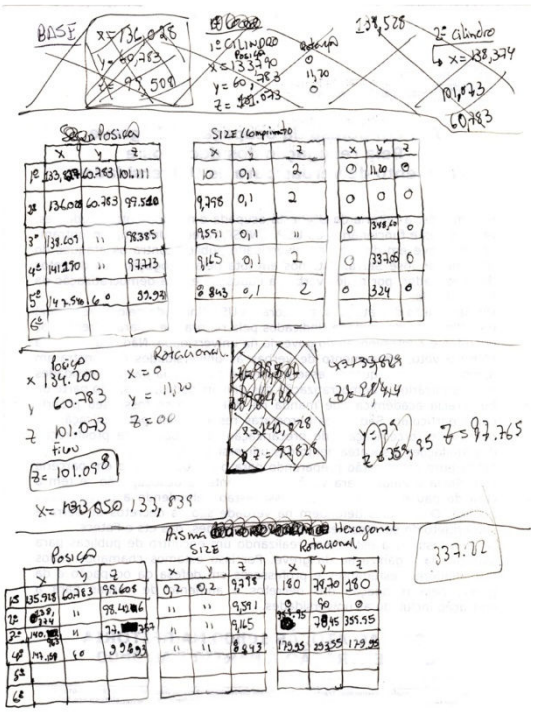
Other kinds of patterns that need to be developed are patterns for the development and expansion of the structure. These types of pattern will determine how the structures change their 3D spatial configurations in time. The combination of such families of patterns will define the final shape of the structure and will provide the procedures to automate the production of the kinetic systems that will move the elements. It is important to notice that a growing structure, being irregular in relation to its mass, will tend to look for physical equilibrium. Such situation conveys that the structure center of mass is des-located in relation to its geometrical center, a fact that needs to be addressed since the beginning of the design process, so it will not become vulnerability and a huge problem.

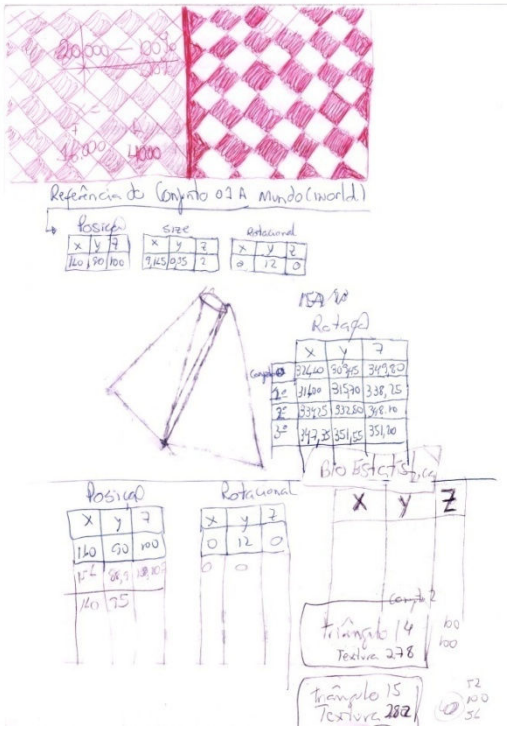
The use of such cognitive reasoning is the base of the Mutable Architectures and Caracolomobile artwork. This computer interface is a surface created aiming to instigate participation. It integrates the participants' actions with real time computer processing. The movements of both surfaces use the same sinusoidal equation. For instance, 'Caracolomobile' and Mutable Architectures, go further into these concepts by adding up affective interfaces to control some processes happening inside the metaverse. The follows images will demonstrate the embodiment calculus reasoning in creative process before to implement computer programming to the metaverse.



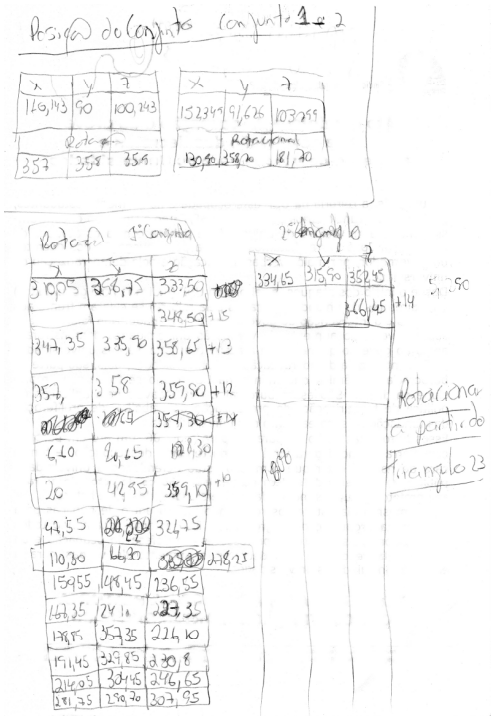


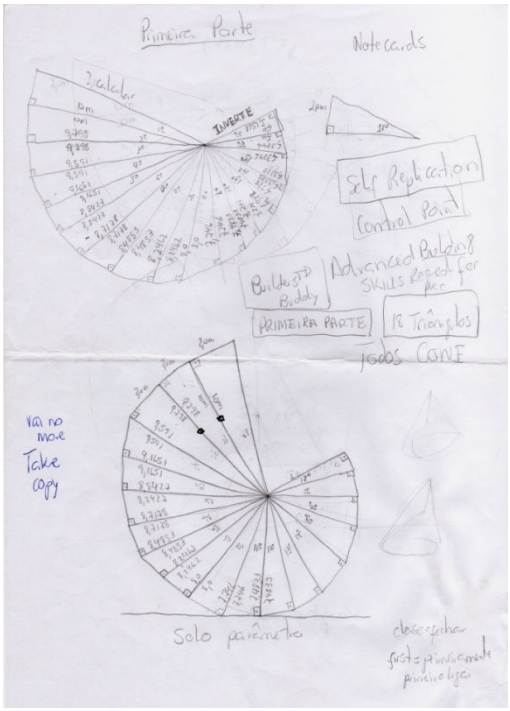
Every scenario and characters which has affective's inherent attributes and physical properties, determined by the generator, and is sometimes called internal influences. In the other hand, the external influences are those to which the system being simulated is subjected. In this way those influences can be phenomenon like wind, gravity or collision on objects which the behavior of the affective system reaches due to its current attributes. The calculus open minds and bring together cognitive effects through emotion and behaviors behind 3D animated images, who describes interactive frames.





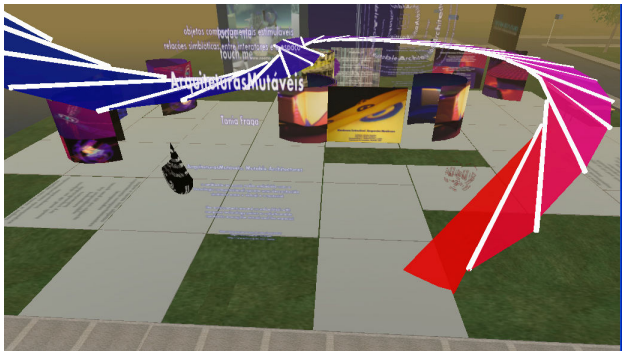
These images, also, show the hidden mathematics in the human creative process, different calculus line for angles and movements that will implement the computational codes to constructing up the immersive virtual world.





Conclusion

The emotion's simulation in virtual environments can be fairly simple or extremely complex. It is the behavior of real-world items that we are trying to duplicate in the controlled environment of computer by artificial intelligence through affective aesthetic computing.



Finally, in general, a virtual world's maximum event rate is fixed by the allocated processing capacity, but in our real world, the fixed maximum that comes to mind is the speed of light. That there is an absolute maximum speed could reflect a maximum information processing rate, and in the digital processing, if a world is virtual, everything in it must be digitalized. Plank's discovery that light is quantized could then generalize not only to charge, spin and matter, but also to space-time.

This paper should inspire and inform in a way that leads to reflect on work in the virtual environment and, above it all, it shall allow reminding of how it feels to be someone who can change lives through the power of affective computing and its digital morphology. As Louro, D. (2007) wrote "To research affective and aesthetic computing effects in immersive virtual worlds and its digital morphologies construction for dynamic spatial 3D structures it is necessary to explore applied cognitive science and all related fields such as visual mathematics, imagetic perceptual analyze, artificial intelligence, algorithms for growing structural shapes, for using random and automated processes, and for developing kinetic systems to provide the movements of their physical parts.

Attempts to clarify what affective computing or aesthetic computing means in the applied cognitive science should start by the acknowledgment of the term's meaning, as the interactivity of this term can cause a successful interaction in the virtual immersive environments, transforming the passive receiver of information into the active participant and collaborator in virtual worlds.

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Williams, R. (1979). The geometrical foundation of natural structure, New York: Dover.

MKAC, MUSEUM KARURA ART CENTRE PROJECT

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The MKAC helps artists to show their art works to the entire world through the virtual world of Second Life.

Figure 1: Logo of the MKAC.

Introduction

The Museum Karura Art Centre (MKAC) was born in 17th September 2008 with the ambitious pretension to promote art in Second Life.

According this premise, all the MKAC activities will pursue the following targets: a) To expand knowledge about real and virtual artists and their works b) To present less known works of universal artists c) To reveal and spread through the virtual world the creations of real painters usually hidden for most of the public.

To achieve these targets, the MKAC board has defined clear guidelines. Concerning the first of the targets the Museum Karura Art Centre will provide its facilities to Second Life and real world artists with no cost, in an altruistic and unselfish way.

To achieve the second target MKAC will exhibit its painting collections by means of temporary or long term exhibitions putting special emphasis on the less known works of the greatest artists.

Ending on what concerns the guidelines, Museum Karura Art Centre aspires to facilitate less known artists, real or virtual, the exhibition of their works and to become a field of sensitive and emotional communication.

Although Museum Karura Art Centre opens its doors as a painting gallery, its board assumes that art covers a wide range of techniques and approaches. Therefore its facilities will host all kind of artistic expressions, covering both visual arts (painting, sculpture, photographs...) and the so-called "minor arts" (fashion, ceramics, jewellery…)

In order to care of its independence and freedom for management, and also to ensure independence and freedom for artists who will show their work in the Museum Karura Art Centre, MKAC will not receive funds from any association, group or lobby. The costs derived from its management will be supported by the board and by donations of individuals, visitors and artists.

In their line to respect and to fulfill the legality effective, all the works and exhibitions shown in the Karura Museum Art Centre, will respect the intellectual property of creative and artists.

With this purpose, the Direction of the MKAC will obtain always by writing the conformity of the artist, heirs or Foundations for the use of images and the one of the artists who exposes in their facilities.

Finally, since its main purpose is to promote culture, art and artists, the Museum is ready to collaborate with any interested group or person, as long as their purposes agree with those of the Museum Karura Art Centre, (MKAC).

Premises

The Karura Museum Art Centre's project is born after making an analysis of museums and galleries of Second Life and perceiving:

1) The absence of activities and events related to their exhibitions, nor on the professional trajectory of the artists

or some of their works to spread the art, works and creators;

2) The absence of study and analysis of the History of the Art, and its implication in the evolution or the human being and our actual culture

3) The absence of pedagogy and didactics and its corresponding programming and methodology.

In order to resolve these deficiencies, the MKAC was created, in which not only is showed the art through individual exhibitions, collective ones and from the bottom of the museum, (generalist and thematic), but that also are made activities with the purpose of their study and analysis through the programming of diverse activities.

Methodology

This one adjusts, in time and space, to the elaborated programming and insists on the spreading and study of the art and the artists through:

1) Activities, publicity using diverse channels as Internet, Virtual Worlds and Biological World mass media, and the feedback of the different exhibitions;

2) The time of permanence of each exhibition (between one or two months), which has allowed to make in these nine months 17 exhibitions, and

3) The feedback between the exhibitions for which these are inaugurated gradually on time.

Guideline

AIMS

a) To expand knowledge about real and virtual artists and their works

b) To present less known works of universal artists

c) To reveal and spread through the virtual world the creations of real painters usually hidden for most of the public

SORT OF EXHIBITIONS

a) Long term exhibitions: painting collections of the MKAC.

b) Thematic exhibitions: works of artists and painting collections of the MKAC.

c) Temporary exhibitions: works of artists and painting collections of the MKAC.

Owing to the definition of MNKAC as an Art Centre, the contents of thematic and temporary exhibitions will cover all kind of artistic and cultural expressions (painting, ceramics, sculpture, jewellery, photography...). Permanent exhibitions will be of painting.

LOANING MKAC FACILITIES

Criteria and procedures for the loan of MKAC facilities will be the following ones:

a) Artists and creators can sell their works during its exhibition time.
b) The full amount of a sale will be for the artist or creator.
c) MKAC board will lend to artists and creators the Museum facilities with no cost for them. Also, will publish and advertise the exhibitions for free.
d) At the end of an exhibition, artists should pick up the works exhibited. If they don't after three days since closure, works will be given back to their inventories.
e) The right to decide about convenience or inconvenience of loaning MKAC facilities to artists and creators is only attributed to its board.

ACTIVITIES IN THE "ALEGRET ROOM"

The "Alegret Room", (Assembly Hall), will host events and activities directed to the diffusion of art and culture: debates, lectures, presentations, promotion of SIMS whose purposes agree with those of the Museum Karura Art Centre, etc.

FINANCING OF MKAC

Because business and profit are not aims of the Museum Karura Art Centre, its board only aspires to get resources through:
a) Donations of artists.
b) Donations of visitors.
c) Sale of pictures of the MKAC painting collections
d) Sale of "souvenirs" in the official store of the MKAC.

MKAC AS A CENTER FOR ART AND CULTURE

Agreeing its pretension to promote art in Second Life, the board of the Museum Karura Art Centre assumes that all posters and signs to be set in the exhibition rooms and land around contain inside short notices about the objects on show.

The Building

Figure 2: MKAC's main building.

The 17th of September of 2008, after months of preparation, analysis and decision-making, the Karura

Museum Art Centre, (MKAC), reality becomes. The building, constructed by Francisco Holgado, fills for its reunited work inauguration of art in a exhibition that, under the generic name of "Un Paseo por el Arte", shows the evolution of the painting from the rock art to the new vanguards of century XX.

At the beginning of year 2009, the Annexed Room is created, builded by the same constructor, to be able to take care of the demand and the interest of the artists to expose in the Karura Museum Art Centre.

The 30th of march 2009, a new installation is inaugurated, also constructed by Francisco Holgado: the AULARIUM with the purpose of dedicating it to didactic activities and new exhibition halls.

The Bottom of the Museum

The Karura Museum Art Centre, (MKAC), has an artistic bottom that it has been elaborated through the compilation of images of pictures that conform the collection of the museum and that is shown to the public in a periodic form.

This collection is made up of more than 2,000 images with its corresponding list of credits in appear the data of each work, (title, author, year, technique, dimensions, artistic style, century and location)..

Exhibits

MUSEUM'S BOTTOM

Due to the cultural, intellectual, pedagogical and didactic character of the exhibitions that are made in the Karura Museum Art Centre, (MKAC), they are not limited to be a simple exhibition of pictures but that on them are made different activities fitting itself from a previous and general programming who includes a presentation of the exhibition and the artist, social gatherings and to char them, analysis on one or several of exposed works, guided visits, etc.

All the exhibitions are accompanied by informative texts on the author, the artistic style to which belong each work, the historical and social time in which the work was created and in which the artist lived and engineering dates of each one of works.

The exhibitions made with the bottom of the MKAC until this date are the following ones:

- *Un Paseo por el Arte* (Inaugural exhibition of the Museum Karura Art Centre –Septembre 17th, 2009)
- *60º Aniversario de la Declaración de los derechos Humanos* (pictures – Desembre 10th, 2008)
- *De los Campos de Algodón al Despacho Oval* (photography–January 5th, 2009)
- *Chicas Pin up* (photography – February 5th, 2009)
- *Nosotras También Existimos*, International Women's Day 2009 commemoration (pictures – March 8th, 2009)
- *Zodiac* (pictures – March, 2009)

ARTISTS

Figure 3: promotional poster of the exhibition *Blanco, negro y color* by Xavier Magalhaes.

Following the educative and formative line of the Karura Museum Art Centre, all the exhibitions made by different artists in their facilities go accompanied of the same activities, posters and informative texts.

Above, the made ones from the inauguration of the museum to date:

- *Halloven RL /SL* by Raimon Cazalet, (photography - Octobre 27th, 2008)
- *Arte Fractal* by Morrygan May, (pictures – Novembre 24th, 2008)
- *WOMAN* by Aleixandre Biedermann, (photography – Desembre 3th, 2008)
- *Provocation* by Punkia Sáenz, (pictures – February 7th, 2009)
- *Comic Girl* by Noke Yuitza, (sculture and pictures – February 9th, 2009)
- *Cai Denimore´s Art* by Cai Denimore, (sculture – February 12th, 2009)
- *Arte Abstracto* by Marion Murni, (pictures –February 28th, 2009)
- *Zhora Manard: Fly and Feel* by Zhora Mayland, (sculture – April 11th, 2009)
- *Xavier Magalhaes: Blanco, negro y color* by Xavier Magalhaes, (pictures –April 12th, 2009)
- *Gleman Jun: Artist Italian* by Gleman Jun, (pictures – May 5th, 2009)
- I*mágenes* by Naky Neox, (pictures – May 18th, 2009)

Collaborations

Besides to sponsor events that other people, groups or organizations make in Second Life, the Karura Museum Art Centre has collaborated with them in the cession of its facilities, in the exhibition in other cultural and artistic

centers of its artistic bottom or in the temporary artwork cession.

As examples we emphasize the following exhibitions:

- *Arte y Esclavitud de la A a la Z*, Bottom of the Museum Karura Art Centre, (pictures –March 10th, 2009)
- *Erotic*, Bottom of the Museum (photography – March 23th, 2009)
- *Tierra*, collective exhibition and of the Bottom of the Museum Karura Art Centre, (pictures – March 30th, 2009)

Other Events

CONFERENCES AND CONCERTS

- Inaugural conference *Museo y Centros de Arte*, gaven by WM Schumann, (Septembre 17th, 2008)
- Conference *60º Aniversario de la Declaración de los Derechos Humanos*, by Alba Drevnerussky, (Desembre 10th, 2008)
- Conference *Amnistía Internacional* by BlueSusan Susanowa, (December 15th, 2008)
- Amnesty International Concert, (December 19th, 2008)
- Inaugural Concert of the AULARIUM (March 30th, 2009)

COMMEMORATIVE FLATTERIES

- San Valentín: *Cupido* of Max Klinger and *El Color de tu Alma* poem by Juan Ramón Jiménez.
- Celebration *10.000 visits to the Museo Karura Art Centre*: *La visita amistosa* by William Merrit Chase
- Celebration *International Museum Day*

a) *En el Museo del Louvre*, by Edgar Degas.

b) *Museos del Mundo* - emission of videos of the museums of El Padro, Louvre, Británico, Hermitage and MOMA.

Incidence of the MKAC in SL

Initiative to create Museum Karura Art Centre, (MKAC), whose fundamental objective is the one of the diffusion of the art and artists, has had a good welcome that is reflected in the 14,857 visits that have been made, since it was inaugurated the 17th of September of 2008, by people whose profiles go from simple the peculiar one to professors, deans and directors of universities, directors of organizations banking, responsible for Social y Cultural Obra of their respective organizations.

Conclusions

To hardly the nine months of the creation of the MKAC, the influence of this one in the world of the SL's art has been let feel by the number of visits that have received their facilities, estimated in 14.284 people in total until June 2009, by the request of artists who wants to expose in the MKAC and the petitions of other groups and people who look for its collaboration.

At the level of internal management and programming of the Museum, this one has been fulfilled first stage, (analysis of the Art and its History in virtual means), and, at the present time, we are in development of the second and third phase: entailment between SL and the physical world through the exhibitions of non virtual artists and the collaboration with groups and associations with fiscal and legal organization.

WEBSITE, PHOTO AND VIDEO MATERIAL:

AUDIOVISUALS

Inaugurations:

http://es.youtube.com/watch?v=X0XxUJpUv3g

http://www.youtube.com/watch?v=qXc-Y7FsMt0

http://es.youtube.com/watch?v=Ly0KPPOcHV4&featre=channel

Human Rights:

http://es.youtube.com/watch?v=i65qyG2JLfQ&feature=channel_page

http://es.youtube.com/watch?v=WUwXxwbI5NU&feature=related

http://es.youtube.com/watch?v=6ilGcNQp5OI&feature=related

Xavier Magalhaes Exhibit:

http://www.youtube.com/watch?v=z35ePnCoSEU

http://www.vimeo.com/4751861

Gleman Jun Exhibit:

http://www.youtube.com/watch?v=O7fF3wKkoGQ

Naky Neox Exhibit:

http://ocuil.es/Naky.html

PHOTOGRAPHY

MKAC's Flickr:

http://www.flickr.com/photos/museo_karura/

WEBSITE

http://www.mundosl.com/phpbb/viewforum.php?f=37&sid=8a8728cadc1ef0da3990de6e7efa639a

http://foros.secondspain.es/component/option,com_joomlaboard/Itemid,100/func,showcat/catid,27/

Digital Guqin Museum from a Virtual World to the Real World : Conception and design of an ongoing cultural sim

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Abstract

The Digital Guqin Museum [1] is built in Secondlife, an immersive platform. Through an avatar, we could zoom in any detail, making the guqin instrument and its culture accessible to any visitor.

The social network group "Guqin" on facebook, one of the largest and more erudite global live discussion group online introduces the Guqin and its culture as follows.

> "The guqin (古琴) is one of the oldest musical instruments still in use, and embodies China's indigenous classical tradition. With a vast and ancient repertoire, a staggering array of interpretive techniques, centuries of theory from the technical to the metaphysical, and intimate relations with China's other arts (poetry, painting, calligraphy, qigong...), the guqin constitutes one of the world's richest and most challenging musical heritages.
>
> ...yet, for precisely these reasons, it has never been a "popular" instrument, and remains little-understood even in China. Many of us qin lovers lie scattered over the earth, finding instruction and companionship hard of access. All the more welcome, therefore, to this hub of international friendship and exchange! Come and join our discussions with qin players and ethnomusicologists all over the globe as we delve into topics less talked about!
>
> 『爲我一揮手，如聽萬壑松』 李白
> "One flex of the hand sounds the myriad pines of the valley." - Li Bai
>
> 『半個《平沙》走天下』 劉少椿
> "Half of 'Wild Geese' will take you around the world." - Liu Shaochun"

How useful is it for professional Chinese music people and the general public, to have a venue for enjoyment of the Guqin culture [2] - the recognized number first place holder for Chinese culture [3] even though many Chinese people have never seen a guqin and confuse the guqin often with the guzheng – a much more common popular instrument. Is the traditional guqin music genre - an elegant and quiet music – a good match for deployment in a virtual world? Would musicians want to play live to an international audience, via mixed reality and to participate in the recreation of an online "*yaji*" – elegant gatherings ? [4] If yes, which groups of Guqin players would and which group would not? [5]

The Digital Guqin Museum in Secondlife enables meetings possible only in a virtual world. Real life people could meet in virtual places, visit cities, venues as an end in itself.

DGM has been shown to professional guqin players, in informal settings [6] and at a specialists conference [7], results engendered the afore-mentioned questions.

Introduction

Prehistory of Digital Guqin Museum picture logbook [8] 0708 is here:

http://www.flickr.com/photos/69077492@N00/sets/72157619515725129/show/

Selections of detail pictures are reproduced at the end of the paper.

The Digital Guqin Museum is a cultural venue designed for pleasure and meaning with functional elegance as focus.

Why are some cultural SIMs more popular and others quite quiet? What are the make up of a successful, frequently visited SIM for a theme based cultural venue? And what happens after we achieved a successful SIM, does the venue

[1] Slurl site location Digital Guqin Museum: http://slurl.com/secondlife/Daiyu%20Island/201/37/4065/?title=Digital%20Guqin%20Museum&msg=come%20and%20play%2C%20try%20the%20Digital%20Guqin%20%21; picture of the Venue: http://swannbb.blogspot.com/2009/07/g8-moonlit-hotel.html

[2] Facebook international group "Guqin", introduction of Guqin and its culture, there are 248 members, all qin players, composed of scholars and qin players, discussion in English.

[3] *qin* (琴 qin), *qi* (棋 qi), *shu* (書 calligraphy) and *hua* (畫 painting). http://en.wikipedia.org/wiki/Four_Arts_of_the_Chinese_Scholar

[4] Guqin master player : John Thompson, sl : Toadall Xuanzang

[5] Other groups are more hermetic not opened to the public for example Japanese groups, and some Hong Kong based groups.

[6] John Thompson's private home museum WeeHawkens NJ

[7] "Intercultural International Conference on Guqin, Aesthetics and Humanism, 『古琴、音樂美學與人文精神』」跨領域、跨文化」國際學術研討會", TaiChung, Taiwan. DGM live demo and tour; url:http://swannbb.blogspot.com/2009/03/taiwan-guqin-conference-programme-2009.html; http://163.17.8.18/ge/files/20090418095955.pdf

[8] For convenience of certain geography regions; the DGM picture 0708 book is here also: http://blog.sina.com.cn/swannjie

stay in the Virtual World or we could hope to export some parts of the builds from the Virtual World?

I investigated a selection of SIMs of playful interests as follows: Chinese themes: Kowloon [9]; ChinaBoat [10]; quiet esthetic life style on tea cultures with Asian settings [11] and non-Asian settings [12] ; and live music venue [13], formal [14] and informal [15] stage sets ; in order to evaluate the multi-facet issues of "social play", "esthetic enjoyment", "building and sharing a narrative", and crossing over experiences to/from real life to immersive online playing.

Background :

Origins of The Digital Guqin Instrument and The Digital Guqin Museum:

In 2000, I had begun a research on the Preservation, Promotion and Development of the Guqin at City University of Hong Kong, with funding from the University at School of Creative Media. During that period, I have recorded many master players performance and understood the guqin milieu at various *YaJi* (Elegant gatherings) from many parts of China, including Hong Kong, Taiwan, and Paris [16]. The present work is a continuation of the research begun from the Digital Video filming, Recording work to the creation of interactive 2D Digital Guqin graphics to music works [17], to the current 3D version for an immersive experience of the Digital Guqin [18].

I had the idea to create a meeting place for interested people who might know or not know anything about the guqin, like a culture club in the Virtual World, because I am interested in building architectural spaces, for both historically reconstructed and contemporary structures for specific virtual world programming to recreate an authentic environment which promotes the expression of the quiet elegance of an intimate voice of the guqin music [19]. Secondlife is able to provide tools for graphics, spatial construction, texturing, online chat; in short, a creativity oriented platform without preset narratives – unlike other MMORPG - which suits my purpose.

Purpose :

To preserve, promote and develop Guqin and Guqin culture by building a nodal gathering point beginning in a virtual world and eventually exporting a part of the virtual to the real world [20]. In the virtual world, everyone could deploy their graphics, construction, speech, story construction, social behavior capacities and play together as one giant size creation (on going 24/7 sl stage) both through passive viewing by simply being inside the immersion experience and actively by creating personal constructions, exchanging visions, collaborative team work, cross disciplinary teaching and learning and, for fun and play in building an ongoing dream. (Dream here means multiple ever-improving scenarios approaching a personal and/or collective vision, including parallel visions, like simultaneous multiple plays with various actors)

Details of methods:

First design and conception :

[9] Katati shop in Kowloon SIM, with graffiti from graffiti king as wall paper. http://swannbb.blogspot.com/2009/05/kowloon-sim-real-kowloon-graffitti-king.html

[10] China Boat "sunken", disappeared ; http://swannbb.blogspot.com/2009/07/asian-style-teahouse-at-yelas-china.html; http://swannbb.blogspot.com/search?q=china+boat

[11] Asian theme pampering tea house atYelas; http://swannbb.blogspot.com/2009/07/asian-style-teahouse-at-yelas-china.html

[12] Tea and Treychnine stylized nature beauty qin playing space; Asian theme tea houses : tea, Chinese chess, Chinese furniture for qin playing: http://swannbb.blogspot.com/2009/07/dgm-yaji-venue.html

[13] An example of live music event at a café: With Café (high quality sim, closed) http://swannbb.blogspot.com/2009/03/with-closing-farewell-party-venice.html

[14] formal stage; http://3.bp.blogspot.com/_e-OWu9iW-Nw/Sc3Lm3uUoMI/AAAAAAAABBM/JaQ4d-uVkkE/s1600-h/live+music+venue+Circes+Circle+Radio.JPG

[15] Informal live music with DJ line up, using street as venue, Circe's Circle Radio: coffee shop piano bar, chapel, etc stage with DJ line up, using street as venue, Circe's Circle Radio: http://swannbb.blogspot.com/2009/07/dgm-yaji-venue.html

[16] List of master guqin player video documentaries 2000-present: http://swannbb.blogspot.com/2009/07/guqin-master-players-video_12.html

[17] Pale Ink, Zebrafish, Museum and the Web: http://www.archimuse.com/mw2006/bios/au_395015835.html; http://www.archimuse.com/mw2006/abstracts/prg_310000681.html

[18] DGM at Daiyu island, http://swannbb.blogspot.com/2009/04/real-life-event-and-sl-presentation-of.html

[19] Guqin gatherings are traditionally small numbered in intimate settings, in gardens, in libraries; not in large auditoriums as the common current norm. See: VanGulik "Lore of the Chinese zither". Elements of yaji are open to discussion and involve many design issues : ie wearing Hanfu (traditional Han Dynasty costumes); are these for showmanship purpose, or role-playing props (cosplay?) What is important? The recreation of ancient configurations or music comes first, we wear white shirt and pants – be sober - and that's fine? What about not-sober colorful fun clothing? Etc.

[20] The DGM design principle has always been focused on the linking of sl to rl worlds as this is the target. The author is not interested in pure role playing as an end in itself, the sl platform is used as a special branch of rl guqin promotion. A lot of the attributes of sl use are uniquely possible in sl. The following initiatives are small steps in exporting sl to rl. Swannjie Postal Service 2007, Swannjie Postal Gift Service 2007-8, Mixed reality events 2008, and MobileMusic HuaHui House constructed by sl+rl people using rl postal service 2009.

Venues: Guqin Music gatherings in the virtual world and in real life.

I have visited a real life Guqin Art Museum at Changshu in summer of 2008 – proclaimed Heritage of Humanity Town of Guqin by Unesco [21] . It is a "Guqin Art Museum" housed in an original Ming Dynasty wood construction, very well preserved with objects depicting guqin culture, setting of Guqin playing, and a mock up of a guqin instrument making workshop. The venue had an ambiance of a quiet bookish elegance. There were not many visitors, and the program was one of passive viewing. When I planned the virtual world museum, I not only complement the rl museum, I deploy the virtual world platform for functions specific to online gatherings using the advantages of the immersive virtual world. The purpose is to bring the content to more people and not "replace the rl guqin culture" as some guqin people feared. If we could augment, complement the passive viewing to actively learning and playing the music with available existing means, why not? I have interviewed the director of the Museum in 2008 – Mr.JU Xi [22], and made a video recording of our discussion. The director is an accomplished player of the guqin himself.

Materials :

Real life architectural builds photos pertaining to guqin historical references; guqin culture references; guqin instrument design, textual and graphical archival documents, music recordings, animation, scripting experts, textile, fashion of Chinese ceremonial wear, everyday wear, graphic design from various periods with accompanying settings.

Procedures and milestones :

Building of a first model of digital guqin instrument "HunDun" [23] in secondlife 2007, invitation to Arts Birthday event in Tokyo sl+rl 2008 [24], Linden Lab Campus Land grant to Swann Jie for representing CNAMenass for Digital Guqin Museum Project 2008 [25] , collaboration and presentation at Universities in sl+rl [26] ; invitation to perform at a concert for a Chinese culture festival as musician player 2008 [27], land donation to Digital Guqin Museum Project by private party WangXiang Tuxing 2008 [28], invitation to mixed reality event broadcast in real life 2008, Rennes, France [29], invitation to present the avatar at Grand Palais, Paris, France, art event : Avatar Parade 2008 [30]; invitation to a real life conference with master guqin scholar players April 2009, Taichung, Taiwan [31]; invitation to present the Digital Guqin Museum at CHIME nov09, Brussels, Belgium.[32]

Equipments used :

Computer specification as per current sl requirements. Projector, screen, broadband connection, microphone. Photoshop, graphic pen palette, sound software, hard disks, camera, video camera.

Findings :

Guqin as an intrument without any pre-briefing is already a beautiful instrument soliciting viewers inquiry. The music has been admired by all listeners. Therefore, further development is definitely worthy because the instrument is full of life by itself.

On Youtube, we see often many self-uploading of various parallel experiments, electric guqins, new guqins designs with pickups, electric dulcimers in the form of a guqin, using electric guitars to reproduce guqin sounds, so on so forth. [33]

From the internet, through wikipedia, and social networks such as Facebook [34], I see Guqin player groups has steadily

[21] Unesco page: http://www.unesco.org/culture/ich/index.php?lg=FR&RL=20

[22] *Changshu Qin* art museum : "*GuYinZhengZhong* 古音正宗-虞山派古琴艺术馆", editor JU Xi, publ. Shanghai *WenHua ChuBanShe*, 2007.

[23] Sl+rl Qin designs; http://swannbb.blogspot.com/2009/07/sl-hundun-rl-half-hundun.html

[24] Arts Birthday in 2008, http://www.artsbirthday.net/2008/; http://swannbb.blogspot.com/2009/07/arts-birthday-2008.html

[25] Linden campus CNAMenass; http://swannbb.blogspot.com/2009/03/my-real-life-home-enass.html

[26] University of Southern Mississippi performance at talkhttp://swannbb.blogspot.com/2008/03/poster-comic-book-style-test-1.html

[27] Owl Bay first concert pic: http://swannbb.blogspot.com/2008/09/strange-dream-bird-shit.html

[28] WangXiang Tuxing blog page: http://wangxiang.wordpress.com/2008/11/15/second-life-un-mur-de-graffitis/

[29] mixed reality blog page: http://swannbb.blogspot.com/2008/11/clap-clip-transmusicale-2008-and-moon.html

[30] Grand Palais blog page : http://swannbb.blogspot.com/2008/12/medieval-horses.html

[31] Taichung conf blog page: http://swannbb.blogspot.com/2009/03/taiwan-guqin-conference-programme-2009.html

[32] CHIME 09: http://swannbb.blogspot.com/2009/06/digital-guqin-museum-presents-at-chime.html

[33] foldable guqin-electric-dulcimer, custom made instrument: http://www.youtube.com/watch?v=OZJQNYLdFuY

electric "Chinese slide-guitar" (guqin); http://www.youtube.com/watch?v=vh8tCtY0Wgk&feature=PlayList&p=A530486319948249&index=1

[34] Facebook, groups of Guqin music and culture, new+old: http://swannbb.blogspot.com/2009/07/vulgar-ideas.html

increased globally, including many non-Chinese groups since my first investigation of this subject in 2000. [35]

Many famous qin models are only exhibited for very brief periods of time per year due to the fragile nature of the object, if we reproduce a "manipulable" double in the Virtual World, more people would be able to see it and enjoy it for what its worth. [36]

Discussion :

How do we enjoy an sl SIM passively and actively? I visited a Kowloon SIM which used all real life documents to recreate the Kowloon Walled City structure and infill with creative elements from avatars using the theme of Kowloon Gate Video game [37]. The game itself is based on Kowloon Walled City. As I know the real life Kowloon City very well, I find it meaningful to pose a Chinese object at the SIM, a package of Pu-erh tea – a standard Cantonese drink for Kowlooners such as you would find in any tea house large or small, buvette stands and restaurants. I proposed to put a Pu-erh tea box at the Kowloon SIM as a cultural and active link to the Chinese DGM culture, however, it was refused by Magnum the manager of Kowloon SIM. He/she explained that, their Kowloon SIM has nothing to do with the real life Kowloon, because their world and pleasure is based on the Kowloon Gate video game [38]. They live another esthetic pleasure which is not related to real life Kowloon City culture. Their world starts with Kowloon Gate, a Japanese video game, and not the real life Kowloon. As the tea box shows real tea and not sl tea – even though it gives out sl tea with a further possibility of tiny bricks of real life tea delivery via postal service making a link from sl to rl- "it is imperfect as object" for the Kowloon sim. Magnum has limited the use of the Kowloon SIM as a uniquely Kowloon Gate video game vision. [39]

This opens an interesting subject because everything in the Kowloon SIM from food to shop to apartment to street names, to urban façades are all based on photographic realities of the real life Kowloon City culture [40]. I rather think isn't a creation that much more rich and vibrant if it is capable of being interpreted and enjoyed at more than one level? Could Star Trek in sl exist without the original Star Trek show? [41] On the otherhand, how many real life resident of real Kowloon would enter the Kowloon sim and find it enjoyable to stay for long periods of time? (not that many real life people would need to enter sl to enjoy their own culture, but we cannot assume that they have no real life use for sl. For example, a German group imported their own home so they could enjoy a mini real home in sl too and share this online with faraway friends. And the entire city of Berlin is being recreated in another virtual world.) [42]

In my present Digital Guqin Museum context, even though the sl platform could present a "parallel virtual world" for very interesting uses [43], from the conference in April09 in Taiwan, most real life Master guqin player's reactions range from aggressive rejection to curious to wanting to see more, but they all want to see a practical application and not to "play" or "socialize" at the present point. I have contacted younger players via Facebook, and they are more receptive to the idea. In general, this group is already computer literate and are using online social networking for their everyday activities. They are more interested in lighter playful aspects of the culture, experimenting with new guqin composition and sounds [44] (post production reverberation textured,), but also costumes, outings, summer school, group gatherings. Their elegant gatherings seem to resemble a larger club like activities. [45]

A fundamental issue is, what are components of the "guqin culture" that real life guqin player feel partial to? Even though Guqin people are rather small in number, there are many different groups. ("pai" = School) [46] "Pai"s of guqin establishes styles of play and whats "guqin culture" and whats "non guqin culture". [47] There has been much discussion on the new Guqin schools in real life, that people only learn to play and have little accompanying guqin

[35] Spanish group web site: http://guqin.mybesthost.com/en/index.cgi/QinShosoin

[36] The Shosoin Qin, Nara, Japan : http://swannbb.blogspot.com/2009/06/locked-up-qin-at-shosoin.html

[37] Kowloon café zero displaying the original document sources and book by Japanese explorer of Kowloon Walled City. See illustration

[38] Kowloon Gate Sony video game, released in Japan 1997

[39] Kowloon SIM born from Kowloon Gate which was born from Kowloon walled city . http://swannbb.blogspot.com/2009/05/kowloon-gate-video-game-and-real.html

[40] Kowloon walled City video report by RTHK. http://www.youtube.com/watch?v=v5hk5oxj5uM

[41] Tilly Ayer talked about passing difficult Star Trek like exam at the role playing academy

[42] Berlin reproduced in Virtual World Twinity. http://news.bbc.co.uk/2/hi/programmes/click_online/7754038.stm

[43] John Thompson's evaluation of Digital Guqin Museum in VW ; http://swannbb.blogspot.com/2009/07/john-thompsons-on-dgm.html

[44] new guqin groups ie: "Vulgar Ideas" (as opposed to *YaYue* = elegant music) "An experimental collective of guqin 古琴 musicians devoted to making our instrument louder, harder, faster, and generally sicker." (facebook group headed by Stephan C Walker) http://swannbb.blogspot.com/2009/07/vulgar-ideas.html

[45] Guqin players in Han costumes at a *Yaji* in Toronto, June 2009. an open event of the Guqin group on Facebook: http://swannbb.blogspot.com/2009/07/guqin-and-hanfu-revival-costume.html

[46] current discussion on "pai" (schools) in Facebook, Guqin group; and formal classifications: http://en.wikipedia.org/wiki/Qin_schools

[47] an example of transmission of guqin: Tsai DeYun's "school", by Bell Yung http://swannbb.blogspot.com/2009/06/locked-up-qin-at-shosoin.html

culture as witnessed in the new Private Guqin studios [48]. We are in year 2009, how many people have time to learn to play the guqin intrument and to study guqin culture as described in the old literati tradition? How many teachers are qualified to teach both subjects? Should we expect some adjustments to be true to our time instead of falling into "role play" in real life?

There are multiple voices on this question, many Guqin groups, no matter from which "school" or style the players have learnt from, all proclaim their interpretation of the existing philosophy as the authentic one, and are upholding the true essence of the Guqin. [49]

In creating a Digital Guqin Museum in sl, targeting exportation of specific elements of the virtual model into real life, I am proposing to make this long heritage from 3000 years ago open to a larger population's enjoyment, currently the group of people who use online services.

I began with an example of a Guqin Museum Club, it's a first interpretation and I will leave some of the delicate question of policing "authenticity of enjoyment" to the viewers and players themselves in order to make way for a richer output and continuation? Because there will always be a group of people who are naturally attracted to verification of authenticity and others are more in tune with creating at an intuitive, sensual level. Without a large base of people working simultaneously on the subject, we would have a harder time to refine and develop, inject vitality into any art, music of any cultural form.

Conclusion :

For the Digital Guqin Museum to be on target and to successfully carry out its original mission, being authentic to the original mandate [50], we need to fulfill three or more conditions:

1/ We need to find existing guqin and guqin culture groups and introduce them to the virtual world possibilities to build a real life player group.

2/ We need to introduce the guqin and guqin culture to existing sl avatar groups so they might be able to develop a corpus of activities and narratives from the social activities starting from the sl environment. Eventually, some members of this group will export into real life to learn the real life instrument.

3/ Through events, we might (as we have already succeeded from being invited to two professional international musician/musicologist conferences [51]) link up the real life group with the virtual world group. Though it may not be in any great numbers compared to other cultural sims, such as Star Trek, but, judging solely from the strength of the beauty of the Guqin instrument and the quality of the music, from the reactions of sl avatars, we have and we will gather a group to expand and carry on this culture in a significantly larger, grander scale than the existing small group. And definitely will have more reach than the single one on one teacher-student real world method. (The one on one method is very good but limited access for both teacher and student.)

4/ While number 1 to 3 is being carried out, it would be fruitful to develop design objects, builds, costumes [52], stories, videos, texts related to Guqin themes – all the paraphernalia [53] of a guqin culture and related activities to increase interest and profile for a sl+rl life style. From sl to rl, these activities are excellent opportunity for teaching and learning aesthetics, design, interactivity, scripting, animation, video editing, machinima, interdisciplinary creations through formal structured coursework or informal "play" oriented research-creations.

5/ Internet connection must be up to grade and speed for an virtual world to run and the virtual world platform itself has to be stable for clients to invest in it. As of now, it's reliable for some uses – for example for non-urgent fun oriented deployments. But for real time teaching lessons, the requirement of stability needs to be higher than the present.

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[48] Wang, Yao Zhu 王耀珠 "琴舘时代 Era of Private *Qin* Institutions" presented at Taiwan conference 25Apr09. http://swannbb.blogspot.com/2009/03/taiwan-guqin-conference-programme-2009.html

[49] Discussion of "pai" (school) in facebook amongst the guqin players. This issue comes up very often and never ends with any conclusion.

[50] Mandate: 1: to show the Guqin Art and Culture to another group of people, an international computer literate online people. 2: to historically recreate tableaux of guqin elegant gatherings in a controlled environment, and create tableaux of other styles and settings as virtual model, as theatre. 3: sharing of fun and design creativity, collaborative amusement and self perfectionnement. The sharing part is especially good aspect of sl, at its best it enables a light, non material, spiritual existence.

[51] Taichung, Taiwan, April09, and chime nov09 urls: http://swannbb.blogspot.com/2009/03/taiwan-guqin-conference-programme-2009.html; http://swannbb.blogspot.com/2009/06/digital-guqin-museum-presents-at-chime.html

[52] Discussion and use of "Han" costumes. Pic of guqin players wearing these clothing. Gong Yi says even if you paid him millions he would never wear such clothing, as its just silliness does not correspond to the present contemporary age. Wearing such clothing is akin to theatre. Though I must say, in the SL environment, cosplay is part of some peoples joy of being in a Virtual World. And we say, I think its Vladimir Jankelevitch, that it is because you conduct yourself as musician that you become musician. So, if we have such a good setting given through sl, why not? And I do believe we don't become musician over night, wearing a costume if it helps to focus on becoming musician, what harm could there be? As long as you don't think you are musician just because you are wearing the "Han" robe. Here the costume aspect is like "prop" for entering the scenario. What matters is the quality of the presentation, does the costume look convincing on the person in context?

[53] Paraphrenalia include: tea ceremony, incense burning, nature setting, costume, hair piece, dialogue, and music play; including other standard accompaniment instruments such as flute, clay flute (Xun) and ruan.

Visitors of the Digital Guqin Museum, avatars interested in the instrument, and mixed reality events [54]

Musician Wildo Hoffman electro acoustic specialist in rl

Dalian Hansen author of first novel published with sl as setting visited DGM

First Mobile Music exporting from sl to rl: Huahuimagiccube Mobile Music House

Previous to the HuaHui House project, there was an experimental postal service project : a real life postcard sent from sl to rl. This experiment was to see how many people you meet in sl are actually interested in receiving a post card from Paris sent via a real life postal service. I sold around 30 postcards. People in sl generally wish to enjoy their sl life and not have to be bothered with rl realities. They enjoy the idea of receiving a card but prefer to keep things separate and simple, just one less problem to worry about.

Visitor Sushimetal testing Huahui house

Huahui cubes arrived via postal service from sl and rl:

Aquito, Estella, WXT, Break out Breakers, WangXiang Tuxing

http://huahuimagiccubehouse.blogspot.com/2009/06/new-version-slim-and-trim.html

Poster publicity offered : Cyber Aquarium, Tukiyo C of Moonlit Hotel in sl, Within Ten Years

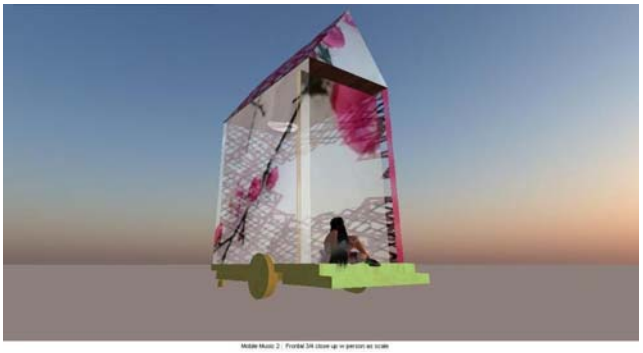
[54] Mixed Reality; http://swannbb.blogspot.com/2008/12/3rd-dec-2008-talk-demo-at-sl-rl.html

Digital Guqin Museum as a social gathering club

1 Cover of Digital Guqin Museum VW/RW Logbook 2007-2008

2 Small mobile guqin playing venue – buildable in rl : in weather proof fire proof cardboard. Here shown under a tree with a Freisian Mare with petting animation, at DGM site. One of the famous historic guqin player was a great horseman. A ridable black horse was gifted by Leni Galli.

3 Virtual model for real life construction in cardboard



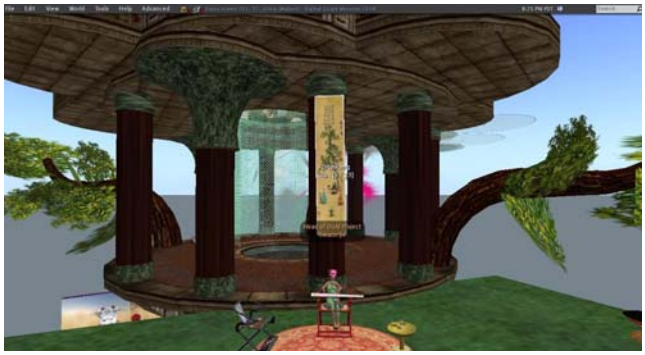
4 Small mobile guqin playing venue ready to travel behind any medium car – dimensions conform to highway travel norms. Light weight tent on frame structure w human scale.

5 Mobile Digital Guqin Museum (airship gifted by Hanako Hammerer (Japanese): DGM Airship on Linden Campus, for CNAMenass. Site of collaborative learning – creation of Oracle consultation service between CNAMenass Swannjie (France: design and conception, content) and University of Southern Mississippi (USA, Prof Sturtevants class: scripting. CNAMenass was client to service provider, the experience provided a real client/service interchange for a class of computer science students. Oracle book based on the original Wong Dai Sin book from the temple of the same name located in Hong Kong.

6 Mobile Digital Guqin Museum visiting the burning China boat.

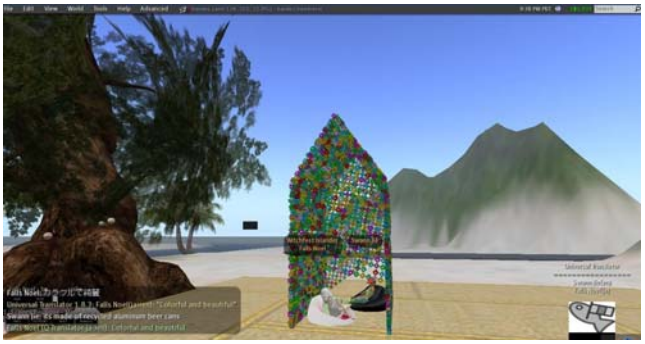
The Boat has the interior of Ancient Chinese architecture, it was burning for an unknown period of time. When interviewed Aston Leisen the creator said, he doesn't know why its burning and for how long and it will probably just slowly sink and disappear.

7 There were high quality posters, furnitures from the 70s, the period cultural revolution era. This corresponds with a current Mao chic in real life. Creator Aston Leisen has selected typical objects from the era, the propaganda poster, the style of simple sparse furniture, nostalgic pretty woman playing the pipa, a canvas school bag. Later, we see now at this exact location, a new China SIM. The burning boat disappeared from sl.



8 Digital Guqin Museum 2009. *Yaji* elegant gathering venue interior design using purchase base of an existing tree stone castle used as template and entirely reconstructed in wood construction with corresponding period Chinese architectural details, and contemporary interior fill.

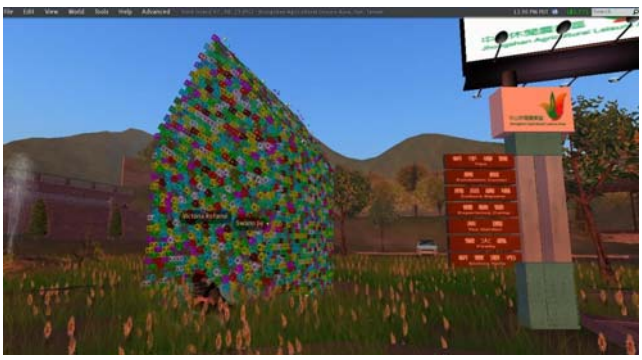
9 Swannjie with a Tea culture vw/rw - testing of an eBusiness model. If visitors wished, they could order the tea shown to be sent to them in rl with DGM label. A previous attempt for rl postcards: Swannjie Postal Service has been made in 2007. On the lower table are: xfactor Artificial intelligence cybertwin chat cube: cybertwin Swannjiejie, Suiseiki stone social chat cube: cybertwin WangXiang. Horse in the back, there was a story of playing qin to a cow ; meaning useless however here you could play to an intelligent pet horse: a cybertwin who gives you echos of Guqin music and culture info.



10 Digital Guqin Museum : MobileMusic HuaHui House. 3200 prims; each cube contains a color changing script and gives a gift. In sl VW, the house comes in 2 versions: multicolored, or silver. In real life, the House also exists in color or silver. Guests were invited to test the ambiance of the house in VW.

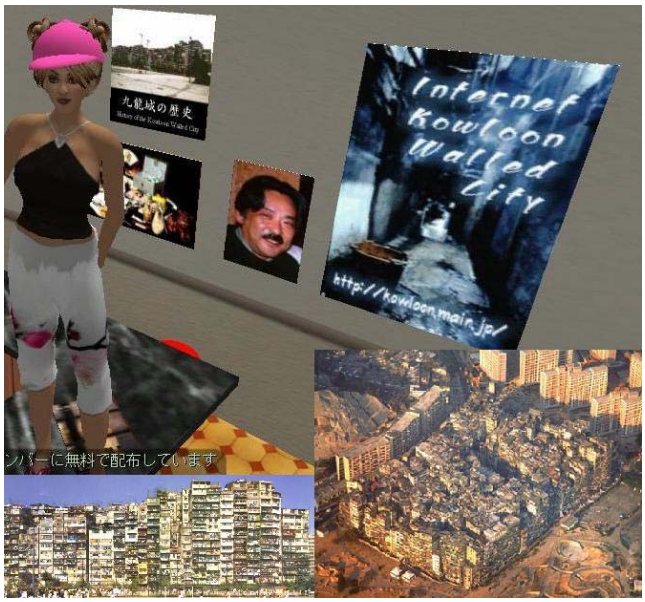
The first prototype being built is silver with high lights in color. Cubes are invited from around the world. Details + contributors: http://huahuimagiccubehouse.blogspot.com/2009/04/list-of-cubes.html; in rl the HHH could be transported from place to place on the highway. Each cube could be assigned to a 2D barcode to link to a web page for details associated with the gift given by the cube. Sometimes, the material gift itself maybe stored directly in the cube itself if the HH house is to be a permanent structure as a physical location of an item – for example if the gift was say a tiny coffee mug, teddy bear, beaker with a plant, notepad with a tiny pencil and other mysterious symbolic items so on so forth.

11 Digital Guqin Museum : HuaHui cubes in real life.



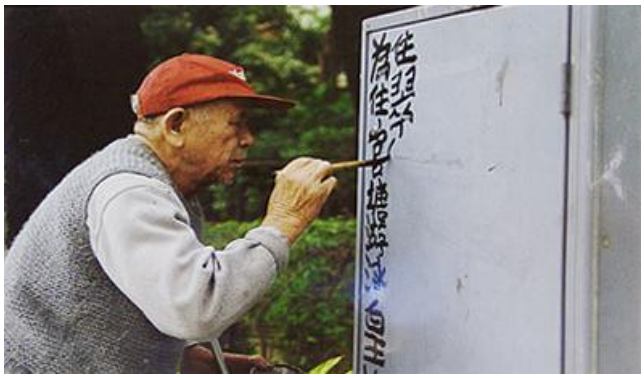
12 Digital Guqin Museum HuaHuiHouse in Ilan Taiwan

Chinese culture deployment in the virtual world as used by Kowloon SIM



13 Kowloon SIM based on references of real documentation of the book Kowloon Walled city by 鈴木隆行氏 Kowloon Explorer team captain

14 Katiti's shop at the Kowloon SIM inspired by Kowloon Emperor's Graffitti, an art brut artist of Hong Kong.



15 TSANG Tsou Choi 曾灶財 "Emperor of Kowloon" Graffitti emperor, http://en.wikipedia.org/wiki/Tsang_Tsou_Choi

16 Kowloon real estate office. These spaces corresponds to a real sl volume sometimes with only 9 prims.

17 Swannjie puts her tea here to try the mobile street vending experience at a typical left over space as found street corner.

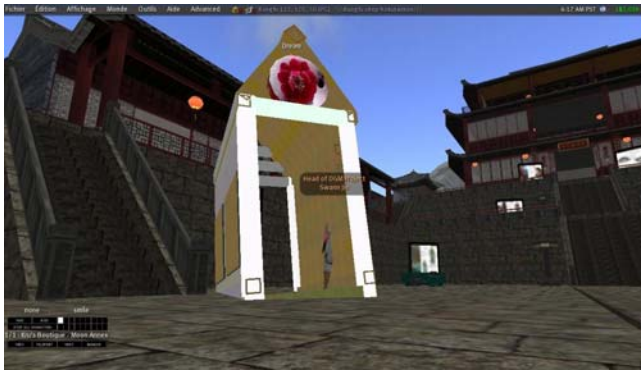
18 Eating porkbun in a Chinese apartment the green and white wall is typical coloration in Kowloon homes in the 60s

19 Computer mall sign seen through the window and a typical popular culture poster on the backwall of this café. *Fu* = plenitude

Popular Tea and leisure culture deployment in the virtual world and in real life as a social rite as standard accompaniment for a guqin event; used by Asian and non-Asian themed tea rooms, exterior spaces

20 Tea & Strychnine http://swannbb.blogspot.com/2009/07/tea-and-strychnine.html

21 Mobile Music House staying a days on a stretch of empty great wall of China



22 Kungfu shop for mystical experiences of guqin music as presented by recent cult kungfu films. The creator said his kungfu fortress sim has no real life model only from kungfu films he saw. His sources would include: inventive hybrid guqin+guzheng instruments, Kungfu hustle, Crouching Tiger Hidden Dragon, Warring States, Erotic desires burns the Qin, and many others because in popular culture the Guqin is mystical.

23 Unusual place: China West SIM, sand, wind, dirt, hardship, tough man land. Owner cctv Back creates Chinese military tough wear. Chance upon a good creator, according to the book of qin, when you are with a friend, it is also a good moment and place to play.

Pleasant ambiance for guqin playing in non-Asian and non-tea room venues

24 Oyster bar.

Pleasant ambiance for guqin playing in Virtual World venues

25 In fairy land

26 Player on a rose (sculptie bed purchased)

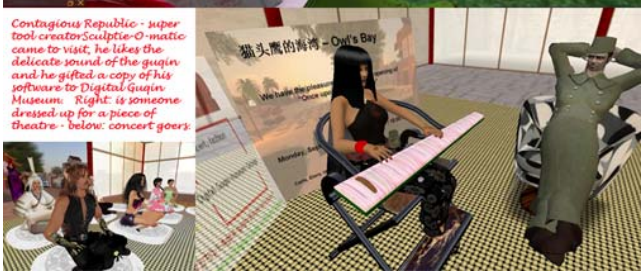
Digital Guqin Museum story logbook 2007 2008

1 Swannjie at Tereboro Izakaya, Hannabi Festival, TV Tokyo shooting session

30July07 Firework Festival

3

Contagious Republic - super tool creator Sculptie-O-matic came to visit, he likes the delicate sound of the guqin and he gifted a copy of his software to Digital Guqin Museum. Right: is someone dressed up for a piece of theatre - below: concert goers.



2

Revisiting the new Isakaya Bar

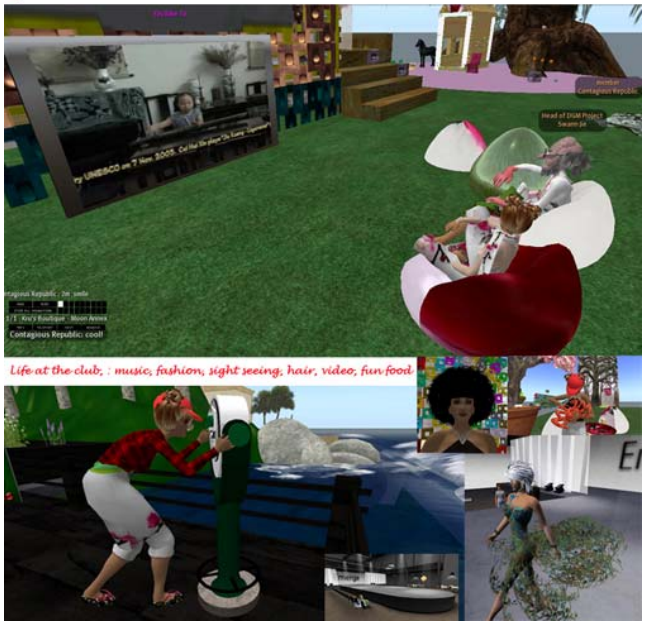
Here I return after one and a half year, with the guqin. I place it on top of the koto to compare the size, and style.

Below is Owl Bay Island, at Chinese culture festival. Swannjie was invited to give a guqin concert. The guests came in Chinese costumes, and they asked a lot of questions. A lot of them tried the guqin and took pictures. Some asked to buy the instrument. Very cool audience. The Chinese building was removed after the festival. Sept 2008

4

MAO HuiSheng happy guqin player! He played JiuKuang very well 2003, he should be a big boy now! YouTube at DGM club house. A popular gathering place - some yg friends came to watch their own little videos, I like that I hope it becomes their secret little club. Mobile Music 3 a little house to carry guqin music and culture around the world, 2009

5



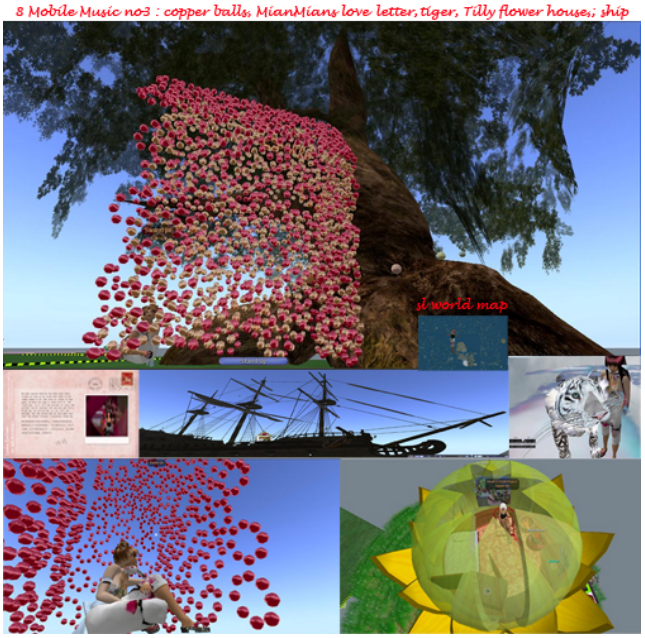
Life at the club, : music, fashion, sight seeing, hair, video, fun food

7 Digital Gugin Museum site, glass house, Kowloon apt, U2concert,Saitot winner !

6

At Grand Palais, avatar parade Swannyie played the gugin live, and video projected onto a large wall Dec2008. Below, Tim Hortens coffee place.North American land scape. Shuri castle, Okinawa

8 Mobile Music no3 : copper balls, MianMians love letter, tiger, Tilly flower house,; ship



9 Mobile Music on the road, RMB city, China, Shuri Castle, Okinawa, Liberta France,

10 MobileMusic HuaHui no 1, rl aluminum cube skin, sl object giving magic cubes.

End

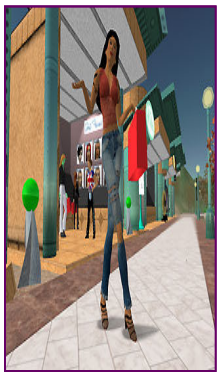
E-business and e-commerce applications

The University of Manchester
Manchester Business School

MANCHESTER 1824

Exploring Customer perceptions of e-service quality in Collaborative Virtual Environments (CVEs): the case of emotionally expressive avatars

Eman Tawfik Gadalla, MIBS Division



Introduction:

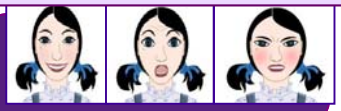
•Collaborative Virtual Environments (CVEs) are distributed 3D virtual reality systems with multi-user access. Each inhabitant is represented by a humanoid embodiment, an avatar (Fabri,2006).

•"Users find interfaces with avatars more entertaining, enjoyable and likeable". Buyer purchase intentions are influenced by the experience of positive emotions while shopping online (Redmond 2002).

•The current study will investigate whether the use of emotionally expressive avatars can serve as a tool to aid inter-personal communication and enhance customer perceptions of e-service quality in CVEs.

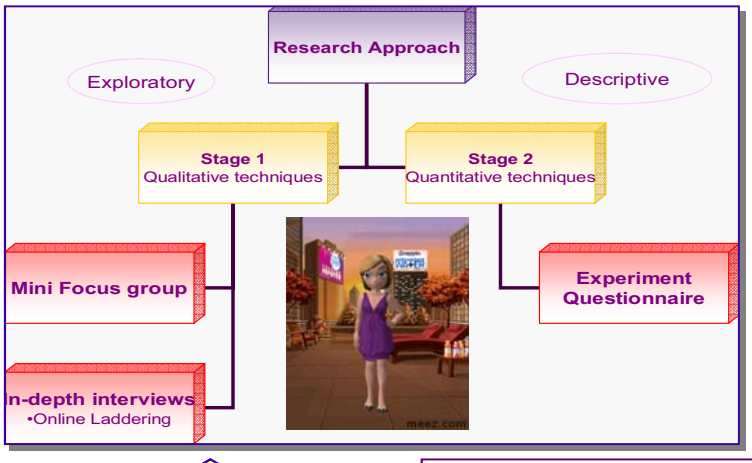
Avatars as salespersons:

Avatars provide visitors with a likeable and enjoyable shopping process in a manner similar to human sales agents (Redmond 2002).



Two main objectives:

1.To identify the 3D e-service quality dimensions.
2.To derive a model of the effects of emotionally expressive avatars on perceptions of e-service quality in collaborative virtual environments.



Research Design:

•The first phase of research will start by conducting focus groups and then followed by in depth interviews using online laddering technique. Then, collected data will be used in the second phase to design both the experiment as well as the questionnaire to collect quantifiable responses.

•The experiment will investigate the effect of emotionally expressive avatars through the participants' exposure to different versions of an e-commerce website each containing an avatar with different emotional interaction features followed by an online questionnaire.

Limitations:

Access to e-tail customers in Virtual worlds

Data analysis:

Nvivo, The SPSS package, Structural Equation Modelling software, such as AMOS or LISREL will be used.

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A phenomenographic study about the future of the electronic commerce in the Second Life

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This work approaches the current status of electronic commerce in the Second Life ® virtual world and the problem of lack of clear knowledge about the future evolution58 of this medium for the development of electronic commerce.

It presents a phenomenographic research effort that contributed for the clarification of the potential and possible directions, based on a series of interviews to residents with a thorough knowledge of this virtual world.

The process of data collection, the testing procedures and the reached results are described.

To conclude, a reflection is presented on the potential contributions of this research for the understanding of electronic commerce phenomenon in the Second Life and one short generalization to other virtual platforms.

Keywords: e-commerce, electronic commerce, virtual environments, three-dimensional environments, virtual worlds, Second Life, phenomenography.

Introduction

The Second Life (SL) is a particular case of three-dimensional virtual world that has proved a particular strength in e-commerce initiatives. Their appearance was in 2003 and since then many companies have invested in a virtual presence, installing shops and offices on-line.

These presences have significant costs associated. A presence through the acquirement or lease of a virtual "ground", and the building of a host of public spaces and, sometimes, programming automatic interactions or interconnections to systems management. Buy or rent land in SL means buy space on server, a similar situation to that found in hosting a website and production of components and automatic printing of this site. If the land is purchased (not rented), in addition to the cost of acquiring space in the server is required to pay a monthly fee for maintenance call tier. The rent gives rights to use plots of private land (usually with the appearance of "island"), making regular payments to the owner of the land. This is responsible for payment tier general of the land to Linden, benefiting from effects of scale. Many users have taken advantage of this possibility of trading in virtual land, area of virtual real estate business which has seen its profits to increase.

Companies like Dell and IBM, also mark presence in this digital world. The bank Espirito Santo was the first Portuguese bank that joined SL in August 2007, to disseminate their values and with strong prospects to create products SL. A number of shops are already installed in Second Life, each targeted to sales of such "real", ie, with applicability outside of this virtual world (eg, customization of product and subsequent order of the "real") and others for sale of 'virtual', ie applicable only within the Second Life (eg, hair and clothing for avatars). An example of the case are Adidas, which is on sale in his shop in SL, avatars tennis to make jump higher, as an example of the first case we have Reebok, which in his shop in SL offers the possibility of customization tennis and then obtain the "real" (with physical existence) result.

The SL is an environment focusing on socialization among people with great interactivity and the objectives of the companies, to engage in a virtual presence in SL, can be more varied. Many companies try to cope with this new technology without changing too much of their business models and invest often without knowing the return that could have.

It is necessary to understand how companies can join this virtual world as a new form of contact with customers, suppliers and partners, but including it in models of business in which it operates. The community of users of SL, deeply knowledgeable of the environment, can provide solutions, new ideas and lead to the creation of innovative businesses.

The project presented here had the objective to identify how the current players, in this community and / or

processes related to electronic commerce in virtual three dimensional environments, understand and see the activities of electronic commerce that are currently active in Second Life. We also wanted, even from those players, discover new paths, opportunities and business opportunities to facilitate the entry of business and strategic planning in the use of this medium.

Methodology

We have chosen to follow a phenomenography research of methodology. The phenomenography is the empirical study of the different ways in which people experience, perceive, learn, understand or conceptualize various phenomenon or aspects of the world around them (Marton & Fai, 1999).

The choice of phenomenography method is concerned primarily with the failure to know from what we expected. The phenomenography is precisely a scientific process of "discovery" in the sense that the set of categories or meanings from the analysis can´t be known in advance, but emerge from the data on which the researcher is related (Hasselgren & Beach, 1997, sec. Åkerlind, 2002). It is divided into five sections: hermeneutics, discursive, experimental, naturalistic and phenomenological. These elements can differ in the data collection, either of practice or even to analyze the results.

The choice of phenomenography strands to use this kind of research derived from it. Aims to draw how the players understand this three-dimensional environment and see that the activities of electronic commerce and the future potential of these environments, we chose to focus on a naturalistic and phenomenological aspects, as described below.

The naturalistic aspect is characterized by focus on gathering empirical data for phenomenographic analysis of authentic situations. This is not to extract data in an organized specifically for the phenomenographic analysis (situation of experimental phenomenography). The aim is rather to collect data from particular situations which usually makes the researcher, an observer without direct involvement.

The strand phenomenological seeks descriptions of the thoughts of people about what really is happening. Initially the studies that gave life to phenomenography only gave importance to the study itself and forget the environment, but only between 1980 and 1990 were given more emphasis to this phenomenological approach. Thus, this part seeks to emphasize the aspects of human behavior, the subject's world, their daily experiences, their social interactions and the meanings they give to these experiences and interactions (Biorn Hasselgren, consulted on 10/01/2008). The methodology it followed the next steps: selection of the sample, selection of tools to use, procedures to be adopted, data collection, analysis of collected data and conclusions.

Selection and Gathering of the data

This phenomenographic investigation took as a base the interviews method. The gathering of data had beginning with a process of initial selection of essentially knowing persons of this environment or residents in the same thing, with the objective to obtain references and generic opinions on the electronic commerce in a first phase. On basis of the obtained results in this phase there followed a specific process of personalities' selection of form to obtain a perspective more defined in the final phase.

The first stage of investigation, it consisted of the selection of the personalities to interview. it interested us persons who knew and were interacting daily with the SL, not necessarily connected with the electronic commerce. Were contemplated, initially:

- Specialists;
- Producers of content;
- Service provider;
- Traders;
- Clients;
- Mediatics people (of the society SL).

The fact of the SL was visited by 13 million users only a small part effectuates great commercial transactions1 what it means that many residents are only explorers and / or have a specific function in the SL as was quoted. The user residence time, as well as his function, they have a predominant weight in the choice of the interviewed one because we consider that are influence factors to acquisition of knowledge and of experience in-world.

As for the used tools we proceeded to an search of places with more affluence, more visited and / or with bigger commercial activity. We used some functionality available by the SL, as a form to do this type of search. The selection personalities' were done through a search in the Internet with several motors of search or about recommendation of already interviewed personalities.

It is possible to communicate in SL in various ways: by public text chat, voice (in public or in private),exchanging notecards and private instant messaging (IM). It was using these tools that interviews were scheduled and carried out. Usually, the request for formal interview took place over a brief IM, sending staff from a notecard, or according to the situation and / or opportunity, in an informal manner by textual chat (through any of these application, was always included a brief description of the project concerned and the players involved) beyond the request for interviews in-world itself. Later, depending the response obtained, and preferably by means of text chat (for a register to facilitate a future analysis), came to the interview itself.

Whenever it was not possible to conduct an interview in-world, it was given the option of choosing the interviewee on the way to perform. Generally, the option in

[1] http://secondlife.com/whatis/economy_stats.php

these cases fell by interviews closed by sending the questions via email. The first interviews were exploratory and open, informal and without a rigid structure, with the aim of collecting information and also gain experience in the conduct of the interviews and still allowing to achieve an initial design rich and comprehensive.

Analysis of the data

The analysis of data coincided with some principles presented by Åkerlind (2002) showed in an investigation where there are, among various studies based on phenomenography, guiding principles common. Thus, it identified that the analysis usually begins with a search for meaning or variation of meanings throughout the interview and are then transcribed and supplemented, not always in this first phase, by a search to a structural relationships among these meanings. In the early stages, reading over the transcripts have a higher opening on possible meanings. The following readings focus on the most private but maintaining the same framework of openness to new interpretations, as the final objective look at data from different perspectives in different moments of time. The whole process is essentially iterative and comparative. It involves looking at the data several times and apart from the continuous sorting of data and comparisons are made between them within each category and between categories themselves. The identification of categories of description can pass through the grouping and regrouping of the transcripts or quotations selected according to the perception of similarities and differences over various criteria. As are analyzed and reanalyzed the data and categories will be, given the time, a decrease in the rate of change and it reaches a stabilization of the system of meanings. Phenomenographic research results are presented as a hypothetical "space for results" obtained from the analysis and interpretations of the researcher based usually on data from interviews. This area of results called "description of categories" is analytically a limited number of qualitatively different ways of characterizing the phenomenon.

As has been said here, our analysis of data began by considering each interview as a data set where each sentence was considered a given. Each data was analyzed in order to try to identify a meaning and then assigned to a given category. The analysis is also iterative, ie, any of the steps was revised again, where warranted, a new cycle of analysis.

Given the results (perspective 1 to 11) and presented in the following point found that the interviewed generally looked at present, for what is the e-commerce today, as such, and to be able to get the reflections on what can be exactly the future of electronic commerce we consider a new range of questions to gather new prospects for addressing exactly this point the resulting perspectives 12 to 16. The new range of issues allowed us to distinguish the collection of data and data analysis in a new phase. This phase is also distinguished by our intention to seek the international perspective once that we already had a national perspective.

Results

They are then identified the different perspectives from the analysis of the content of the interviews (the citation presented are merely examples of the type shown in perspective, are not in any case the only source of their perspective):

Perspective 1: Most of the interviewed ones think that the SL is still a platform in development: it is a bigger necessary credit spread of same in the form to stimulate the enterprises to invest. The base of this perspective was obtained by bigger distinction from the interviews 1, 3, 4, 5, 6, 12, 13 and 15, though it is underlying in almost all the interviews.
Example:
" … it is still completely very green it is necessary time in order that someone manages to pass the message and for the platform, also link to ripen " (Nuno Chapman, Interviews 4)

Perspective 2: E-commerce in SL is made mainly by amateurs, there are few companies to work for this platform, something directly related to the human costs of disclosure. Interviews 1, 3, 4, 5 and 12 justify this.
Examples:
"... e-commerce in SL is 99.999% amateurs ... the problem is that companies are not giving the same level of involvement that an" amateur "who has time and is free ... for a company time is very expensive and very scarce "(Eggy Lippmann, Interview 1)

Perspective 3: The SL, as a platform for communication, allows a closer interaction with the client, direct contact. The information in this perspective was gathered from interviews 1, 3, 5, 6, 8, 15, 18, 19, 21, 23, 25 and 28 although it is behind the other.
Example:
"The SL allows for personal interaction, less intimidating (than a webcam) and more intimate than a conversation into text." (Eggy Lippmann, Interview 1)

Perspective 4: The companies, to invest in SL, should be based on who knows the platform, and develop a strategy to integrate it, either in communication or in offerings, adapting to the characteristics of the platform. The information for this view was obtained in interviews 1, 3, 4, 6, 11, 14, 16, 25 and 27.

Example:
"(...) The rapprochement between the two worlds can´t be the same as in the market for the RL. If the staff is here for companies to sell products only to leave soon. "(Winter Wardhani, Interview 3)

Perspective 5: Companies should strive to have products targeted at the Second Life in order to serve its residents. Interviews 2, 6, 9 and 18 support this assertion.
Example:
".. already have some business in SL for RL, but the truth is that the SL "requires" that the company has also come to a product metaverso ... "(Nyne Wolf, Interview 6)

Perspective 6: The services providers and publicity will still be in the next two years, large areas of activities of enterprises in general. This is seen in various interviews 5, 6, 7, 8, 9, 10, 13, 15 and 18.
Example:
"... The SL is publicity and forget everything else because the publicity only finish when there is no players." (ScorpionSoul Paine, Interview 9)

Perspective 7: The publicity should be supported by complementary activities in SL, to ensure loyalty and stay of visitors / customers. The information was gathered in this perspective interview 1, 3, 4, 8, 14 and 18.
Example:
"You can loyalty to the brand. Here the people do not want blatant advertising does not work. "(Winter Wardhani, Interview 3)

Perspective 8: The Companies with origin in SL and are successful will continue to be profitable, ever since that they have quality and affordable prices. The following quote illustrates perspective and this is perceptible, also, in interviews 4, 6, 7, 8, 10, 12, 14 and 17.
Example:
"... Only those who can pay month after month is that the costs will become ..." (Zuis Mertel, Interview 13)

Perspective 9: The Linden Lab is always a commercial basis and it will depend them the business investment in SL, particularly in monetary security and implementation of new technologies. Interviews 8, 10, 12, 14, 15, 17, 22, 26 and 29 show that.
Example:
"... A person can have their business in SL oriented to services or products in SL when Linden Lab facilitate the bureaucracies sales and purchases of currencies L$ within the platform in their countries." (Digo Hynes, Interview 8).

Perspective 10: The enterprises can bet on is expanding across borders, for now essentially in terms of publicity. This approach stands out in interviews 1, 5, 6, 16 and 18.
Example:
"Sl ... what really can you do with business, and closer and a larger number of countries, products that can only be purchased by going to a particular region or country." (Nyne Wolf, Interview 6)

Perspective 11: On the world of fashion products for the SL, the trend is to merge, or hiring more designers to work for one brand. The information for this view was based on interviews: 6, 8, 19 and 20.
Example:
"... Without plurality and competition we don´t have Improvements, the people don´t have motivation." (Mary Gerardhi, Interview 7)

Perspective 12: E-commerce in SL converges increasingly to customize the service and products to the customer. Support this view the interviews 19, 20, 22, 25, 27, 28 and 29.
Examples:
"... Possibility of the creator or distributor of the product / service have an immediate feedback to the public and even to actively participate." (Nyne Wof, Interview 22)

"... Together we can recreate the sensations of game design and colors that have impact and influence on the client an intention to purchase the same." (Galhardo Yalin, Interview 20)

Perspective 13: The electronic commerce in the SL depends on a good integration of the already existent technology, on the appearance of new technologies and on the development of new scripts for more dynamic contents. We find ideas in the convergent interviews 20, 21, 26, 27 and 29.
Examples:
"... The simple functionality of the avatars can, as the body move, mexerem hands ... I think there is still plenty of things that can be done, and that will undoubtedly contribute to the trade in SL (Annah Whitfield, Interview 21)

Perspective 14: The e-commerce addresses for the sale and publicity of real products in the SL. This approach was identified in the interviews 22, 25, 27 and 28.

Examples:
"I think we will see companies using 3D platforms in the future is showing and selling RL products." (Tue Torok, Interview 28)

Perspective 15: In Second Life the e-commerce is not viable based only on bots, they should be used as a support and never replace human presence. Almost all interviewed are unanimous in this view though those who put this

hypothesis only consider it for from here to a few good years.
Examples:
"I believe bots can be used up to a certain point, but they can never replace the real deal." (Tue Torok, Interview 28)

Perspective 16: A new form of electronic commerce can be considered, the SL itself. We find convergent ideas in the interviews 19, 20, 22, 24 and 27.
Examples:
"Oh yes theres new concepts arising all the time" (IntLibber BNT, Interview 26)

Conclusions

If on a side there are opinions that are very much likened , others exist completely antagonistic , on the other side. Of the gathering and analysis of the interviews effectuated in the first phase it was possible to determine that the great majority defends the publicity like half a propeller of any enterprise. from the 11 perspectives found about electronic commerce in the SL, from the first questionnaire, are not of impetuosity or idealism, not even of suppositions or visions of long term; are conservatives in general, since project like evolutions viable just the expansion and generalization of the already existent forms of electronic commerce – and, inside this, of what they are successful at this moment.

The results obtained in the second phase are more orientated for more futurist perspectives on the electronic commerce. From the analysis effectuated to the data of this phase we check what a great deal of the interviewed new ones share of the same perspectives that were identified in the first phase and when we looked in an international perspective at the vision it becomes more specialized, in the sense of they know and to substantiate with concrete examples, but with projections equally identic to the national ones.

Comparing the first phase with the second one we can say that the perspectives that appeared initially with a not much substantial base stood out in the second phase namely the opinion relatively to the involvement of the electronic commerce with the real products that gained more weight with the perspective 14.

Final reflections

The economy produced in the Second Life shows in many aspects the economy of the real world and in conversation with ours interviewed, we realize that we are before a platform that it causes interest any user. As there said Annah Whitfield, creator of contents connected with the fashion, in that of our interviews " I always thought that I would limit myself to creation, we are curious about what also they manage to do, and we ourselves spend immense money! ".

The active activities in the Second Life are moved big part by the curiosity but other factors weigh in the decision of assuming a presence in this virtual three-dimensional world. The existence with other persons in simultaneous, the share of ideas, the development and spread of collaborative projects take most of the residents to discover or to create the new forms of making this more and more attractive platform. The creativity is not lacking, the motivation is big but they can be stipulated by factors that here we presented in this work, namely, for the enterprise Linden Lab.

Despite everything the enterprises can find in the SL a platform that allows to them, for already, to carry out a study of market and use the existent resources to deepen the contact with the client, such as: to receive the client with comfort, to cause it returning to the place, causing the curiosity, proving the quality, between other things that can appear and that there obliges the enterprise to act in the efficient form and calculable. For that it is necessary that enterprise adapts to the demands of the world in-world, invest in his entry resorting to specialized present help in the world SL and maintain an active and human, publicizing presence and above all innovatory.

The SL is a new technology in virtual three-dimensional environment that can or not to be the new interface between clients, traders or collaborators but at least it is distinguished of other environments since is the only one that at present conjugates a diversity of functionality and where the electronic commerce is an integrant part.

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Consumers in virtual worlds: is there a tangible relation with brands?

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Abstract: Consumer activities are constantly changing. They've begun to move their interests to the virtual, looking at the internet as a new and interesting space to be. With easier access to information and communication technologies, the consumer requests from social networks space to exist and coexist. From the current social being emerges a new digital social being. The outcome of this research tries to seek how brands should re-strategize their marketing given consumers' fast changing multimedia habits. We believe brands should realize that they are no longer the "conversation" leaders. Consumers are now in the control of the propagation of messages. Thus brands need to put aside the holy branding and follow the information flux coming from the users' conversations taking place in virtual worlds. They can support this new approach making use of more engaging experiences of their products based in interactivity and simulation. Support of these new media must be seen as complementary to current use of traditional media. The study we present tried to understand the new media use done by brands and understand if the models were supportive enough for the new digital social audience. An analysis based on interactivity models of McMillan and Downes (2002) and Shedroff (1999) designed to find problems and make suggestions to support actions of enhancement of the relation brand-consumer.

Introduction

According to Reis (2007a) brands generate respect and are always seeking new ways of strengthening the relationship with consumers. Brands need then to prepare themselves for the new profile the new so-called 2.0 consumer, a person who devotes most of his free time surfing the web, creating virtual relationships and staying online. Thus having a consumer who spends part of his/her time in online social networks, seeking information / entertainment on the Internet, we believe brands should try to extend marketing strategies to this group. But how can they create an effective relationship? The question arises when we see current migration from real to virtual and when "[...] consumers pay more attention to the Internet than other media because of the interactive nature of this medium compared to television, radio, press and outdoor advertising. People spend more and more time online [...], even at the expense of the prime time television. "(Rita & Oliveira, 2006, p. 30)

These authors also indicate that individuals use the internet to develop five types of activities: entertainment, relationship with other individuals, seeking information, demand for multimedia and transactions. In this context, it appears that the attention of the individual seems to be fragmented between the real and the virtual world. As a result brands should adapt themselves to these new channels and take a step forward into the digital world.

The approach of brands to consumers is difficult when we realize that consumer's attention within this new media channels is highly selective. This is the all time fight, but we see that companies are in some way forced to take advantages of the "more efficient means of communication, able to more quickly achieve the objectives" (Scatolim, 2005, p. 2). In order to explain how consumer acts online we present current studies that present some suggestions and perspectives on the new trends of the Web (blogs, Twitter, forums, sharing and social networks). For example, France and Carvalho (2008) report that the change in consumption habits and profiles of individuals required from companies to seek "[...] in the alternative media solutions to escape the commonplace and clichés, especially when it is important to conquest the involvement of consumers "(France & Carvalho, 2008). We believe that "[...] the web 2.0 is the realization of the dream of any advertiser: the dream of reaching each one on is individuality by giving answers to their concerns and desires" (Jewelry & Gonçalves, 2007)

Advertising is the visible face of the objectives of any brand and injects in the minds of consumers a "sense of gratification and unconscious protection" (Freoa, 2006), or fit it into a process of reward for having acquired a brand.

However, some of them seem unaware that individuals are social beings who want to interact and participate. The digital consumer of today controls what he wants to see either in time or in space (multiple channels). They control the conversations with other online consumers, the information given by the RSS Feeds, they establish relations and provide environments within the virtual space. In this scenario, we understand that the era of direct transposition of the advertisement broadcast from traditional media (TV, Radio, Press, etc.) to the virtual environment, the hyperlinks, the animated stories and video online seems to lead to a new era of social media and social networks. Following this new paradigm must emerge new forms of communication that can take part of the digital flow without resistance.

The widespread of internet access, the 3d virtual worlds, the sharing and redistribution of information by bloggers and micro bloggers catapulted what was already taking place: relationship and conversation. Jones (2008) states that now "agencies need to be thinking about how to influence, inform and stimulate the conversations that are already taking place". Therefore brands need to re-establish the relationship with the new digital consumer.

Brands and consumers: seeking a new approach

With the development of information and communication technologies the interaction between consumer and brand has become much simpler and faster. Lately interactive advertising agencies are becoming the solution for brands being online. However, we recall that brands ability to relate interactively with the audience is not entirely new and recent. We believe that the internet medium in which audience are spending more time has certain characteristics who distinct it from traditional media (press, television, radio, outdoor, cinema, etc.). Throughout internet users can find varied information in a faster way than the traditional newspaper, find and buy products, preset preferences and communicate with one click. "Moreover marketers can potentially provide consumers with a more enjoyable experience by offering such services as information, entertainment […]" (Pavlou & Stewart, 2000).

Therefore, the natural interactive ability of the Internet medium provides brands to create a strategic relationship with their audience. Thus, according to Rosenkrans (2009) "Internet interactivity and its implications for the emerging electronic marketplace require greater understanding as well." The author conducted a study to evaluate and measure the effectiveness of a Rich Media[1] ad in comparison with static online ads. He found that the first gathered more users' membership than the latter. In this context, the study of how the user engages with the advertisement of a brand in the online environment has brought new opportunities for strategic brands. In view of the fact that the study of Rosenkrans is indicative of favorable factors in dynamic formats, such as generating memory in the minds of users rather against static formats, we'll see how relevant these factors are likely to help the relationship between brands and consumers.

An ad in the dynamic online environment has a predisposition to be able to help solve the problem of consumption and "increase customers' involvement and satisfaction, and promote trust through reciprocity in information exchange, technical assistance, information and reduction of Asymmetry" (Pavlou & Stewart , 2000). We perceive in this context that a brand that is capable of creating interaction with your audience must also create surroundings and above all make a call-to-action.

It is important at this stage, to understand consumer behavior in the Internet and combine interactive capabilities for a possible positive and effective relationship with the user. It is perhaps one factor that brands should take into account. Thus, understanding the reasons for which the user seeks information on the Internet, such as how to select and take advantage of them is central to understand the effects of the advertising communication of brands. Shelly & Thorson (2000) said "[...] structure alone cannot explain what drives individuals to enter cyberspace, and how they react to the physical features of Internet cyber ads once the journey has begun." One of the perspectives presented points out the use of online ads from users in order to pursue its objectives. So, Shelly & Thorson propose a model of analysis that combines structural and functional aspects of the Internet in an attempt to explain the reasons why users use the medium,

The availability and location of advertising in the Internet is still controlled by brands, however it is in the control of the flow of information that we see the reversal of roles. The consumer controls the flow of information and the type of messages distributed by the brands. They have the ability to control and select the desired content, distribute and communicate with other users (Rosenkrans, 2009). We notice that consumers are taking more pro-active actions on what they see and hear.

Users "surf" the Internet with a defined objective. Thus controlling all the steps to achieve this. So, Shelly & Thorson (ibid) round saying that "[...] users are in the driver's seat throughout the entire online experience - interacting with websites, ads, Advertisers, other consumers and so on [...]." The experience that users feel when being online is certainly started by them.

[1] Rich Media is a format used on the Internet for advertising and uses technologies such as video streaming, flash, etc. It allows immediate interaction with users.

At this point, brands must monitor and understand how users moves in to new means of dissemination and promotion and see how these will fit the users demanding and knowledgeable of what they want. They must find a place that is common to the "2.0" consumer. As Vasques (2007) said "[...] able to merge completely with the most traditional media with the more imaginative, surprising or more up to date, such as www, virtual reality, programming and high tech devices. Far from it is just a fief of communication, these "new" type of media are at the reach of the anonymous citizen [...]. "

The digital consumer demand interaction in a digital interactive environment and their searches includes also relationship with others. McDonald (2009) points to new data to explain how users surf on the Internet: the social object theory[2]. Explains that any communication originated on the Internet is around some kind of object. Illustrates this with comparison between sites that create social networks (e.g. LinkdIn, Facebook) and sites that create social spaces where there are objects (Flickr, Delicious, Twitter). That is, objects for which users are interested and have shared and commented, objects (Flickr - photos, Delicious - bookmarks; Amazon - books, Myspace - music) that cause people to register on these sites.

These are objects that may attract the attention of the digital consumer? But how? The interactive capacity of the internet medium, especially in virtual worlds can be a form of interaction with brands.

Interactivity on Virtual Worlds: the new recipe

Using only traditional media to spread brand messages is to exclude an increasingly large proportion of contact with the consumer. According to a study by the ITU Internet Report (2006) realize that "Globally, more hours are spent consuming digital media, such as the internet, than any analogue media, including television and radio. Digital technologies are transforming businesses and governments, and changing the ways we live and interact "(p.20). And the mass of information technology, access to internet communication applications are putting advertisers and marketers on hold. Used to talk to consumers and not with consumers, brands must redefine its relationship with this new type of audience. More than breaking a reaction "to the traditional media of advertising" (Moita, 2007) must develop an intimate relationship with the consumer. A new consumer who divides his time between real and virtual world. Thus, in this context, we see that brands are unleashing the control of the "conversation" with is target audience to engage them and facilitate the relationship. Brands can offer, in exchange of user's attention, entertainment, information and interaction with requested desired products.

In this context, brands can provide positive experiences to users using the capabilities of virtual worlds. Smart *et al* (s.d., p 6) and Hemp (2006, p. 3) characterized these virtual spaces by the ability they have to fulfill objectives (multiplayer games, with defined goals) and social environment (social space filled with relationships, exchange information and products and entertainment). We will focus our study in the virtual space with a social environment. To Vedrashko (2006, p. 60), the virtual worlds such as Second Life ® is not governed by specific objectives, they have areas that are only intended to represent and simulate real-world metaphors

The Second Life ® is also known as an MMOSG area (Massively Multiplayer Online Social Game) which can provide in real time socialization and interaction, but with the fantasy of a game. Gunn (2000) defines it as "[...] something superficially similar, a meeting point for socialization that happens in a game with goals. However, the Second Life ® is radically different in one important aspect: the whole world - sights, objects, events - is created by people and belongs to them".

This environment encourages users through an avatar to explore, create objects and relate freely among others. This idea will be important to understand how brands are behaving in such spaces.

The interaction in Second Life ® is made in real time and based on dialogue between avatars and three-dimensional objects. The user actions are also relevant to understand the affective and effective relationship that brands can create with their audience. According to Tucherman and Accioly (2007), users are looking for a space in virtual worlds where time and space limitations do not exist. These spaces recreate intuitive interfaces for present mental models of the users. User experience and reality representation in virtual worlds are variables that make the experience seamless and positive. That is, users create mental representations when they interact with Second Life® and try to understand their relationship. If they are established, the mental representation is stronger and user feels that the system is intuitive. Thus, accordingly to Norman (2004) who studies the design of virtual spaces, objects must conform to user expectations. In this context, the objects displayed in the virtual spaces must be identified and establish relationship with its users. If we think about them as objects that create meaning and memory, the relationship can become more intimate and positive. An aesthetically appealing object can create, according to Norman positive feelings and curiosity. However, they should be controlled and create value for the experience that users are experiencing. Thus, we point out the concept of interactive

[2] "I believe a great digital social object is one that is highly portable, and can be easily copied and reproduced in as many channels and formats." McDonald (2009)

and virtual experience of the product as a recipe for a more satisfying feeling in the users mind, because they realize that there is a benefit to interact with the desired object. If this object belongs to a brand, then the relationship can happen.

Chen *et al* (2005, p.31) says that "interactive environments where customers experiences products directly" through "virtual reality, *telepresence* or virtual direct experience" (op. cit., P. 30) enhances the effectiveness of communication between brands and consumers.

However, there are degrees in virtual experience that covers what we call poor or rich, or indirectly and directly experience. What distinguishes them is also the level of realism provided by the degrees of interactivity. So what Jiang and Benbasat (2004) called the Virtual Product Experience can "increase the attitude towards the brand and the intention to purchase" (p.2). For this, users should be able to experience brand products (visual control) and testing their functions (functional control). Below (Figure 1) we can see how technology components can provide a virtual control available in virtual worlds.

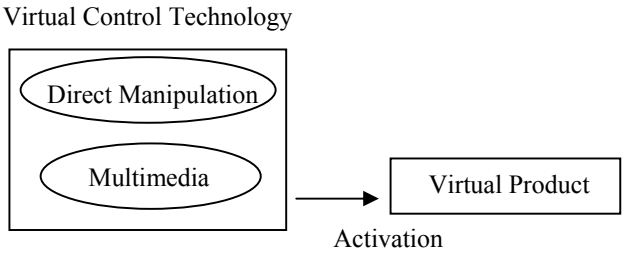

Figure 1: Virtual Control and its technological components (Jiang & Benbasat, 2004, p. 5)

The virtual worlds simulate an environment in order to provide feelings of telepresence. Steuer (1993, pp. 11-14) describes telepresence as the joint of space interactivity where it's possible to change content and form, and sharpness in the way virtual worlds represent their content. In this context, the virtual control becomes significant by directly allowing manipulating variables such as sound, audio, image or video (Multimedia), to ensure that consumers find relevant information about a product. By allowing manipulation (Direct Manipulation), brands can be positively engaging for the user, reflecting once again what he knows of real world: the consumer can go to a virtual store and choose from a virtual corridor a brand so he can interact with a three-dimensional simulation (Virtual Product). Basically, consumers can after this experience actively "talk" about it in their social networks.

Therefore, we present an analysis model to evaluate the degree of interactivity on objects offered by a brand in the virtual world Second Life ®.

Methods and Analysis

The virtual experience of the brands attributes and their ability to influence a digital hyper-social consumer can be achieved through the ability of virtual worlds on creating interaction. The experience reflects satisfaction when users can experience brand products in such spaces.

We noticed that with all the interaction possibilities, control and social relationship creates a consumer who demands new and more "hype[3]" things and quickly can ignore what he doesn't like or ignore what is no longer suitable for his group. Meadows-Klue (2007) states that "media literacy evolved into digital media literacy, and another step-change took place, this time in audience's shift to manage and select their own exposure to marketing messages."

Chen *et al* (2005) and Sundar and Kim (2005) say that Internet is now a new environment with the ability to capture consumer's attention through interactivity. This concept has been widely studied by authors like Sims (1997), Ricante (2001), Salen and Zimmerman (2004), and Primo Cassol (sd). They defined the concept as the reciprocal participation within two agents. In this context, we adopt for our model the models of McMillan and Downes (2002) and Shedroff (1999), which will be explained below.

In order to identify how users perceive interactivity, McMillan and Downes did a study on the different views of what is interactive. They set dimensions to demonstrate levels of interfaces interactivity. Divided into two parts:

a) Who builds the message?

1 - Communication Direction

When there is a process of interaction, there must be an exchange of messages in both directions. The degree of interactivity is higher in bidirectional communication.

2 - Time Flexibility

If communication time look closer to real and it is controlled by the user, the degree of interactivity is larger.

3 - Sense of space

[3] Concept derived from English word hyperbole, which means what people are speaking and which is in fashion - http://pt.wikipedia.org/wiki/Hype [online]

The space should provide familiarity and sense of belonging

b) Who uses?

4 - Control Level

If the interface allows control the higher will be the degree of interactivity

5 - Response Degree

Immediate levels on the communication perpetuated the actors will define higher degrees of interactivity.

6- Communication Purpose Perception

If the purpose of communication is merely the exchange of information and not persuasion interactivity will be higher.

Shedroff (1999) presents a model capable of evaluating the quality of interaction between players. Quality he divides into passive and interactive. He states that in the passive side there is no user action in the selection of paths or content processing. On the opposite side, the user action is richer and they can transform content and objects. Within these dichotomous variables, the author identified several components to assess.

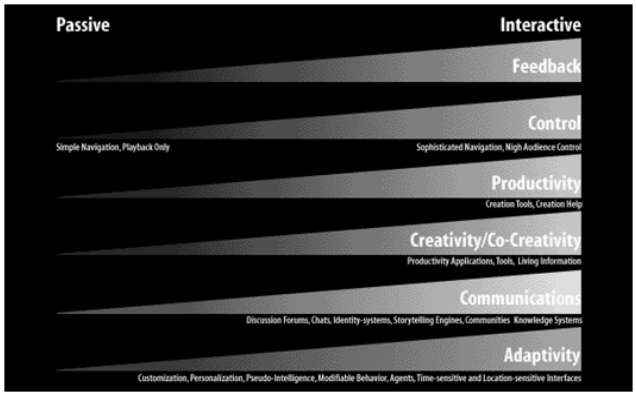

Figure 2: Interactive Components of Nathan Shedroff (1999)

1) Feedback - number of returning from the interface or by the players.

2) Control - amount of control given to the player within the sequences and actions of the interface.

3) Creative Experience - possibility of sharing something created by the user

4) Productivity - possibility to create something.

5) Communication Experience - possibility of relationship and communication between users

6) Adaptability - interface ability to adapt the behavior of the user.

The author states in his study that levels of satisfaction for the interface must have the components listed in the interactive part.

In this context, we will show from an adaptation of the models mentioned above, our analysis model. We support the research to verify the implementation of the following hypothesis:

H1 - The higher the degree of interactivity, on dimensions like bidirectional communication, direct experience, control, perception of communication objectives and brand experience felt by the user, the better will be the relationship between brand and your audience.

The bidirectional communication dimension wants to check if there is feedback between brands and consumers in the virtual world Second Life. This experience should give a sensation of immersion and both visual and functional control. In this relationship brands must be purely informational and be distributed among other users.

The study aims to understand if brands strategies in virtual environments create affinity with target audience. We set an analysis grid to assign degrees of interactivity to the objects displayed by brands in their advertising strategy.

We defined the observation instrument – analysis grid and divided it into five sections: Communication Direction, Space, Control, Perception of communication objectives and felt experience. The grid was composed of fifty closed questions. The application of the instrument was made to the objects of Nokia store in Second Life ®. The analysis was performed on objects found in the store on 04 September 2008. We evaluated nine objects: N78 BOXED Developer Kit (consisting of a virtual mobile phone with access to three brand sites and a t-shirt to the avatar), Free-Nokia Phone Chair (user is able to offer to another user), free T-shirts; MetaVoter (the user can say if he like the store); Exhibitor mobile phones; Avatar Robot (user can sign up the Nokia group); Post Teleport (user teleportation to various spaces in Nokia island); Suggestion Box; Public Feedback (display of various cellular models where user can vote)

The selected objects result in choosing a space in the virtual world Second Life that had as sole purpose the dissemination of its brand. The brands produced in these

environments adapted forms of communication and techniques to the particularities of the virtual world and the way of being of the world residents. Thus, through the model of analysis and consequent grid analysis we tried to found out if objects, arranged in the Nokia´s shop, on Nokia Second Life Island had a greater or lesser degree of interactivity.

Nokia Brand implemented in Second Life ® areas of distribution of their products, information and ways of communicating with the consumer. Nokia island is the main area, however the brand has also spread through this metaverse several kiosks and shops. Therefore, the objects analyzed and defined above were found in-store and at Nokia store entrance on Nokia Island.

The observation instrument was divided into five sections, which relates to the dimensions determined in the analysis model with the aim to understand if each object of the Nokia brand has greater or lesser degree of interactivity. For each segment[4], closed questions were designed for the objects found in the sample. The model provides a non-interactive side of the objects and a fully interactive side. Thus, we define a dichotomy between the A side – Passive B side - Interactive. If the analyzed object is in part A of each dimension is taken as null in terms of degree of interactivity. If the object is positioned entirely within the B side of each dimension is taken as an interactive object.

Outcomes

In the analysis made to the Nokia store objects, we saw for the dimension of Communication Direction that objects create direct brand contact. We believe that this dimension is paramount in the relationship that the brand can create with the consumer, but more than half of the objects do not allow two way communication (N78 BOXED Developer Kit (1), Free-Nokia Phone Chair (2); free T-shirts (3); Exhibitor of Mobile (5) and Teleport Post (7)). Objects MetaVoter (4), Avatar Robot (6), Suggestion Box (8) and Public Feedback (9) allows communication between the brand and consumer.

In the dimension of Space, we found that most objects simulate a space similar to what the consumer knows the real Nokia store. Objects produce telepresence. Object 4 were the one that raised more scores, having the capacity to provide an immersive space.

With regard to the dimension of Control, where there may be a control of the objects, the study found that there is total control both at a functional level and at the visual level (only object 9 does not have the total score)

The next dimension (perception of the goals of communicating brand) objects 1, 2 and 7 have total score. We found that most objects have an objective: communication information (although they do not have maximum score). We know that the brand / consumer relationship is much more effective if consumer feels that communication don't have a commercial and persuasive purpose.

Dimension User experience felt on items 5, 6 and 7 do not allow any kind of experience. The creative and sharing experience didn't happen. The examined objects do not scored enough to interpret the experience as perceived positively. Since we wanted to ascertain the degree of interactivity and virtual experience 'felt' experiencing these objects, so that the relationship between brand and consumer happens, we assumed that objects in this dimension were not interactive.

Conclusions

Nowadays there is a new type of consumer. A consumer that uses information and communication technologies in an increasingly active way. And somehow this action increasingly occupies most of their time. However, we realize that individuals have not changed their intention, they still want to belong to a group, ensuring their individuality. They certainly want to create relationships, find types of fun and purchase products and services. What seems to be happening is the way they do it and how they are now using the internet and for what purpose. In this context, we discovered a consumer / user able to use the Internet to achieve goals, whether in their work and family, whether in the emotional and private area. With the release and mass of technologies and applications on the Internet, the number of users increases every day, reducing the number of viewers of television, radio listeners and press readers. But is in the cross media era that consumer of today coexists. Where their social networks, information *mashups* and cooperation sites have been the reason in which we see the evolution of the social man to the digital social man. With this trend, the information available is

[4] Communication Direction dimension, Space Dimension, Control Dimension, Perception of the Communication Objectives Dimension and Brand Experience felt by the user Dimension

highly widespread and unavoidable need for a screening, which ultimately generates a kind of deeper knowledge and expertise among the users.

The social individual who lives in a community is giving way to another type of relationship where there seems to exist no space for effective knowledge and intimacy between the parties involved. This period is marked by the transition of social and real individual to a person ever more avatar and virtual.

The era of active digital individual are telling brands that the well known and tested formulas and effective proven strategies are no longer the most appropriate to the 2.0 consumer. Instead of imposing a message to large groups, brands must think its advertising strategy by "entering the conversation" with consumers. The activity happening in online spaces with significant number of users shows brands that their actions must work for the creation of interaction with their audience and offer something in exchange of their attention.

Brands are quickly realizing that they are not starting the conversation; it is because the consumer is increasingly controlling the flow of information, the choice of how and when he receives it. This has created a new paradigm in communications, in other words it is redefining concepts such as space and time

Brand advertising strategies are following consumers' migration to the virtual world and are seeking in interactive strategies the solution to find this new consumer. But is the convergence between what is traditional with what is truly dynamic virtual and interactive? Are the brands taking advantages of the capabilities of interactive media to create real interaction?

The study chose the virtual world Second Life ®. We tried to understand if a brand (Nokia) strategy was, throughout interactive, immersive. We also wanted to check if the consumer could feel an immersive environment and be able to experience the brand object.

The research found that brand objects in the virtual store in Second Life were not fully interactive; the feeling to try these objects has fallen short of expectations. We found that the Control Dimension gatherer greater consensus. The examined objects have a more or less interactive control, conveying the feeling of power play the product. However, in the dimension Communication Direction only four of the objects examined had two way communication. The ability to return the message was not enough to test the ability of the brand to create relationship with a consumer.

Objects were able to in the Space Dimension, provide feelings of belonging and 'telepresence'. Already in the dimension Perception of the Brand Communication Objectives we find results about the importance of designing objects with informative intention and not with an intent and persuasive communications. Objects that have the propensity to report only bring users closer to the brand.

The Experience Perceived by the user dimension objects should be allowed to share creatively and communicatively. However, only one subject (Public Feedback) enabled the sharing of what had been built to other users.

The virtual worlds are spaces that can bring the brand to their audience. The interactivity concept should be considered as a vector capable of uniting the consumer to the brand. These spaces want to simulate the real, involve the user and produce real feelings. On the other side they need to allow objects to be transportable between applications and virtual spaces. These objects should be free and offered to other consumers.

The social consumer creates successful social interactions around an object. If this object belongs to a brand, advertising communication can be shared and spread over thousands of users in virtual worlds and their social networks. If this object is transportable between channels and formats, the brand may ensure the conversations focus within web surfers.

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Educational research, applications, and case studies

Building Knowledge in the Virtual World – Influence of Real Life Relationships

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This paper intends to present a preliminary PhD research that is being developed by the authors, with the intention to determine how to improve teaching and learning situations, at the university level, based on experiences in immersive virtual worlds. The authors have realized that, nowadays, courses don't fulfill our students' needs. They belong to a networked and multitasking generation, and what they get from today's teaching strategy does not, in many situations, fulfill students' needs and perspectives. They need to gather competences in order to become motivated citizens, communicative and knowledge builders. It is our belief that we can take advantage from the immersive virtual worlds' resources to overcome this situation and therefore to transfer it to real life. In order to achieve this we need, at the first instance, to understand how social interactions occur in these environments (in particular at Second Life®), how they grow and how they are developed. What we present here is a preliminary sample of our intended research.

Introduction

Our society is changing, as are all the citizens that are growing and living in this new age. Education cannot ignore those changes, cannot cling to the old habits and methods of teaching and learning from the last century. Today's society, and therefore today's kids and students, are interconnected. They live in a digital age, being able to multitask; they live in a "world of fast context-switching" (Brown, 2002). With today's networked society (with special impact from the facilities offered by the World Wide Web) we can observe a new way of learning that is discovery based. The Web is now not only an informational and social resource, but also a learning tool that enables new ways of creating and sharing knowledge. Consequently teachers are becoming challenged to develop new strategies of teaching and learning, in order to fulfill the needs and enhance the skills of their digital age students. We believe that we can only catch and keep students' attention and motivation if we leverage the same tools. We have to enter and to get to know their digital worlds; and thereby become part of it! Our major focus of interest is university students. The research we are conducting has the aim to achieve better and more efficient ways to teach and learn at a higher level. We have made some preliminary research and we recognise that many studies are being done in this area. However, we detected that an important area was not being covered, due in part to the emergent nature of the tools. We are referring to immersive virtual worlds, with particular emphasis to the Second Life® platform. We have been residents of this environment for some time and we see its potential in teaching and learning situations. Why is that? Because it is immersive; it is a real world simulator; it is a social network and allows real time communication, cooperation, collaboration and interaction, and all this in a safe and controlled environment. Through understanding all those potentialities, we believe that immersive learning can be integrated in today's pedagogical practices. However we can only apply and suggest best practices if we get to know the Second Life® environment, to learn and understand how interactions and relationships are established between the users (or residents) of this Multi-User Virtual Environment (MUVE). In order to start and to achieve our research foundations we have been observing, for some months, residents behavior at Second Life®, including some informal learning situations.

In this paper we would like to briefly discuss the evolution of the web, in order to contextualize the study. It

will be followed by the presentation of the research itself, with our purposes and goals. We will end with some preliminary conclusions and outline our future work.

State of the art

With the advent of Web2.0 users have "immersive Web sites with flash quickly followed combined with ubiquitous communication via IM and IRC chat (…) the exponential growth of self publishing, blogs and wikis (…) the massive sharing social network communities of flickr and YouTube in sync with the explosion of portals containing all the above in services such as MySpace, Yahoo and MSN" (Hayes, 2006). We are no longer simple information collectors (Web 1.0), now we are active and reactive users, we develop and share content and information. Each one of us has an intrinsic need of being part of cyberspace, of being known by our partners. We could say that we all have an unfulfilled eagerness for communication, and to share our thoughts, needs and knowledge. And that's what Web2.0 is all about: sharing. We all are now content builders, information sharers, communicators. We all belong to a common space with no barriers called World Wide Web. Although we are already behind Web 2.0, we are in presence of what some authors called as Web 3.0. This concept is related with "virtual environments in which we meet as avatars, interact as 3D moving objects that takes sharing, co-creation and communication to the next, predictable level" (Hayes, 2006). We are now in the age of the real time collaborative web, a web where "human become more linked together (…) more networked (…) internet have no limits or borders" (Veen e Vrakking, 2006). We present a figure (*cf.* Figure 1), that clearly shows the evolution of the Web concept – from 1.0 to 3.0.

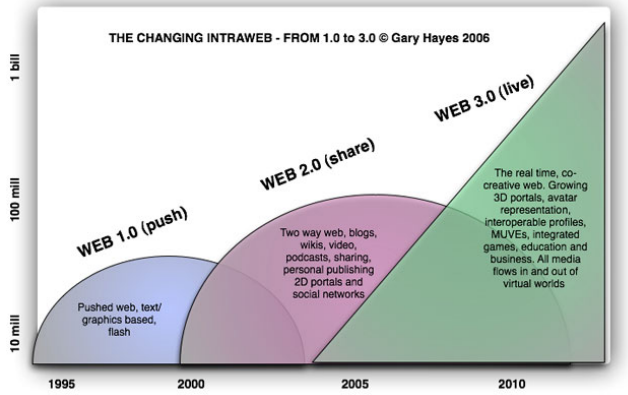

Figure 1: The Changing Intraweb(Hayes, 2006)

We would like to say that, for us, the environment Second Life® might be the best representation of the "real time, co-creative Web". We see Second Life® as an immersive 3D multi-user virtual world, where each user (or resident, as they are called) is able to have a life "em tudo correspondente à vida real (…) é literalmente uma segunda vida, onde cada um define o que pretende ser, fazer ou ter"[1] (Bettencourt e Abade, 2007), represented in world by his/her avatar. In fact, and according to Linden Lab® itself, "Second Life is a virtual world that allows its residents to create completely original content using atomistic building tools in a shared and globally accessible space" (Lester, 2009).
The term avatar was made popular by Neal Stephenson in his novel Snow Crash, and is "an interactive representation of a human figure in a games-based or three-dimensional interactive graphical environment (…) Usually an avatar will have human characteristics, including speech and facial expressions" (Freitas, 2006).

According with the Web 3.0 assumptions we believe that Second Life®, having itself MUVE's (Multi-User Virtual Environment) characteristics, have great possibilities if used for education and learning purposes. This environment is like an "ever growing virtual playground that is limited only by the creativity of its users" (Johnson, 2006). According with Federation of American Scientists (Wagner, 2007) it will allow us "to build 3-D objects collaboratively and in real time with others in the same world", with major applications at "building, design, and art principles". On the other hand, Second Life®, is a "rough simulation of the natural world, with meteorological and gravitational systems, the possibilities of experimenting with natural and physical sciences are endless", and all this "in a safe and controlled environment" (Wagner, 2007). The twist is that in an immersive environment we are walking inside the material, not just viewing it from a distance. In fact, Second Life® and other MUVEs "have attracted a growing and increasingly sophisticated community of practice (Wenger, 1998) focused on the topic of teaching and learning in 3D immersive worlds" (Richter, Inman & Frisbee, 2007).

We have perceived that "Education began, slowly, to realize that many of the attributes of great game playing, from the intellectual challenge to the provision of multiple learning styles, had an immediate part to play in learning" (Freitas, 2006).

We also assist, with the Web 3.0, to what we called as the humanization of the virtual space, through the representation of each one of us by the avatar. It's as if we were actually living the experiences. It's about growth, life, interaction, communication, knowledge creation and sharing experiences in a 3D virtual world, and how real life relationships can influence it, that we would like to talk about in this paper.

[1] "in similarity with real life (…) it is indeed a second life, where each one of us decides what we claim to be, to do or to have" (paper author's translation)

Building knowledge in the virtual world – Influence of real life relationships

Logging in

Second Life®, as a real world simulator, has great potential. However, how can we use and enhance it? How can we be successful educators in a virtual world? What makes us grow? What makes us stick around?

Every day there are between 60-75 thousand users in world at any moment (*cf.* Figure 2), and according to Hayes (2009), it "seems many folk do tire of it at around 18 months with only around 20% going for longer than two years" (*cf.* Figure 3).

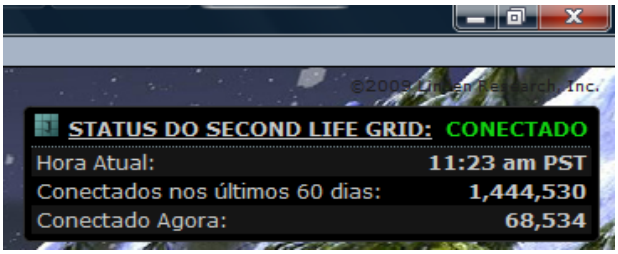

Figure 2: Users logged in (example)

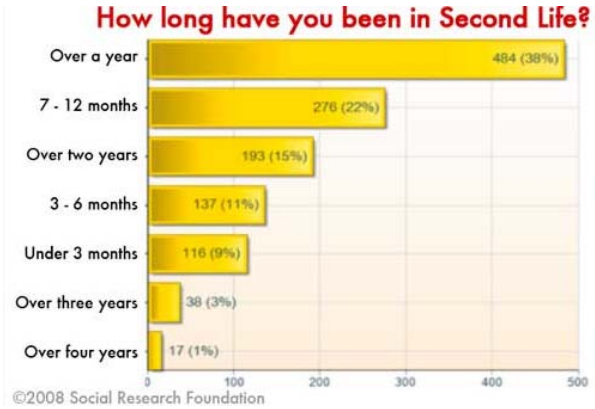

Figure 3: How long have you been in Second Life® (Hayes, 2009)

This could be a problem if we wish to develop a project in a virtual world. With no residents/avatars it doesn't make much sense. If it doesn't grow, it has no future at all.

For us, and from what we have been observing from the past few months, one of the most important conditions for people stick around at Second Life® is related with the relationships that are made (not just between avatars, but also between avatars and persons behind the screen) and with the sense of belong to a community. Like Paul (2009) said "Shared practices and meanings help solidify cultural practices and develop common symbols and structures with which to interpret surrounding stimuli". Second Life® is a good example of a social network and we believe that the main goal why people sign into it can be related with the need of socialize, interact, communicate. To have the chance to contact with other persons, cultures, languages, ideas. In many cases people open a Second Life® account by some friend's influence. But, on the other hand, there are also those who join Second Life® because they are "forced" to do it, maybe because of an academic project, a business/work project or just because a teacher said so! What are the major differences of behavior between people who came to Second Life® by free will and the ones who, somehow, were forced to join the environment? That's what we intend to find out. As we can see by the chart in figure 4, we have people that spend 16 or more hours per week in world. Who are they? Why are they at Second Life®? What are they doing? Where do they spend their time?

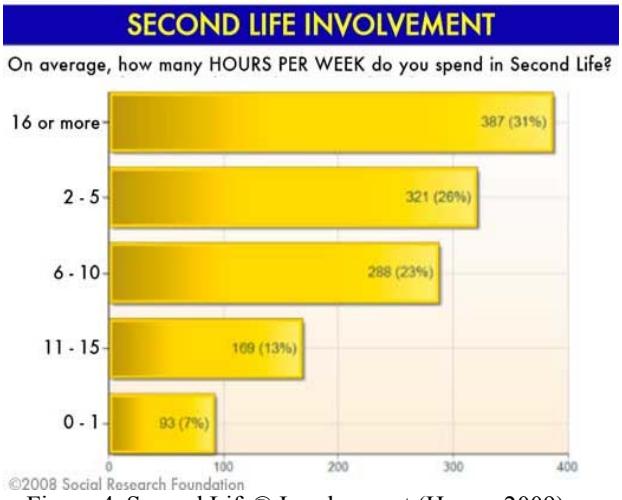

Figure 4: Second Life® Involvement (Hayes, 2009)

We should also consider the ones who are giving up Second Life® or, not giving up, don't grow or socialize in the virtual world. If we could achieve the reasons why this happens we might get into some ways to help them to stay and enjoy, and above of all, to learn through MUVE's.

Therefore we will summarize some of the Second Life® barriers, that were already identified by some authors (Harold, 2009; Pita, 2008; Kirkpatrick, 2007; Richter, Inman & Frisbee, 2007) . First of all we need to have access to a good and fast Internet connection. Besides that we need to install and constantly update the software viewer. The software is very demanding in terms of hardware (*cf.* http://secondlife.com/support/sysreqs.php); we need, for instance, to have a good graphics card and a recent operating system in order to properly run it. As a consequence of the many improvements that are constantly made the servers and the grid is often unavailable (normally, and fortunately, for short periods of time).

Another barrier could be the fact that Second Life® is not available in all languages. All these issues lead many people to give up Second Life® at an early stage. According with Kirkpatrick (2007) and due to the huge complexity of the software, only one person, among six, keeps logging into Second Life® after the first month.

Learning in immersive worlds

The potential of Second Life® has already begun to be used for teaching and learning, for some of the reasons we have already presented in this paper. We all have realized by now that we are living in the age of the "digital natives" (Prensky, 2003), of the connected generation. Nowadays, and because of the advantages of the social web, students "have a lot of practice of e-mailing, blogging, googling, chatting, gaming, and so on!" (Bekkers, 2009). They can develop several tasks at the same time; they are multitasking. For instance, "students in higher education walk around their faculties or work at computers while listening to their music files, using their iPods and MP3 players. It's common to meet students at a teacher training college multitasking while surfing the internet, listening to their music in one ear, and communicating with a peer student through the other" (Veen & Vrakking, 2006). These are our students and we had better cater for their needs in a digital age. In fact, students "entering universities after 2000 (…) were portrayed as needing a more and IT driven learning environment" (Paul, 2009). But what do they get when they arrive to the Universities? In the most part of the cases some old strategies from the last century.

According with Bettencourt and Abade research (2007) "those students are asked to sit in rows and listen to lectures, take notes or solve exercises given by teachers. It's a teaching strategy that doesn't prepare students to be critical citizens and professional workers on their specialty, nor give them the skills and competences needed to be autonomous and constructors of knowledge" (Bekkers, 2009).

Nowadays students live in a multimodal and interconnect world and for them this "way of dealing with information is much more intensive than listening to one source of information at a time" (Veen & Vrakking, 2006).

Students are familiarized with video games, computer games, and online games. We could say that this is their natural environment. They are used to deal with several spaces where they present and share themselves, many times "cycling through" (Turkle, 1995) multiple characters, according with the time and space where they are mingling. These multiple "selves" are, in fact, one and the same. The same person is behind the screen or behind the gadget, the player of the game himself. Virtual spaces "blur the boundaries between self and game, self and role, self and simulation (…) 'You are what you pretend to be...you are what you play'" (Turkle, 1995). In fact, "today's kids are always 'multiprocessing'-they do several things simultaneously- in parallel and so unobtrusively" (Brown, 2002).

According with these assumptions, we could dare to say that our students are hugely familiarized with virtual life. No matter if used as a game, as a communication tool or a way to socialize. Therefore, we will state again that we believe that virtual and immersive worlds, like Second Life®, can be used to teach and to learn with success. Our society is becoming "more networked every day (…) Virtual worlds like Second Life represent the future of human interaction in a globally networked world, and students who grown up in the Internet naturally swim in these waters" (Zhu, Wang & Jia, 2007).

We would like to say that we don't see Second Life® as a game, like many others believe it is, because it doesn't really have the major characteristics of a game (like multiple levels, scores, or an end – we don't see the game over label!). Of course that we can find in this virtual world some forms of game, like in role-play communities, but "virtual worlds are not themselves games" (Austin & Boulder, 2007). Even so, "Multi-user virtual environments, whether game or non-game, all have one thing in common: communication (…) may be non-verbal through gestures, appearance, or battle" (Robbins, 2007).

There so the use of MUVEs in education also allows learning "through exploring environments, 'realia', lived and virtual experiences with tutorial and peer-based support. This method of learning is based upon the notion that learning patterns can be helpfully transferred to dissimilar situations through meta-reflection. (…) helping individuals to use their imagination and creativity to draw out lessons from interactions as well as extracting meaning from data" (Freitas, 2006). In these virtual environments students are, usually, more open, more participative, more creative, and more reactive.

In fact, in the immersive virtual worlds, students attend the classes because they want to learn. Students actually can interact with the simulated world "allowing them to engage with content (Bricken, 1991). Being able to learn subject matter in the first person, as opposed to the third person" which is "experiential, nonsymbolic, interactive, and multisensory" (Richter, Inman & Frisbee, 2007).

The study

The research we are here presenting is an early stage. It will be develop in the aim of the Doctoral Program in Multimedia in Education of the University of Aveiro.

We are conducting the research under the theory of Connectivism, defined as being a learning theory for the digital age (Siemens, 2004). In connectivism we can

indentify, in learning situations that occur at the MUVEs, many aspects from its major principles, such as:

- "Learning and knowledge rests in diversity of opinions.
- Learning is a process of connecting specialized nodes or information sources.
- Learning may reside in non-human appliances.
- Capacity to know more is more critical than what is currently known
- Nurturing and maintaining connections is needed to facilitate continual learning.
- Ability to see connections between fields, ideas, and concepts is a core skill.
- Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.
- Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision" (Siemens, 2004).

After a careful comparison with the other Learning theories we believe Connectivism provides the best framework for this study.

SL® as a learning platform reflects the assumptions of the Connectivisim theory in many ways. We know nowadays that information and knowledge are transitory, chaotic and unstable, there is an inherent need of a continuous learning (long life learning). SL® enables a contact and connection with a diversity of opinions, nodes, links and specialized information sources. Because it is digital, virtual and immersive it allows that those information links to be more interactive, which enhances the learning and information sharing. On the other hand, the motivation, feelings and sense of community belonging that are generated among SL® users helps to create, develop and maintain connections, and facilitate a process of continuous and natural learning. According to Siemens (2004), ability to "know more is more critical than what is currently known" and incidence (correct, up-to-date information and knowledge) is the purpose of learning contexts based in Connectivism.

As we said earlier in this paper, our main goal is focusing on understanding what are the major differences of behavior between people who came to Second Life® by free will and the ones who, somehow, were forced to join the environment. We intended to provide some "insights to all educators and researchers interested in using those environments as a teaching medium in real life, and those new approaches to better prepare the university students for the marketplace will emerge" (Bekkers, 2009), as well to achieve a better understanding how people grow and build knowledge in Second Life® in both formal and informal learning contexts.

Our study emerges from the need to observe some of the variables that have been already identified by Bekkers' study (2009) and give it continuity (*cf.* Figure 5).

These variables are related with three major areas: the person and their motivations; the relationships that exist or are established between avatars or between avatars and persons; and the social integration at Second Life® (sense of community). Although as we can see at figure 5, the three main areas are related and can't be observed in a separated way, they all are interconnected. They all influence one another.

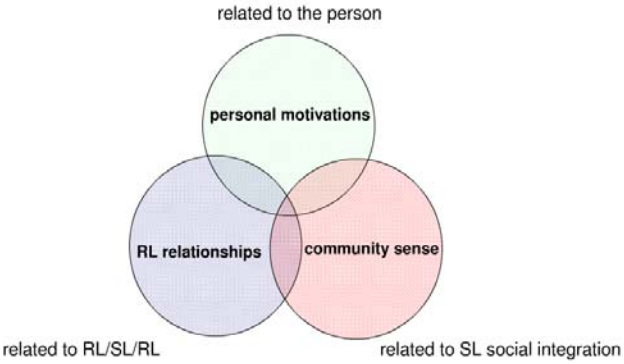

Figure 5: Variables of the Study (Bekkers, 2009)

Besides that, and in order to better explain our goals, we can say that our research concerns are more focusing on the variable related to RL/SL/RL relationships, being aware of the others variables interference.

It will be an exploratory and qualitative study.

We intend to divide the study in two different parts. For our in world research we will observe learners in what we will call as formal and as natural contexts. As formal learners we will count with the cooperation of students from Portuguese Universities (at least in an earlier phase), and as natural learners we will observe avatars that are engaged in some free courses that are available at Second Life® (also Portuguese language speakers, in this first stage). This sample will be our target audience for the research.

To collect the data we intend to use surveys (with closed answers) to inquire about the reasons why people enter into Second Life® and also what kind of difficulties they experience in using the environment; if they felt curiosity about exploring the environment; what kind of activities are they doing, where and how long; what is the frequency of logging in and how many hours they stay logged in.

We also intend to make some interviews when, and if, we feel need of an additional information, or a clarification / explanation about some data or answer.

Besides these two instruments we also will be working as observers, to identify key indicators (such as the avatar appearance and how the avatar behaves when in a group or community), that will help us to clarify the level of growth or socialization of the avatar / person in the virtual world of Second Life®.

Conclusions and Further Work

We agree with Wagner (2007) when he says that MUVEs are "an ideal pedagogical resource", special because, "acting in virtual communities is nothing new to homo zappiens and is part of normal life", because nowadays for the most common users "both real and virtual life are components of their lives, without considering one less valuable or real than the other" (Ween & Vrakking, 2006). In fact "the digital natives (Pransky, 2001) have limited patience with an educational system that has not changed substantially since the 19th century. They think and learn in environments that are fast-paced, multimedia, multimodal, interactive, and, of course, digital. These volatile, interconnected, and complex social milieus (Cohill, 2000) call for learning options that are critical, collaborative, creative, and futures oriented." (Richter, Inman & Frisbee, 2007).

We can say that immersive environment bridges the gap, so people live the experience, live the learning, and thereby learn better. For us these are alternative methods of presenting content, as an attempt to catch student's attention. In fact immersive worlds have a huge potential for education because they can facilitate "collaborations, community and experiential learning" (Kemp & Livingstone, 2007).

We will be developing this research, outlined above, for the next two years. Our purpose is to achieve a better understanding of immersive learning and develop best practices to teach and learn in virtual worlds, namely in what it concerns to the RL/SL/RL relationships variable mentioned earlier in this paper. With the information that we hope to achieve, we will intend to transfer it to a real life learning context and thereby to improve our ways of teaching and learning at a higher level.

For now we can just say that, and for what we have collected so far, Second Life® "induces teachers' innovation of their practices and leads them into a collaborative approach with students. Teachers and students become partners and interact socially to a common goal. The process of teaching and learning tend to be more focused on the development of skills: critical thinking, making initiatives, entrepreneurship, responsibility, teamwork, respect for others and their differences, inter-culturality" (Bekkers, 2009).

According with these factors we can only stay motivated to keep going with our work. For now, and because we are in a preliminary stage of this research we can not present any results or data based conclusions. We are still, at this very moment, building the analytical instruments to collect our study data. We hope we can bring further results in a next article.

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HK PolyU Library in Second Life

YouTube video:

http://www.youtube.com/watch?v=kfd4zGNqE_4

A Second Life First Year Experience

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Learning experiences within Multi User Virtual Environments (MUVE's) focus on discovery and active experiences and provide many opportunities to support multicultural learners. Virtual worlds have the potential to become meaningful, highly sophisticated tools for educators and students, and it is timely to consider how educators can move from the hype to the how and why? Consideration needs to be given to the characteristics of meaningful pedagogical activities that move learners from playing to an enhanced learning experience? This paper presents a case study in which the MUVE Second Life was used to support a First Life (Real-World) orientation programme for students within the School of Hotel and Tourism Management at the Hong Kong Polytechnic University. Presented is an overview of the approach, rationale for the use of Second Life as well as lessons learned in relation to the application of virtual worlds for learners within the Hong Kong context. The study concludes that the Second Life orientation programme was not as successful as envisioned. However, the specific lessons learned, and 'moments' of intervention and further assistance identified have provided rich material and an emerging interest' in relation to the incorporation of Second Life into meaningful educational activities in the university.

Keywords

Game Based Learning, Virtual Worlds, MUVE, Second Life, Higher Education

Introduction

Why should the notion of incorporating Virtual Worlds such as Second Life (http://secondlife.com/) be important within education? In what ways has the rapid development of digital technologies associated with Second Life and its use in education enabled individuals to interact differently within existing and emerging ecologies of learning? How can educators engage students in appropriate pedagogical activities to incorporate virtual worlds like Second Life in meaningful ways?

This paper presents a case study in which the MUVE (multi-user virtual environment) Second Life was used to support various First Life (Real-World) Orientation Programmes for freshman students within the School of Hotel and Tourism Management at the Hong Kong Polytechnic University. Presented is an overview of the approach, rationale for the use of Second Life as well as lessons learned in relation to the current application of virtual worlds in the provision of meaningful educational strategies for learners within a Hong Kong context.

A Student Context

The university environment has typically been viewed as a merging of the academic and social. Terms such as diverse learner, multiculturalism, educational equity, and learning styles have been used pervasively in the literature to indicate the diverse range of considerations within this educational context.

Many students experience difficulties in moving from their school life into University. This case study presents the integration of the virtual world Second Life into an existing student orientation within the School of Hospitality, Tourism and Management. The experience of first year university students has become a major focus of concern in the US, the UK and Australia. This has been prompted by factors such as increasing student numbers, widening diversity in the backgrounds of students, high student drop out rates in first year, and the accelerating implementation of teaching technologies and flexible course delivery (McInnis, James, & McNaught, 1995).

Ideally the enculturation of First Year Students involves practices to address these issues as it is in the first year that students are most likely to form lasting outlooks, values and patterns of behaviour with respect to higher education and lifelong learning. Identifying the diverse multicultural learner, facilitating the myriad of classroom learning styles, developing responsive curricula, and implementing innovative teaching methodologies are strategies that must work simultaneously to provide an equitable and engaging classroom environment and introduction to university life for all students (ASHE Report, 2002; Bonner & Hairston, 2001; Meacham, McClellan, Pearse, & Rashidi; Weinstein, Tomlinson-Clarke, & Curran, 2004).

Students today have grown up within a world of pervasive technology including mobile phones, digital cameras and the omnipresent internet. Described as, "Gen-X, Millennials, the Nintendo and Net Generation" (Tapscott, 1997; Oblinger, 2003; Olsen, 2005), these students interact in immersive 3-D worlds, blog, listen to podcasts, instant message friends and collaborate in the creation of 'digital stories' for their ePortfolio. They absorb information quickly, in images and video as well as text, from multiple sources simultaneously. They operate at what Prensky (2004) describes as, "twitch speed", expecting instant responses and feedback.

A range of new technologies relating to the use of Virtual Worlds is playing an increasing role in many learners' everyday lives. Virtual worlds offer the potential to engage learners at higher levels, offer flexibility in identity and access, create a sense of presence within in-world educational tasks and have the potential to become a meaningful, highly sophisticated tool for educators. The two key considerations here are how can we capitalize on the willingness of learners to engage with virtual worlds? And, what is the range of pedagogical activities to move learners from playing to an enhanced learning experience?

The case study being presented within this paper highlights the particular use of Second Life within the multicultural context of Hong Kong and in particular the first year SHTM (School of Hotel and Tourism Management) student cohort at the Hong Kong Polytechnic University. This context typifies many areas and associated pedagogic challenges associated with a diverse multicultural and in many cases trilingual ESL student. Presented will be initially an overview of Virtual Worlds, a rationale for the use of Second Life as well as lessons learned in relation to the context of the case study and current application of virtual worlds in the provision of meaningful educational strategies for learners within a Hong Kong context.

Background to Virtual Worlds

"The unique qualities of a 3D virtual worlds can provide opportunities for rich sensory immersive experiences, authentic contexts and activities for experiential learning, simulation and role-play, modeling of complex scenarios, a platform for data visualization and opportunities for collaboration and co-creation that can not be easily experienced using other platforms". (Introduction to Second Life; http://sleducation.wikispaces.com/educationaluses)

Virtual worlds are extensive and absorbing 3D places that people use to interact and communicate with others using an "avatar". Virtual worlds, such as Second Life (http://secondlife.com/) or Active Worlds (http://www.activeworlds.com/), are different from game worlds (e.g.: World of Warcraft) in that they "can be applied to any context". Game worlds usually "have a fixed, goal-oriented purpose". This means that with virtual worlds you can do nearly anything, limited to the general environment of the world and the users located there. Game worlds have a specific goal to which everything you do is bringing you closer. to that goal. Virtual world users develop their own goals and pursue them. Whether it's making friends, making money, education or just having fun, in a virtual world, you can do whatever you want.

The following are six commonly identified features of Virtual Worlds;

1. Shared Space: the world allows many users to participate at once.
2. Graphical User Interface: the world depicts space visually.
3. Immediacy: interaction takes place in real time.
4. Interactivity: the world allows users to alter, develop, build, content.
5. Persistence: continues regardless of whether individual users are logged in.
6. Socialization/Community: the world allows and encourages the formation of in-world social groups.

(Adapted from Current Reality and Future Vision, Open Virtual Worlds; January, 2008)

Virtual worlds are being increasingly used by higher education (Hiltch and Duncan, 2005). Platforms such as Second Life make it relatively fast and cost-effective to design and set up a virtual environment for teaching and learning. Aldrich (2004) suggested there are three types of simulations – linear, cyclical and open-ended. Each has its strengths and weaknesses, and each have a main purpose or outcome. Linear simulations are like movies and books – they have a beginning and ending – and although there may be different routes through the content, the end result is the same. Most e-Learning today is linear, usually includes standard tests and assessment, and is primarily owned and managed by the creator. Cyclical content is the sort of simulation used in arcade games where the outcomes depend on the skill and speed of the user. This type of content may be useful in the educational context if you need to teach a skill or precise activity, but it is less valuable as a learning tool. Open-ended content is the most challenging – for the user as well as the creator – and is very good in developing strategies and transferable skills. Virtual worlds can be considered the next generation of e-learning and can offer this open-ended structure for learners.

Background to Second Life

Launched in 2003, Second Life is an online 3D virtual world created by Linden Labs (http://secondlife.com/). Much like massively multiplayer games, Second Life provides an immersive environment for users to play and

interact in. However, Second Life goes beyond a game, allowing residents to build and create their own environments; and interact with others from any internet connected location. Philip Rosedale from Linden Labs suggests the following as a vision for Second Life;

> *"Well.. what if you could create a 3D immersive environment that looked as good as a video game, that was tactile and visceral and exciting and you know sexy, fun to be in... but had the (of course) very web like and very compelling property that everything in it was built by you. And that in fact, the method of building would be the method of living. That you would just do things there, in the same way that you do them in the real world... you could touch things, you could sculpt things, you could build, you could just make stuff."* (Rosedale, 2008)

Second Life is the size of a small city, with thousands of servers (called simulators) and a Resident population of over 15 million (and growing). Residents come to the world from over 100 countries with concentrations in North America and the UK. Demographically, 60% are men, 40% are women and they span in age from 18 – 85. It is based on a game engine, but expanded to allow more natural social interactions and user-created content outside the restrictions of a game. It has a self-contained economy of Linden dollars, themed simulations created by users, and over 70,000 logged in at any given time (Second Life Metrics, March 2009). Users are represented by completely customizable avatars and are from diverse real-world backgrounds such as gamers, housewives, artists, musicians, programmers, lawyers, firemen, political activists, college students, business owners, active duty military overseas, architects, and medical doctors, to name just a few. (Source of statistics, current as of March 2009: FAQ – Second Life, http://secondlife.com/whatis/faq.php) There is also a Second Life Teen Grid for teenagers between the ages of 13 and 17, and where adults are not allowed in.

The School of Hotel and Tourism Management decided to explore the educational possibilities of Second Life after developing a virtual hospitality simulation, 'Virtel'. The Virtel project was an interactive 3-D game that allowed students to participate in simulations relating to real-world authentic scenarios that they may experience in their work placement. Second Life was chosen to further explore the pedagogic possibilities of Virtual Worlds for several reasons;

1. It is extremely challenging for any educational institution to develop a well produced simulation as they cannot compete on budget with industry, nor can they compete with talented game designers and Second Life provides a ready-made platform.
2. Second Life enables students, educators, and businesses to create innovative environments for distance learning, computer-supported cooperative work, simulations and teaching.
3. Second Life provides a 3-D simulation in a safe environment to enhance experiential learning, allowing individuals to practice skills, try new ideas, and learn from their mistakes. The ability to prepare for similar real-world experiences by using Second Life as a tool for simulation was identified as having unlimited potential.
4. Students and educators can work together in Second Life from anywhere in the world as part of a networked and very social virtual classroom environment.
5. Second Life offers flexibility in access, identity, is easily customised and offers a distinct feeling of presence not seen in other e-Learning (social) activities.
6. Using Second Life as a supplement to traditional classroom environments also provides new opportunities for enriching an existing curriculum.

Background to the Case Study

At the Hong Kong Polytechnic University (PolyU), the School of Hotel and Tourism Management (SHTM) together with the School of Design (SD) created an innovative virtual campus in Second Life called PolyuSotel (http://virtel.shtm.polyu.edu.hk/sotel/) in order to;

- To provide a cost-effective platform for SHTM to continue teaching & learning in a virtual world;
- To provide an innovative and stimulating learning environment for students;
- To provide an existing virtual campus for other departments to test and use Virtual worlds;
- To encourage innovation and research in educational technology;
- To support PolyU's outcome-based education initiative by offering 'real-world' scenarios for teaching and learning

The project team originally planned to create their own virtual world using one of the open source platforms available. However, the attraction of using an existing world with a large number of residents outweighed the early plan. It was therefore decided to test one of the platforms available, Second Life, and to explore the educational possibilities of trialing the platform to support the School's student orientation programme conducted during September to October 2007. It was envisioned that this first foray into the educational possibilities of Virtual Worlds would provide a valuable learning experience and areas of further exploration. This 'virtual' orientation programme aimed to cultivate new learning experiences for the students and the provision of various educational activities. Over 400 full-time Year 1 hotel and tourism students were invited to join the orientation programme

and academic staff; Year 2 and 3 students took the roles of "teacher" and "student mentor".

PolyUSotel

This island was developed with many recognizable buildings from the bricks and mortar PolyU campus to enhance an existing student orientation programme. It was designed to help students become familiarized with their new study environment and understand how to become an effective and successful student in the Hong Kong Polytechnic University.

In PolyUSotel, students registered and created a personalized 3-D avatar in order to participate in various structured tasks related to the SHTM orientation programme. They were expected to explore the campus and team-up with fellow students in a series of competitive and structured activities. Opportunities were also provided for them to interact with, and learn from, senior students and teachers through in-world consultations. Also, as a motivational strategy they could redeem virtual gifts at PolyUSotel using the reward points accumulated on successful completion of tasks or competitions. Lastly a set of unstructured 'places of interest' were developed in order to assist the students in exploring this virtual environment. The following clarifies in more detail the three identified aspects of the PolyUSotel experience.

1. Activities

PolyUSotel provided a series of activities within a supported environment to help students get to know fellow students, teachers, learn about university life and some essential learning skills. The students could interact with other participants in the PolyUSotel at their own discretion and also had the opportunity to complete a scheduled series of interesting activities requiring active participation and completion of learning tasks. There were chances for students individually and in teams to be rewarded with real and virtual gifts upon completion of these activities or missions. Below is a sample of two of the missions;

EG: Mission 2: *Grooming in formal events*

Brief: Collect a formal outfit at the "Grooming" kiosk in PolyUSotel. Wear the outfit and alter your character's appearance when you attend online discussion session in the virtual classroom/theatre.

EG: Mission 4: *Learning styles*
Brief: Complete a Learning Styles self-test at http://www.engr.ncsu.edu/learningstyles/ilsweb.html.
Submit your personal result according to the score sheet generated, and obtain a meeting schedule you need for Mission 5. Duration: 4 Sep – 17 Sep Reward points 20 points

2. In-World real-time consultations

Teachers were scheduled to provide in-world real-time consultation sessions on different themes related to students study and personal development. This was on a voluntary basis for students and the maximum capacity for each session was around 30 persons, on a first-come-first-served basis.

The following were some of the topic areas offered;

a) Personal grooming and classroom etiquette
b) Understanding your learning style & strengths
c) How to be an effective student: study skills (reading, note taking, handling exams etc)
d) How to become an active learner in PolyU
e) Managing pressure & stress
f) Academic Honesty – what is plagiarism and how to deal with it?
g) Work-integrated education – what it is, how it works, how you benefit + Q&A
h) Student exchange programme + Q&A
i) Meeting with 2007/08 Year 1 tutor (Q&A)
j) Meeting with 2006/07 Year 1 tutor (Q&A)
k) Meeting with MSc programme leader (Q&A)

3. Places of Interest

Also within PolyUSotel the following were established as 'open-ended' and 'unstructured' places of interest;

Landmark – clock tower and plaza	The Clock Tower Landmark was the central meeting place in PolyUSotel and where you first appeared when you teleported to the island. It mimicked the real-world clock tower on the Polyu campus.
Information Signpost	The Signpost was designed to provide hints and guidance for students related to various tasks and consultations
Team Room	The Team Room was designed to provide various break-out rooms where smaller groups could meet and discuss aspects related to the tasks for different mission objectives

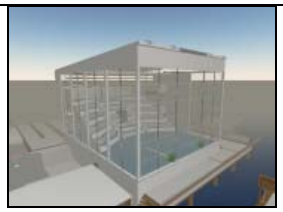
Wishing Tree	The Wishing Tree was where students could leave feedback and comments in relation to their experiences in the PolyUSotel environment
 Theatre	The Theater space was designed to provide an environment similar to a Real-World lecture with the opportunity for groups to meet, participate in lecture-like activities and presentations
Resource Centre	The Resource Centre provided an environment similar to the Real-World library in which resources (video / text. etc) were linked to bookshelves in the Centre.
Gift Shop	The Gift Shop was where students could spend their reward points earned through participation in various activities on items for their avatar OR real-world gift vouchers.

Figure 1: Places of Interest in PolyUSotel

Second Life Pedagogy

The following were identified as key educational benefits of Second Life as opposed to other eLearning possibilities that were considered in order to provide a richer orientation experience for the SHTM students.

Social Presence

One of the most profound impact of the sweeping popularity of the Internet advocates social learning which is based on the fundamental premise that learning and understanding is 'socially constructed' through a wide range of activities afforded by a rich social learning space where students can interact with other follow students, tutors, and the instructional elements in a wide range of social activities.

Richard J. Light (2001) highlighted that one of the strongest-determinants of student learning success was students' ability to engage in small study groups and thus socially build their understandings and construct knowledge. In the literature there are a number of documented studies exploring the potential of social learning (Klamma et al 2006; Saltze et al, 2004; Reffay and Chanier, 2002; Kreijns et al, 2002; Hiltz and Turoff, 2002 and Brusilovsky et al, 2005), including those performed on Second Life in the Harvard Law School, the University of Southern Queensland (Australia), Ohio University, New York University, to name a few (Ducheneaut et al, 2005).

Second Life provides a much greater sense of presence than the World Wide Web. Usually students manifest their presence in the Web through activities such as discussion forums, blogs, posting YouTube videos, or social networking sites such as Facebook and MySpace. In Second Life there is a greater sense of realism, as if users are attending the event with others. Technologies within Second Life also contribute to this sense of social presence by allowing users to more clearly hear someone speaking close by than with an avatar that is further away.

Self Identity

The use of avatars to represent the individual can significantly change social / multicultural perceptions and judgment, and gender and status expectations. Bradshaw, (2006) describes Michelle Dodd, of Challenger TAFE (WA), who managed a Framework inclusive e-learning project in 2006 and used Yahoo avatars with learners with a disability. She discovered that the students were very liberated by the use of their avatars, as they could choose what identity they would like to be, although it is interesting to note that towards the end of the project individual avatars more closely resembled the real person in looks.

Imagine being a learner where for example English is the predominant medium of instruction. However your native language is not English. Students could be assigned different roles within specific activities designed to allow them to take on various identities in role-play in order to highlight some of the difficulties and strategies needed to be adopted within various learning scenarios. The experience could well make that student (and teacher) a more empathic learners and bring to light some underpinnings that need to be considered in these types of learning scenarios. Lancefield (2006), suggests that the level of anonymity afforded in virtual worlds through playing a role and use of an avatar can enhance the level of social confidence to enact new behaviors and increase self-awareness and efficacy.

Teachers as Central

The 2006 New Practices in Flexible Learning action research project, “Virtual Worlds – Real Learning!”, emphasized that the role of the teacher is absolutely central and highlighted that at every stage, the teacher needs to be fully present, engaged and alert. This report suggested that if teachers and learners are to achieve the educational

wealth inherent in Second Life, there are three key factors that are vital:

- the provision of time for teachers to prepare themselves for inhabiting Second Life as a broad and deep learning environment
- according critical importance to continuous, integrated reflection – which means incorporating guided dialogues with students before and after immersion
- providing adequate professional development and ongoing support for teachers, as they venture into what, for most, will be unknown territory – as both guides and 'guardians' of their students

Enhances students' learning experience

Simulation, games and role-play are notable for their extensive potential in engaging students in their own learning with a stimulating, 'real-life' environment applicable to tourism and hospitality curricula, with a focus on work-based problem solving and professional, transferable skills (Armstrong, 2003). Simulations can be described as learning by doing, as though the user is actually in a situation, and really doing something (Schank, 1997) and simulations are being increasingly used not only by industry and the military but in education. Successful educational simulations need to be a combination of three elements according to Aldrich (2004). The first is 'simulation' which models reality and enables discovery, experimentation, practice and construction of content. Second, 'game elements' which provide familiar and entertaining interactions and which motivate students to learn. Third, the 'pedagogical or didactic' elements which help to provide a focus for activities and ensure students' time is spent productively.

Engages students in deeper learning

Students engaged in educational games and simulations are interpreting, analysing, discovering, evaluating, acting, and problem-solving. Simulations are suggested as a replacement of real-life situations which are too dangerous, too expensive, or impractical to allow students to experience in the real-world. Simulations can provide an environment where students can explore, experiment, question and reflect on real life situations. Role-play is historically been used in a range of disciplines including drama, education, psychology (Britt, 1995), social sciences (Duveen and Solomon, 1994), health sciences, business (Brown, 1994; Egri, 1999), tourism and hospitality, ethics (Brown, 1994; Raisner, 1997; Armstrong 2003), economics, marketing, political science and information technology (Kirkwood and Ross, 1997). New approaches are also emerging via specially designed computer software (Wagner, 1997). Simulation and role-play, if designed appropriately, can provide the following benefits:

- Enhance interest in the topic and retention of knowledge and skills;
- Capture students' imagination, stimulate involvement and allow significant freedom of expression;
- Build the confidence of students in a non-threatening environment.

Uses learning methods that motivate students and achieve results

Students today are in touch with technology and innovation in their everyday lives. These young people are community-focused (especially in Asia), they belong to virtual communities to discuss shared interests (communities of interest), to develop social relations (community of relationships), and to explore new identities (communities of fantasy) (Hagel and Armstrong, 1997). According to Zemsky and Massey (2004), students want to use technology in order to be entertained through music, games and movies, to be connected to one another and to present themselves and their work. Educational institutions are playing catch up, and not doing it very successfully. Yet, despite this situation, there are signs of change, with learning taking place in some academic departments which demonstrate student-centred and innovative teaching through e-Learning and "Serious Games" (Annetta, Murray, Laird, Bohr and Park, 2006).

It might be construed that the use of 'game' ideas such as 'missions' and 'reward point' might not be educationally sound or in conflict with other pedagogical ideas described earlier. However, the use of these game concepts to motivate and help students plot a path through the programme seemed to help rather than hinder the learning experience. Some students in their evaluation indicated that they expected more game-based activities and were disappointed that Second Life was not so 'dynamic' as other games they had played. Therefore our use of some game concepts helped to provide a pathway and a plot which did help some students progress through the programme.

Hind-Sight and Lessons Learned

The programme was voluntary and received over 60 student registrations, however only 10 students took part in the activities and workshops. This substantial lack of numbers in the project indicated for the project team that there were some serious issues that needed to be addressed in future teaching and learning activities incorporating Virtual Worlds. There were a number of identifiable moments within the process of the programme delivery that provide the reader with an insight into areas identified for improvement.

Moment 1: Awareness and Understanding of the Programme

What was identified very early on in the programme was a greater need to have defined and demonstrated through numerous channels the benefits of participation in the programme. Also explored was the option of making some aspect of the programme more closely tied to a compulsory event such as one inclusive of the students Work Integrated Education training.

Moment 2: Technical Issues and Support

Second Life does require some quite specific technical requirements and although every effort was made to ensure a specific lab was established with these specifications still students needed additional support (for example maybe a designated contact point via email, phone or MSN messenger

Moment 3: Second Life Orientation

There were some difficulties in students being able to complete the Second Life Orientation Island and from there to easily locate the PolyUSotel Island. It was identified that a guide to the user interface in Second Life and making the PolyUSotel Island open to the public would have been beneficial.

Moment 4: Develop a PolyUSotel presence

At times because of the lack of students in the PolyUSotel Island there was a feeling of isolation by the students (and staff) who did participate. Recommended for future trials would be to train a cohort of students in the use of PolyUSotel and have them present in the island as guides to meet newcomers and to help them settle in.

Moment 5: Clarity of Task Instruction

Although some of the tasks were identified as beneficial to students from an educational perspective and also from the perspective of achieving the objectives of the programme, there at times seemed to be a disjunction between these and the social or play aspects of the simulation in Second Life. Future plans should aim to both simplify the tasks and associated instructions and to provide more opportunities to 'play / explore'.

Moment 6: Timing and Awareness of Consultation

There was a clash in times when students were interested in using Second Life and when the consultation times / teaching staff were available. Students mostly explored Second Life in the evenings and early morning (typical of Hong Kong students) whereas teachers often were available for consultation during working hours. It was also suggested to align the tasks with more concrete real-world tasks.

Conclusions and follow-up

Clearly the use of Second Life to support the student orientation programme of the SHTM students was not the success (in terms of usage) that the project team had hoped for. However, it is pleasing to note that this initial foray into the use of Virtual Worlds has provided an emerging grassroots interest at the Hong Kong Polytechnic University in the teaching and learning possibilities of Second Life. As an outcome of this project several other programmes are now actively teaching using Second Life and a recently submitted eLearning funding proposal entitled "Core SL – HK PolyU in Second Life" highlights the success of this case in relation to initiating some conversations and further interest in this area.

This new project, "Core SL – HK PolyU in Second Life", started in late-2008 and builds on and expands upon existing funded projects in Second Life and the experiences of teaching and learning efforts by the School of Hotel and Tourism Management and the School of Design. It has already provided a new virtual campus to enhance the learning experience of students at the HK Polytechnic University through the development and deployment of four functional spaces within the 3D online world of Second Life.

The project was jointly proposed by staff from the Department of Applied Social Sciences, the Department of Computing, the School of Hotel and Tourism Management, the School of Design, and the Pao Yue-kong library. The project has initially targeted a number of programmes and courses which directly affect over 1000 students in the four different departments or schools. The new Hong Kong PolyU Second Life Campus has provided a rich 3D virtual environment to support student learning activities with four functional spaces: Teaching & Learning, Assessment, Design and Resources.

Closing thoughts

If Moore's law holds true, Second Life will not be at the bleeding edge of technology for long. As server power and bandwidth increase, more possibilities will develop around Second Life and Virtual Worlds in general. An anticipated increase in ubiquity and technology will allow Second Life and related three-dimensional simulations to develop a more realistic look and enhanced interface, with more powerful tools for communication and interaction.

One can easily imagine a more immersive environment. Kurzweil (2005) describes several scenarios for building full sensory environments with offshoots of today's technology. Technologies like Second Life provide people with an opportunity to role-play very different lives. Avatars cross gender, race, and cultural lines, blurring the differences that can be obvious in real life interactions. The social and (multi)cultural implications of a more powerful and immersive environment are immense. The first artificially intelligent agents (AIA's) capable of interacting with avatar residents are appearing in Second Life by linking modern artificial intelligence engines into avatars. Some are obviously designed to appear artificial, while

others attempt to pose as real people. As the engines get better, the distinction between residents and AIA's becomes will become more blurred.

Like the early days of the Internet, there is an optimism driving experimentation and exploration across the learning ecology presented by Second Life. The unique qualities of Second Life can provide immersive authentic contexts involving simulation and role-play and opportunities for social learning that can not be easily achieved using other platforms.

Which tools are used by learners and teachers, and whether such tools will be used at all, will always depend on the specific pedagogical needs of a teaching situation. Second Life presents educators with shifting frames of reference to consider in relation to teaching and learning. Clearly acknowledged is that the use of Second Life as part of the orientation programme in SHTM was not as successful as originally envisioned. However, the specific lessons learned, and 'moments' of intervention and further assistance identified have provided rich material and an emerging interest' in relation to the incorporation of Second Life into meaningful educational activities.

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Second Life in Education, some examples

The growing use of Second Life within education is illustrated below by a small sample of many examples and is sourced from; http://schome.open.ac.uk/wikiworks/index.php/Second_Life_education_websites;

- The list of universities who have locations in SL http://simteach.com/wiki/index.php?title=Institutions_and_Organizations_in_SL
- Second Life Education Wiki http://simteach.com/wiki/index.php?title=Second_Life_Education_Wiki
- Proceedings of the Second Life Education Workshop (August 20th. August 2006) http://www.simteach.com/SLCC06/slcc2006-proceedings.pdf
- Metalab: "Creating and exploring tools for online learning events within Second Life" http://metalab.blogspot.com/2006/06/communal-whiteboard.html
- VITAL Lab at Ohio University - overview of a good range of SL projects http://vital.cs.ohiou.edu/index.php/Second_Life_Development
- 101 Uses for Second Life in the College Classroom http://trumpy.cs.elon.edu/metaverse/gst364Win2005/handout.html
- The New Media Consortium (NMC) Campus (SLurl) is the largest educational presence in Second Life and supports events, classes, demonstrations, art exhibitions and learning experiences (http://sleducation.wikispaces.com/educationaluses)

For more information about this project please refer to;

http://virtel.shtm.polyu.edu.hk/sotel/

http://project.shtm.polyu.edu.hk/new-index.html

http://slurl.com/secondlife/Polyusotel/128/1

Second Life: Offering Marginalized Youth a Second Chance

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At an alternative high school serving predominantly at-risk underrepresented students evicted from mainstream education, we implemented *Fractal Village*, a critical/computational/constructionist-pedagogy (C^3) learning environment of my design. Fractal Village, instantiated in the virtual-world "Second Life," constituted an empirical environment to research my emergent model of *mathematical/computational agency (m/c)* as well as an intervention aiming to foster such agency. Key research objectives were to: (1) study relations amongst cognitive, affective, material, technological, and social factors that would contribute to individual development of m/c agency; (2) delineate design principles for fostering m/c agency; (3) implement a sustainable program in collaboration with school personnel.

The student cohort engaged collaboratively in virtual-world imaginative construction activities each manifesting *generative themes* (Freire, 1968), to which the designers-as-teachers tailored mathematical and computer-science concepts, such that students appropriated the STEM content *apropos* of tackling their own emergent construction problems. Through the lens of three case studies, we argue that to build agency, students must develop both skills and dispositions—a spiraling inter-constructive growth. We conclude that we can, and must, engage at-risk youth by helping them to build STEM identities, engaging their a priori m/c agency, and customizing skills and dispositions-related classroom discursive supports.

Introduction

It is every educator's aspiration that students become powerful agents in their own learning by adapting, transforming, and applying knowledge in the pursuit of change they want to see within themselves and the world. Herein we report on a design-based research study that investigated the nature and conditions for the development of mathematical and computational agency in Second Life. A potential contribution of this paper is in highlighting emergent reciprocities between methodology and theory in design-based projects. Namely, we have come to reinterpret aspects of the facilitation, which we had regarded as logistical, as bearing directly on the complexity of constructs under inquiry.

Our two research questions straddled theory and practice. The theory-oriented research question is: What are the relations amongst cognitive, affective, material, technological, and social factors apparently contributing to m/c agency? The practice-oriented research question is: What are the design principles that help foster m/c agency development?

In order to create an empirical setting for investigation of these research questions, we searched for a medium that would provide space sequestered from real-world contexts, including any personal inhibitions students might have—a space that would provide opportunity for powerful identity transformations and potentially develop students' mathematical and computational literacy. We chose a digital environment called Teen Second Life (TSL), a proprietary virtual 3D world owned by Linden Laboratories (Linden_Research, 2007). It was hoped that living, playing, and learning in a virtual world could help suspend, or even change, students' beliefs about mathematical and computational fields and about their own identities as STEM practitioners. Within TSL, we designed and implemented *Fractal Village* (Veeragoudar Harrell & Abrahamson, 2007), a 3D virtual island in which students could construct personae of their own making and build imaginative artifacts through a programming interface.

Pedagogical and Theoretical Commitments

Veeragoudar Harrell (2007) proposed and studied a model of mathematical agency that is comprised of the following six interacting factors characterizing aspects of individual students' knowledge, skills, and psychological and social inclinations:

a. Availability of mathematical concepts, such as definitions and formulae, in the personal knowledge-base repertory;

b. Ability to select and apply appropriate mathematical procedures during inquiry, proof, and problem solving (Collins & Ferguson, 1993; Schoenfeld, 1985);
c. Personal positioning with respect to the practice of mathematical reasoning, both in terms of identification as a mathematics learner and doer (Cobb & Hodge, 2002; Nasir, 2002; Lee, 2003) and within the socio-cultural context of mathematical practice, such as a one-to-one tutoring session, whole class discussion, or small group project (Lave & Wenger, 1991; Yackel & Cobb, 1996);
d. Affective disposition toward mathematics content and mathematical practices, e.g., toward explorative modeling-based mathematical problem solving;
e. Fluency in mathematical literacy, broadly perceived, and knowledge of privileged mathematical discourse norms, e.g. ability to articulate one's reasoning using a mathematics 'register,' generating normative mathematical inscriptions and artifacts in so doing (Balacheff, 1999; diSessa, 2000; Ernest, 1998; Mahiri, 2004);
f. Facility (cognitive, affective) in appropriating personally new semiotic means, e.g., diagrams or innovative computer-based tools, (Vygotsky, 1978/1930).

Stemming from a framework in which critical pedagogy and constructionism are jointly applied to STEM content, the following pedagogical commitments informed the design of an instructional intervention to foster mathematical agency: (1) engage generative themes; (2) develop computational literacy; (3) foster imagination play; and (4) focus on constructionist activity.

The construction and facilitation of Fractal Village was inspired by the proposed slogan *Critical-Constructionist-Computational literacy (C^3),* a blend of the critical-pedagogy vision of Paulo Freire (1973), the constructionist pedagogical philosophy of Seymour Papert (1980, 1991), and the idea that computational literacy will one day be as widespread and important as textual literacy (diSessa, 2000).

Central to our approach is the Freirean concept of dialogic education, by which teacher and student share ideas "horizontally" (not hierarchically) with mutual trust, and knowledge and understanding are seen as emergent and transformational (as opposed to static and conventional). Accordingly, we worked with students to identify generative themes—central productions of dialogic education consisting of aspirations, motives, and objectives, rooted in temporal-spatial conditions of the students (Freire, 1973), albeit with the understanding that such themes are dynamic. Through constructionist activities, we aimed to create opportunities for students to develop mathematical reasoning skills and computational literacy as they engage the generative themes.

Veeragoudar Harrell's (2007) emergent view of STEM agency should be viewed as operationalizing the application of C^3 to students' STEM learning. This m/c agency model spells out the six factors discussed above that are pertinent to individual students' agency in a situated mathematics-problem-solving context. In turn, this model informs design decisions on the iterative development of Fractal Village. Table A elaborates on the C^3 pedagogical commitments alongside the m/c agency factors, that informed the design of Fractal Village.[1]

Table A.

Pedagogical commitments of the study

Inspiration	Pedagogical Commitment in Design of Fractal Village
Paulo's Freire's (1973) critical pedagogy	Generative themes
Seymour Papert's (2000) constructionism	Constructionist activity
Andrea diSessa's (2000) computational literacy	Computational literacy development
James Gee's (2003) work in games and learning, Katherine Clinton's (2006) dissertation on embodiment in video games, and Katherine Hayles' (1999) work on imagination in virtual words	Imagination Play

These pedagogical commitments reflect the intellectual commitments of the study and, specifically, the design that was created to provide the empirical setting of the central study (see Figure A, below left). Hence, we add these pedagogical commitments to the theoretical foundations alongside the 6-factored model (see Figure A, below right).

[1] Yet another pedagogical commitment, imagination play, is included. This commitment emerged as a topical feature of TSL. However, imagination has long been viewed as a capacity for STEM creativity (e.g., Salk).

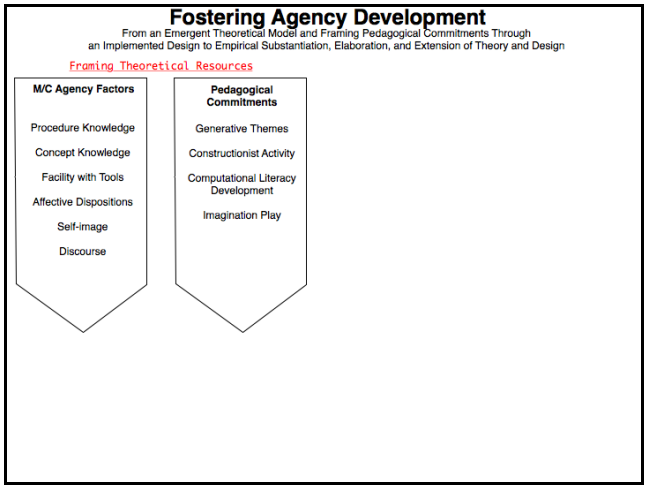


Figure A: The development of an ecology for fostering agency.

The m/c agency model and pedagogical commitments informed the instructional design elements, comprised of materials, activities, and facilitation (Abrahamson & Wilensky, 2007). Thus, the materials selected/built for this study served dual purposes: (1) to create context for activities eliciting students' *generative themes* (Freire, 1973) that the designers-as-teachers could then reflexively and strategically match with target mathematical concepts (e.g., variables and functions) and computer-science concepts (e.g., recursion, looping), so that students appropriate the STEM content in the process of tackling emergent construction problems they have identified and articulated; and (2) to elicit students' discourse surrounding mathematical activity and, hence, provide a lens on the dynamics of their self-image as mathematical practitioners (see Figure B, below).

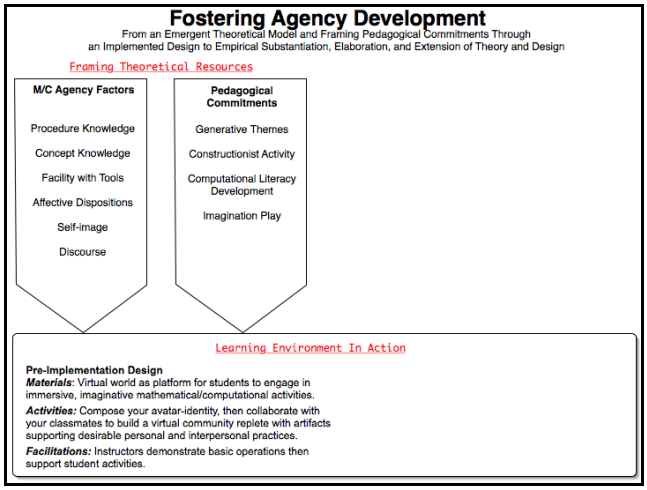


Figure B: The development of an ecology for fostering agency.

Data Sources

This being a design-based research study, our data sources are comprised of a rich documentation of the implementation of an experimental instructional intervention. Following, we overview this implementation and then focus on our case study.

Materials: Virtual Location and Journals. We used networked computers with access to Teen Second Life (TSL) or Second Life (SL). "Fractal Village," our virtual-world activity, takes place on a 16-acre island in TSL. Each student maintains a journal in which they regularly respond to questions the research team poses. These questions are intended to elicit students' experiences with technology and their dispositions toward media and content as well as to collect feedback on their experience with the designed activity and environment on an on-going basis.

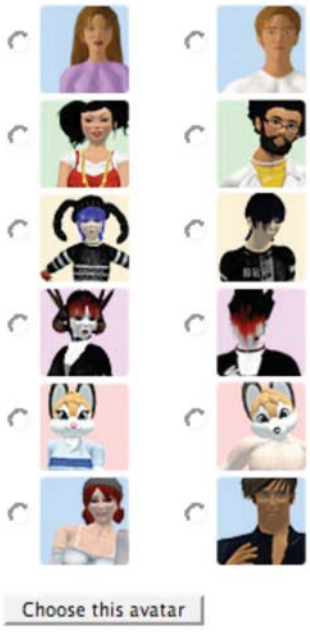


Figure C: Generic set of avatars user can choose among. These can be modified later.

Methods of Analysis

Using techniques adapted from grounded theory (Glaser & Strauss, 1967) and micro-genetic analysis (Schoenfeld, Smith, & Arcavi, 1991), we developed the key constructs discussed herein, and specifically we examined the adequacy of the initially proposed model of mathematical agency to capture the collected data. The Results section summarizes consistent patterns in the data as well as our interpretations of these patterns vis-à-vis our emerging model.

Results

We identified two discursive supports as necessary for student success that had not been specified prior to the implementation. The discursive supports (see Figure D, on the right)—skills- and dispositions-related—reflect aspects of teacher–student interactions. These supports were not part of the initial design, but to maximize student success we augmented the model.

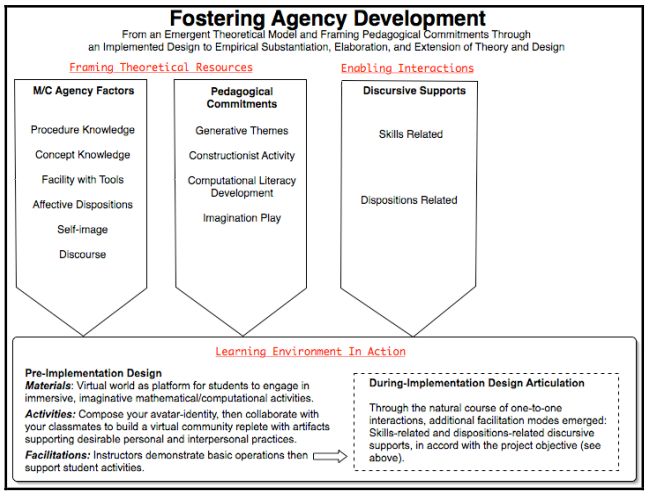
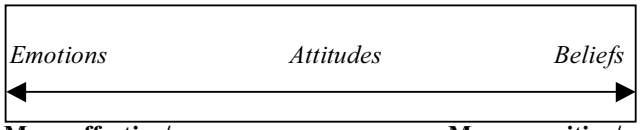


Figure D. Fostering Student Agency Model: The design of the learning environment was augmented during the implementation based on two identified enabling interactions—skills- and dispositions-related discursive supports—that emerged through intense day-by-day planning/debrief sessions of the research team.

Skills and Dispositions. Through data analysis, we came to appreciate that it would be methodologically beneficial to cluster several of the original six m/c agency factors into two groups: skills (to include procedural and conceptual knowledge and facility with tools) and dispositions (to include affective disposition and self-image/personal positioning). As we attempted to code data[2], we found that the same data segments could be assigned to two or three different factors. Thus, creating the six factors into two clusters availed me of richer data segments. A brief description of each of the two clusters is furnished below.

Skills. Students developed two types of skills; *interface deftness* and *computational literacy*. By "interface deftness" we refer to students' ability to efficiently navigate the graphical user interface to accomplish a problem-solving task. "Computational literacy" is based on diSessa's (2000) work in new literacies and is defined as effective deployment of material intelligence in the context of computational problem solving to achieve valued intellectual ends (a slight adaptations of diSessa's definition of literacy, p. 19). The original scope of computational literacy has been narrowed for purposes of analysis of skills in this study.

Dispositions. Mathematics-education research into affect has risen dramatically over the past two decades and was prominently positioned by both the National Council of Teachers of Mathematics and the National Research Council in 1989, in their recommendation that researchers attend to affective, as well as cognitive, factors related to mathematics teaching and learning (NCTM, 1989; NRC, 1989). Much of early mathematics-education research into affect utilized McLeod's (1994) classification scheme for concepts in the affective domain. The scheme included three concepts: *emotions*, *attitude*, and *beliefs*, ranging from 'more affective/less stable' to 'more cognitive/more stable' (see Figure E, below).



More affective/ Less stable — **More cognitive/ More stable**

Figure E: Uni-dimensional view of concepts in affective domain (McLeod, 1994).

McLeod's influential classification scheme was an important beginning that has since been elaborated to include the concept of *values* as well as interaction amongst the concepts (DeBellis & Goldin, 1997). The resulting model can be illustrated as a tetrahedral diagram (see Figure F, below).

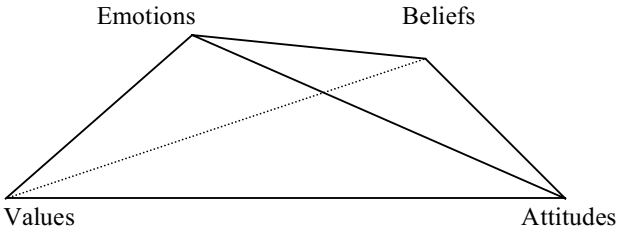


Figure F: Tetrahedron model of affect in mathematics learning (DeBellis & Goldin, 1997).

Yet the tetrahedral model of affect, too is incomplete: it does not account for a variety of emotional phenomena such as motivation, mood, interest, anxiety, and conception that need to be, and are currently being, investigated by numerous researchers across disciplines. Predominantly, mathematics-education researchers have focused their attention on attitude. A newer wave of researchers has been oriented toward coupling, "what one knows" with "how one learned it" (Gresalfi & Ingram-Goble, 2008). My research is aligned with this last view, which couples knowledge with the process of obtaining that knowledge. We utilize the disposition construct defined by Gresalfi and Cobb (2006) as "ways of being in the world that involve ideas about, perspectives on, and engagement with

[2] The coding scheme I used is detailed in the Methods chapter.

information which can be seen both in moments of interaction and in more enduring patterns over time." In this way the term "dispositions" is intended to capture affect towards mathematics/computer science problem solving ("looking out") as well as towards one's self as a mathematics/computer science learner and practitioner ("looking in").

After collapsing the six factors into skills and dispositions[3], we came to realize that these were aligned with the enabling interactions we had earlier identified. These relations are color coded in Figure G, below. M/C agency factors and discursive supports related to skills are written in blue text and those related to dispositions are in written in green text.

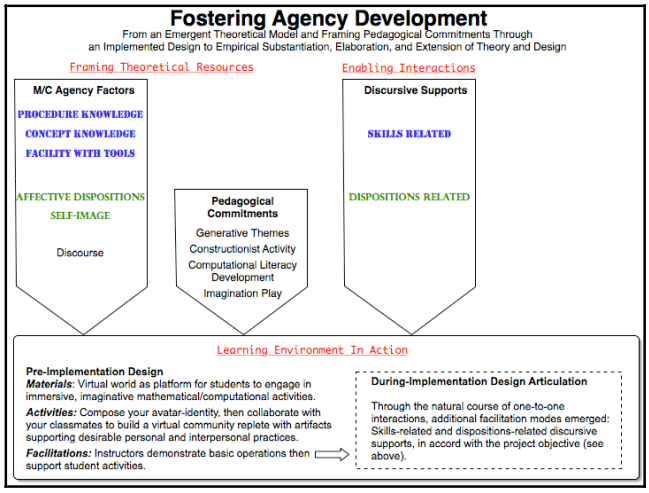


Figure G: We collapsed M/C agency factors into skills- and dispositions-related factors. We realized after the study that there was a correspondence of the newly collapsed m/c agency factors with the discursive supports we had identified during the study.

Thus far, we have discussed all that was invested *into* the learning environment. Next, we will look at what came *out* of the learning environment. Specifically, we will look at students' m/c agency development over the course of the project, which roughly stretches from left to right in the figures.

Students' M/C Agency Development. We found that students developed m/c agency. This claim is substantiated by measurable skills and dispositions found in data collected during the study.

[3] The factor relating to discourse practices will not be discussed in this section. I found minimal data episodes relating to a change in discourse practices and therefore, instead of including it in the analysis, I will discuss this factor in the future-work section.

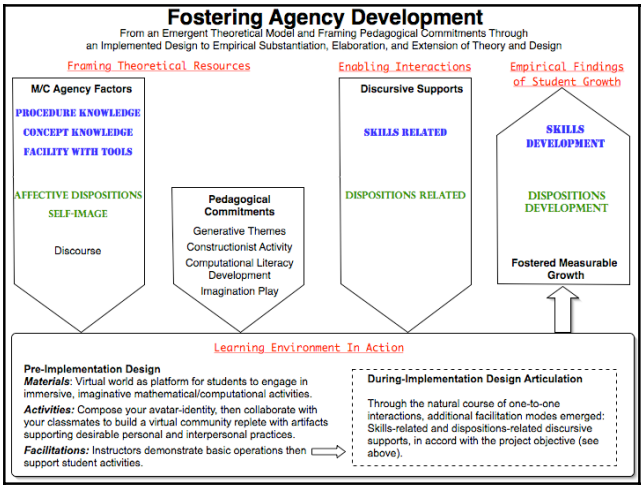


Figure H. The learning environment in action fostered measurable growth in students, specifically skills- and dispositions development.

Recall that the project aimed to illuminate best theory and practice. With respect to the theory-oriented goal, we found that cognitive and affective factors are co-dependent variables, reciprocally related, in contributing to m/c agency development (see Figure I below, noting the feedback loop between skills and dispositions).

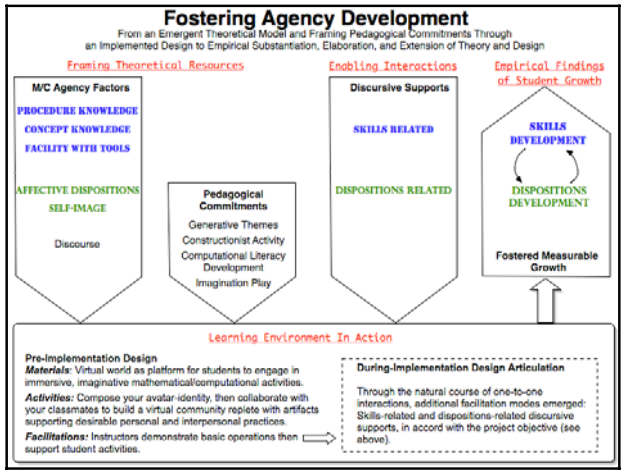


Figure I: Fostering Student Agency Model. Students skills- and dispositions development was reciprocal, gaining skills fostered positive disposition development and vice-versa.

With respect to the practice-oriented goal (delineating design principles), the emerging claim is that m/c agency development can be fostered through implementing a convergence of two sets of interventional components, namely *pedagogical commitments* and *discursive supports* (see Figure I, above).

Educational and Scientific Importance of Study

The students in this study are those that have been thrown away by the mainstream school system and explicitly told not to return. They are marginalized and disenfranchised, and the alternative school represents a last chance for most of them. While the resources necessary to support their development of agency in learning are enormous, this study acts as an existence proof that we can learn from, and build upon. The consequences of not paying attention to research that yields demonstrable positive results is devastating, both for students—the "end client" of the entire educational research endeavor—and for design-based researchers who are liable to continue wondering why their instructional materials fail to "work" for all students.

ACKNOWLEDGMENTS

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GeLve: Requirement Collection for Student Software Engineering Projects in a Virtual World

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Many IT students may have the image of possessing good technical and analytical skills while creativity and entrepreneurship are lacking. The GeLve project has been started and aims to help students to gain more business knowledge. The virtual company, SVG Corporation, has established with multiple departments and AI robots in Second Life so as to simulate the real-world business environment. Students can practice their communication and fact finding skills during the visits in the departments and interviews with the virtual "staff". The development of this fictitious company not only provides a new experience in requirement collection process to students, but also lowers the working effort of our colleagues in acting as the external business clients. The overall feedbacks from students have been positive while coordination and presentation difficulties have been encountered. This paper discusses our development effort, student arrangement, design and progresses.

1. INTRODUCTION

Recent survey (Project Tomorrow, 2008) indicates that computerized games can promote student learning in three different aspects, which are learning attitude, learning efficiency and learning effectiveness, because of their attractive interface, multi-tasking characteristic and simulative nature (Buckstein, 2008; Ellis, Heppell, Kirriemuir, Krotoski & McFarlane, 2006; Ostweil, Austin, Drzaic & Roy, 2006). Hence, Second Life (SL) is chosen for our work as it provides users with "variety of opportunities for interaction, sense of community and users' self-building (Zhang, 2007, Overview)" and which makes it become a popular platform for education. According to SimTeach, there are over 100 institutes of higher education working with active projects in SL (Joly, 2007). In addition, researches also show that SL has been involved in teaching Computer Science, including programming (Esteves, Antunes, Fonseca, Morgado & Martins) and software engineering (Ye, Liu & Polack-Wahl, 2007) because of its building and scripting functions of SL (Zhang, 2007).

For many companies, IT students are expected not only having technical skill, but also other soft techniques like communication skill, creativity and entrepreneurship so as to cope with the rapidly-changing business environment (Žagar, Bosnić & Orlić, 2008). In order to provide more practice for students, a multi-module software engineering term project has been set up for students as practical training since 2006 in our department.

This paper consists of 5 sections. After the introduction, section 2 presents the structure of the joint project. Next, the project supporting components for assisting student learning are described. It is followed by the descriptions of different types of development projects available in the virtual company. Two student work samples are shown before the end of the section as well. Section 5 concludes the paper.

2. PROJECT DESIGN

In Fall 2006, a simulated environment with business cases of a "company" has been introduced and colleagues were acted as external clients for giving requirements during interviews. With this arrangement, students gave very positive feedback because they considered, through the project, they have learned communication skill and business knowledge, which were quite difficult to acquire in the regular lectures and tutorials. However, the project arrangement cannot be scaled up because of there are increasingly more students involved while resources of physical presence of "company" managers are limited. Since 2008, alternative platforms utilizing recent ICT

technologies, such as the Second Life (SL), have been adopted to support the increasing demand and complexity of this multi-modules term project.

The joint project has involved 2 modules – Human Computer Interface (HCI) and Foundations of Database Systems (DB). The 2 modules are complimentary so as to allow students taking this opportunity to integrate their knowledge and understanding on the actual ICT business cases and problems. The duration of this project is one semester. As everything in SL is made to simulate the real world, an IT business environment can be offered to students by the development of a virtual company with AI robots acting as staff so students can collect user requirement without imposing heavy workload on our colleagues.

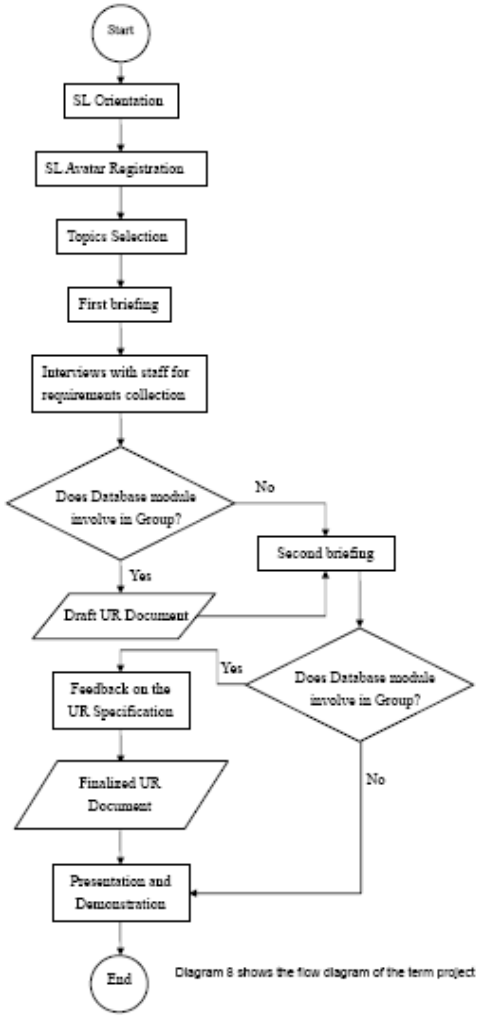

Figure 1: Multi-module student project Workflow to collect user requirement

During Fall 2008, students were guided progressively with just in time information about the multi-module student project (MMSP) and the SVG Corporation, a fictitious company. The flowchart of the project arrangement to collect user requirement is shown in Figure 1. Intermediate submissions from students would be commented by lecturers while the feedback presentations have been done through avators or robots acting as staff in SVG. With this arrangement, lecturers were at the back scene while students felt more realistic dealing with the business world.

3. PREPARATION AND DEVELOPMENT

In order to streamline the logistics of the multi-module student project, our team has developed the virtual environment in SL and several tools to support the student learnng.

3.1 SVG – The Virtual Company

A virtual company with several departments named as the SVG Corporation is built inside SL so that a "real-world" business environment can be simulated. The following is a description of the SVG, which is provided to students as a handout.

"SVG Corporation mimics an international company which earns revenue as a franchiser and an operator of restaurants. Apart from restaurants, SVG also funds SVG Charity House (SCH) and SVG Burger University. Although the SCH is an independent non-profit organization, SVG Corporation pays the general and administrative costs of the SCH global office. Therefore, a majority of the money donated by individuals and organizations go to the SCH and support the SCH programs. SVG Burger University has provided trainings which emphasize consistent restaurant operation procedures, service, quality and cleanliness. It is the marvelous global center for SVG's operations training and leadership development. Furthermore, SVG Privilege Club has been set up as the membership program for the customers. It also links with SCH because points can be gained through any kind of donations to the SCH. The SVG is a subsidiary of the SVG Corporation."

The company structure of SVG is shown as in Figure 2. Some snapshots of SVG in SL are displayed in Figure 3 and Figure 4.

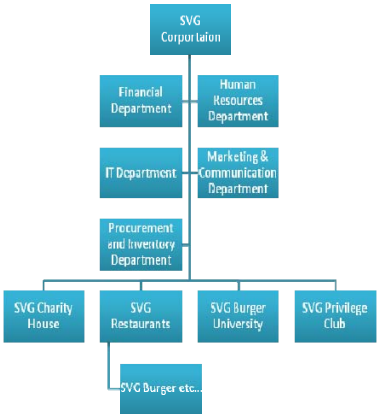

Figure 2: Company Organization Chart of SVG

Figure 3: The SVG Corporation in Second Life (top view)

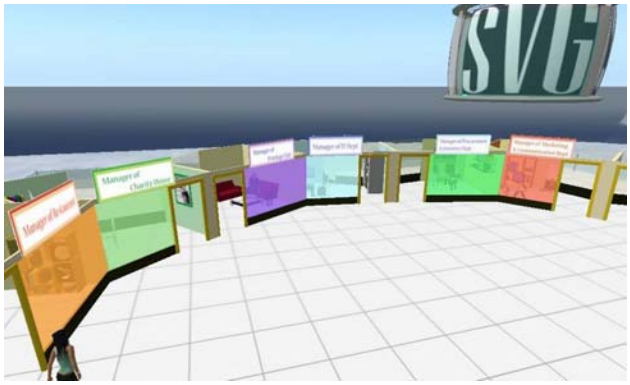

Figure 4: Different Departments in SVG

3.2 Centralized Information Source

A project website for the multi-module student project, as shown in Figure 5, has been constructed to deliver all the necessary information, such as group formation, submission deadline, samples and tutorials, related to the MMSP. It also acts as a channel to notify students about the progress of the project and collect feedbacks from the lecturers.

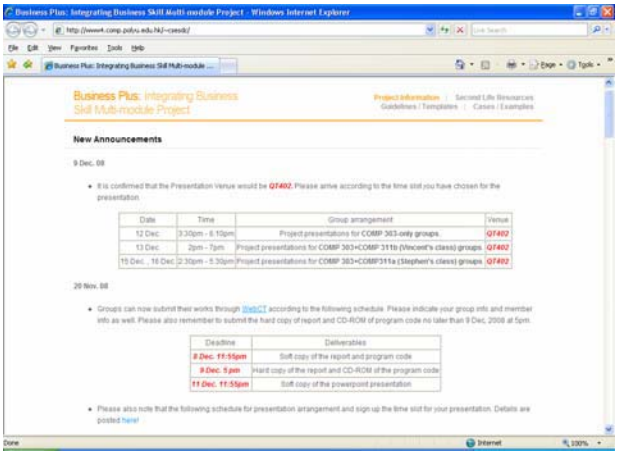

Figure 5: The project website

3.3 Avatar Registration Page

The Avatar registration page, as shown in Figure 6, enables students to establish the correspondence between their avator ID and student numbers. After the matching done, logging of student activities or conversations in the SVG is possible. Lecturers can use the logs to analyze student activities and provide better guidance. For example, they can comment on the communication skill of the students through the interview records. Also, the existence of avatar registration page enables the appointment arrangements for interviewing with SVG staff.

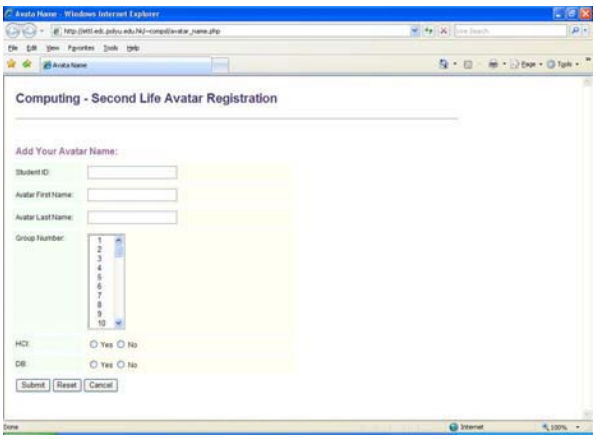

Figure 6: The avatar registration page

3.4 SVG Staff - AI Robots

One objective of introducing SL is to reduce the workload of colleagues to act as external clients while at the same time, to enrich students to acquire some real world experience in communicating with people outside campus. A number of techniques has been investigated and the approach of utilizing AI robots is adopted.

The building of AI robots is based on Panaorobots, which provides robot hosting service (http://www.pandorabots.com/botmaster/en/home). The dialog control of the interviews between students and SVG staff are represented by Artificial Intelligence Markup Language (AIML). Through matching the pre-defined keywords and the question structures, SVG staff can offer appropriate responses to students. Through Pandorabots, the processes for both robotic creation and robotic training become simpler and easier as the AIML scripts could be generated automatically through the operations by using a few user-friendly interfaces without involving much computer programming. Figure 7 illustrates the platform for building an AI robot.

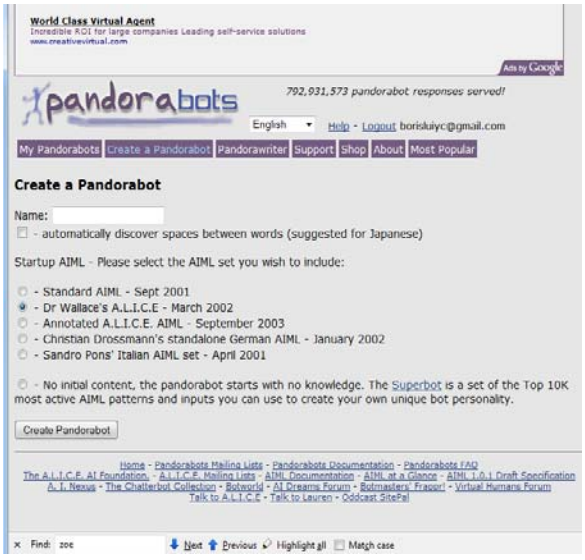

Figure 7: Robotic Creation within Pandorabots

In order to allow the robots to develop their own "intelligence", trainings are provided by inserting different sets of questions and the corresponding answers into their "brains" (database). After the insertions, AIML scripts for robotic activities will be generated and stored into the system. Another approach is to use the botmasters to train AI robots through direct editing of AIML files for better flexibility and functions. Figure 8 - 9 reveal the interfaces for robotic training and Figure 10 shows the AIML scripting interface for edition.

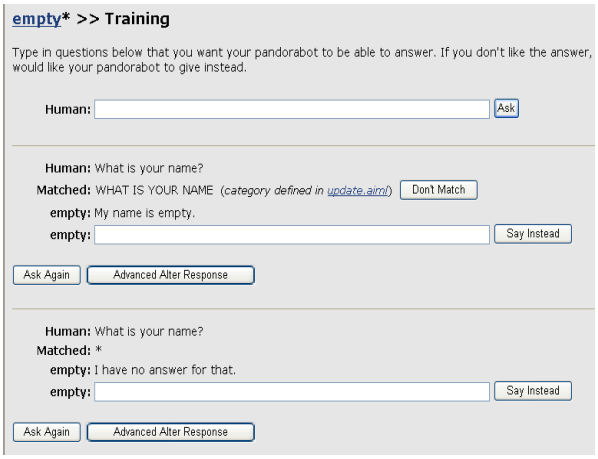

Figure 8: Basic training interface

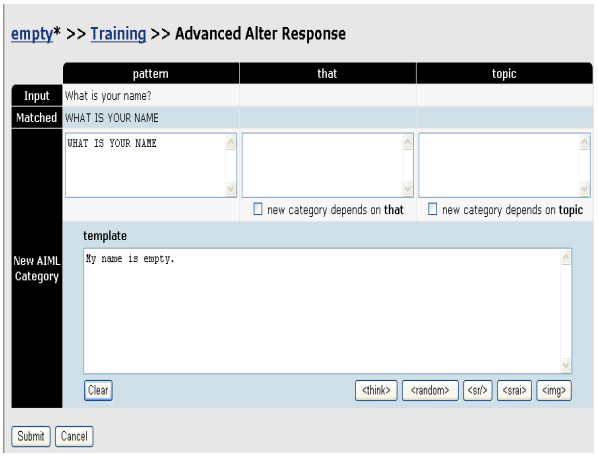

Figure 9: Advanced training interface

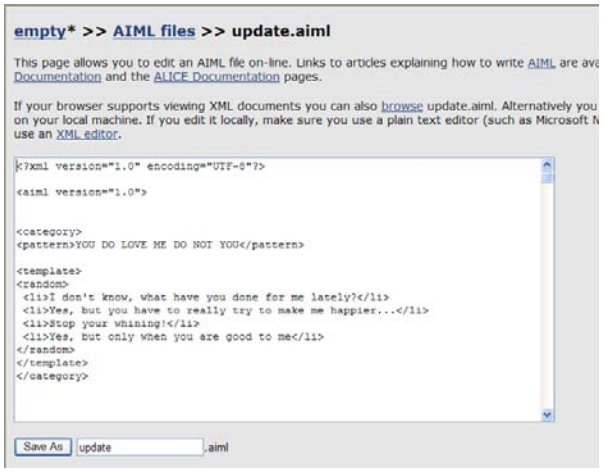

Figure 10: AIML scripting

Apart from the development of the AIML scripts, PHP coding is used for logging the conversations during staff-student interviews. A database is constructed to store the student information, including student ID and the corresponding avatar names as well as the questions and answers acquired during interviews. It acts as a reference for lecturers to investigate the interview skill of an individual student. Figure 11 shows the mechanism of the AI robots work. Figure 12 include some snapshots of the staff (AI robots).

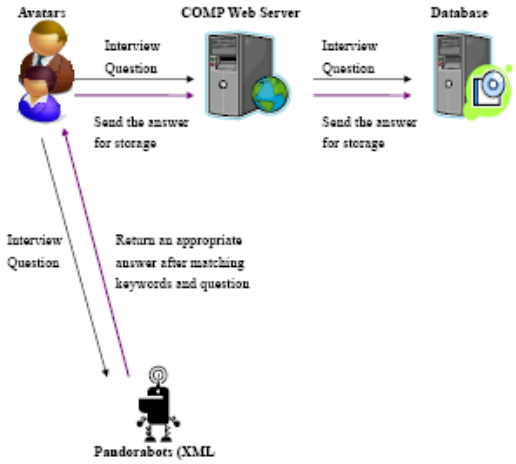

Figure 11: Working mechanism of the robots.

Figure 12a: The General Manager of SVG

Figure 12b: The Principal of the SVG Burger University

Figure 12c: The Manager of IT Department in SVG

Figure 12d: The Manager of Financial Department in SVG (top) and the Manager of HR Department in SVG (bottom)

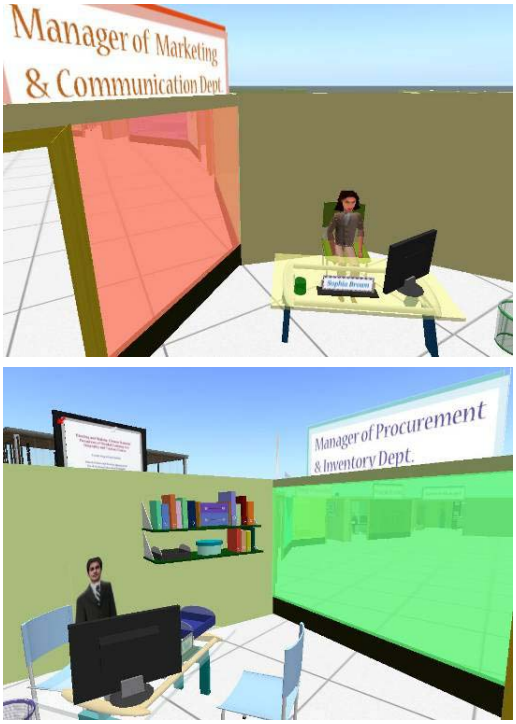

Figure 12e: The Manager of Marketing & Communication Department in SVG (top) and the Manager of Procurement & Inventory Department in SVG (bottom)

4. MMSP STUDENT PROJECTS

The SVG would like to streamline different operations, either within business or charity works, through building up a new information system or improving the performance of the existing systems. This implies students are asked to develop new ICT systems for SVG and acquire the business requirements for the respective system from the "staff" interviews and documents available.

There are 4 systems potentially for students to select and work on. Two existing systems, which are Contact Management System (CMS) and Recipe Management System (RMS), are looking for enhancement, while two new systems are requested by the general manager of SVG for fulfilling the arising needs from staff training and community charity. These two new systems are Donor Management System (DMS) and Online Quiz Management System (OQMS).

CMS is useful in managing contact information in an easy and efficient manner. It helps in organizing group contacts in different ways effectively. Besides, it allows users to rearrange the follow-up actions in priority. The target users of CMS are staff in Marketing and communication Department and Privilege Club. The former retrieve customer contacts and satisfactory reports for further marketing research and analysis with the help of CMS while the Privilege Cub needs this system for recording the customers' details. In addition, staff from IT Department would be in charge of system maintenance. The General Manager of SVG also has the authority to access the system. As a result, students are required to get the system requirements from these 4 parties in SVG Corporation so as to enhance CMS for them.

RMS acts as the central repository for all recipes present in the restaurants owned by SVG Corporation. Also, it provides management in ordering ingredients. The target users of RMS are staff in the Financial Department, the Procurement and Inventory Department and all SVG's restaurants. The Financial Department makes use of this system for acquiring the price of individual ingredient, vendor details and the stock of ingredients while the Procurement and Inventory Department uses RMS to check the vendor details and ordering information, such as collection date of purchases. With the help of RMS, the staff from restaurants can deal with the inventory management and the chefs can work with recipe creation and edition. In addition, staff from IT Department and the General Manager of SVG also needs to access this system for system maintenance and system monitoring, respectively. Therefore, students are required to visit 5 different parties in order to get the system requirements for RMS refinement.

DMS is one of the new developments in SVG and which is important in organizing the donor details, relationship, donations and pledges, mailing lists and campaigns into a single repository in an effective and efficient means. Built-in marketing tools are also required in DMS so as to support marketing campaigns. The target users of this system are staff in SCH and the Marketing and Communication Department. SCH uses this system to manage donor accounts and generate reports, mailing lists while the Marketing and Communication Department can collect donation information for marketing research and analysis. Similar to CMS and RMS, staff from IT Department and the General Manager of SVG would be involved in this system for system maintenance and system monitoring respectively. Hence, students can gather the useful system requirement of DMS from these 4 parties during interviews. Figure 9 shows two screen dumps of a completed DMS student project.

Figure 9a: The menu page of DMS

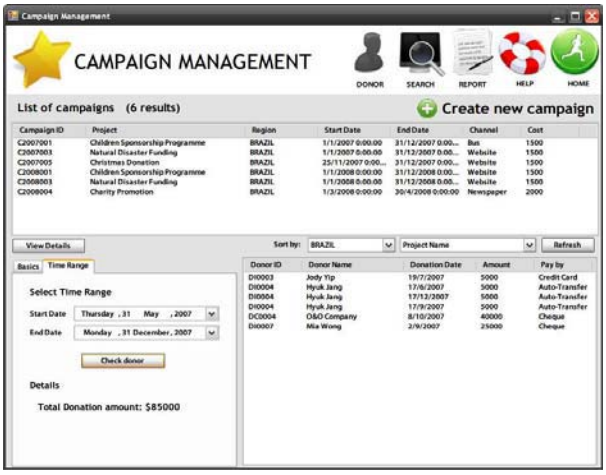

Figure 9b: The campaign management interface of DMS

OQMS is another new development in SVG. It helps to design the content of the quizzes and arrange them for students. Also, OQMS can manage quiz results for staff who has trained at the SVG Burger University. The target users of this system are teachers and students of the SVG Burger University and staff of the Human Resources Department which take staff results and print different kinds of report for further application using OQMS. Likewise, OQMS is also accessed by the General Manager of SVG for supervision and staff from IT Department for system maintenance. Thus, students can collect system requirements from these parties for OQMS development. Figure 10 shows two screen dumps of an OQMS of a student team.

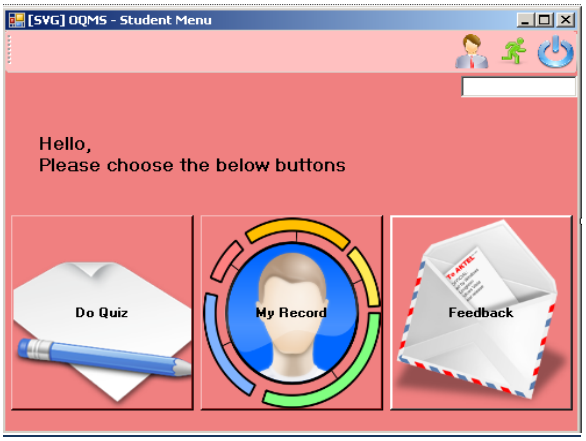

Figure 10a: The student menu of OQMS

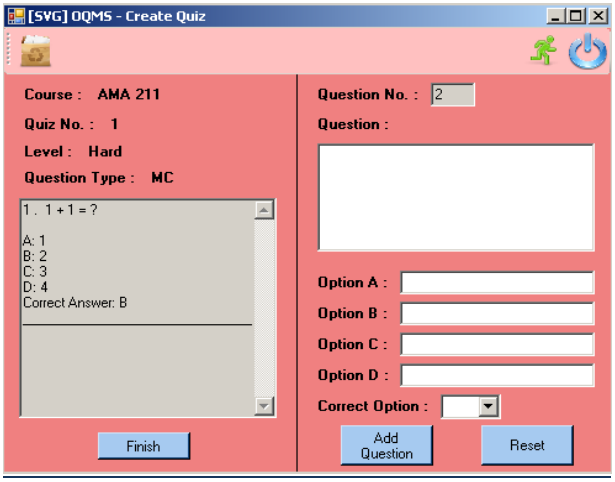

Figure 10b: The interface for question creation of OQMS

5. CONCLUSION

This paper discussed the motivation and arrangement on a new learning approach for students to collect user requirement of a software engineering project supporting two teaching modules in the Department of Computing, The Hong Kong Polytechnic University. Through this set up, students were required to collect functional requirements from a virtual company for their term projects. Student activities in the virtual company can be recorded for analysis so as to provide feedbacks to students for further improvement. During Fall 2008, a major problem was the network bandwidth which had lowered student learning interest in using SL. We are investigating different alternatives, such as OpenSim, for the future operations of MMSP again.

ACKNOWLEDGEMENT

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METAVERSE - The Learning in the Immersive Worlds

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This paper explores the learning in Metaverse as virtual reality system findings educational possibilities from real world. The Metaverse concept is familiar to us from virtual worlds. However, the concept of a learning virtual universe is new, and asks for a carefully cognition study about the relationship between the mind and the digital technology (Gibbs, 2007). The first question is the merit of the virtual world learning. Is it possible to teach with the metaverse and is it desirable? The second question is the choice of the metaverse´s kind. In fact, to choose the best reality simulation, it is necessary to know how the human mind changes with the technology influence. The digital generation or net generation (Tapscott, 2008) is an example of this question. Which kind of Metaverse should we pick up for them: a simulation of school or a complete different learning universe? Doing those specifics questions could be possible to propose an educational game with several themes. Finally, this paper will consider the virtue of this modality of education and its best kind of application.

Introduction

The traditional school have always been centered in the teacher´s figure and placed in a physical structure with chairs, tables and the traditional blackboard. This concept of learning has implied in an unilateral knowledge transmission where the teacher gives the information and the student must learn it and, in several times, to memorize it. Instead, the new millennium asks for other skills as capacity to organize, synthesize and trial the immensity of information available by the communication´s medias, to respect the different kinds of culture which are contacting themselves helped by the globalization, creativity to solve the new problems and autonomy´s responsibility (Gardner, 2007).

Facing those new challenges the traditional school became obsolete and a new form to teach and learn is imposing itself. Besides, the new student's generation has raised in the digital context and, consequently, would hardly be teached by blackboards and paper´s notebooks. Actually, this net generation has a different kind of cognition created by the contact with the immersive virtual environment and the new technologies advances. In this contest of the learning inside metaverse environments could be an interesting pedagogical tool to prepared and teach people. But this metaverse universe should be a reproduction of school environment or it should be a totally new learning space? And could this educational toll be applied to develop the necessary's skills to our times?

To answer those questions is, firstly, necessary to discuss the mind and technologies' symbiosis, to understand the mechanism of the creation of the net generation (1). Secondly, a didactic re-reading about the learning digital virtues imposed it self (2). Consequently would be possible to suggest in which kind of learning metaverse environment would be the more appropriate (3).

(1) The mind and technologies' symbiosis

For understand the mind and technologies' symbiosis would be necessary to define the cognition science. Fetzer (1991) define this science as a "science of human nature" with the objective of explains the human behavior. This definition seems to be the most appropriate to the present work, once one of the studies points is the behavior changes caused by the technologies influences.

In fact, the technology modifies man since the beginning of history. But with the internet and the virtual reality invention this feedback between the human mind and the news artifacts reach a new level: the humanity concept is changing itself by the technology's´ influence. One of the deeper modifications is what Breton (apud Novaes 2003) calls the Farewell to the Body [Adieu au Corps]. Actually the man doesn´t need anymore of his body to participate of an universe of relationships and activities. This phenomenon is caused by the virtual reality; term created in the 80's by Jaron Lamier when he felt the necessity to give a specific denomination to his digital worlds.

Raymond Gibbs (2006), in turn, believes that the body concept is changing because the embodiment caused by the immersion in a digital universe. For him, there isn't anymore a cartesian dualism between the body and the mind. Therefore, the mind brings others kinds of embodiments, for example, a person can simulate her existence throw an avatar, and feel even physicals sensations. The symbiosis between the technology and mind can be exemplified by the constructions of images in virtual worlds. Indeed, the morphology of images, and they emotional simulation, are constructed by the mathematical and physicals principles (Louro and Fraga, 2008). Those principals simulate real formers and create an illusion of reality at the human eyes, allowing the mind to immerge in the virtual world.

Is this technological phenomenon is it changing de human mind? For cognitive scientists, as Tapscott (2008), the answer is yes, once the influence of digital world in the new generation of kids has changed their cognition and, consequently, they have needed another education system: "Take education. For this generation, the old model is wrong. It puts the teacher on the stage. The teacher teaches; the students write notes, study, and write exams, alone. This model of education may have been good for training young people to obey orders, but it makes no sense for a generation that's grown up to collaborate and exchange ideas with people around the world." (Tapscott, 2008).

Following this line of thoughts, Santaella (2004) defends the theory that this kind of reading is the result of a cognitive-perceptive transformation founded in:

a. "Specials kinds of perceptive actions and controls witch results of a decoding agile signs and semiotics routes.

b. Kinds of cognitive behaviors and decisions based in inferencials processes, search methods and problems solutions.

c. In the linking between the perceptive-cognitive functions and the multi-sensoriality and body's mobility sense in his global psycho-sensorial." (Santaella, 2004). Therefore, a didactic re-reading became necessary.

(2) A didactic re-reading: the virtues of the digital learning

In fact, the Tapscott theory (2008) has broken some prejudices about this net generation. For some educators, and teachers, they are disconnect with the world, disabling the interaction with the society and even have a low Q.I. But a deeply analysis of them, shows a very intelligent, organized, critics and informed generation. A good example is the Obama´s election. The net generation organize them self without waiting the head office orders, showing their capacity to work together.

Indeed, the net generation are multifunctional, those young, between age of 11 until 31 years, are able to read, navigate, study, answer the telephone and listen music in the same time. So, they are just different of the old generation, different and, perhaps, most properly to the new world. Thus, who need to be aware of new tendencies are the parents and, mainly, the educators and teachers. For Yu (2009), in the 21th century the "learning goals including cultivating critical thinking, developing generic skills, life-long learning, seeing things in multi-perspectives, collaborating with others as well as enhancing social awareness become more important." So, the traditional teached-centred classroom system of learning is no more enough to develop those skills.

Others educators like Desbien (apud Guilbert, Boisvert, Ferguson, 1999) also remark the importance of learn to learn and learn to think in the actual century. For him only this skill can allow the young to make the difference between the good and the bad information in internet and others Medias. At last, the third millennium changes ask for new educations processes having the goal of breed the five different kinds of minds pointed by Gardner (2007): the discipline mind, the synthesizing mind, creative mind, the respectful mind and the ethical mind. This is why learning in the virtual world is so necessary, to reach the cognition of new generation, and is desirable, to answer to the "challenges of the 21th century induced by the globalization, the information explosion and international competition" (Yu, 2009).

(3) The choice of Metaverse environment

The new cognition analysis of net generation allows the conclusion that the replica of a traditional school environment wouldn't be the most appropriate to the virtual learning environment. In fact, the new generation has its own environment and the best choice would be just a creation of a formal learning alternative in this world. One good example of this experience is the massive multi-student online learning environment (MMOLE), (Yu, 2009).

It is a virtual space where students meet to learn and exchange information. Galamond and Zibts (2007, apud Yu, 2009) made a study pointing that the MMOLE´s players developed the skills of team work, knowledge construction and others abilities required by the actual society, even if to develop these skills is not a directly goal of these games. Moreover, by playing and sharing knowledge the players become able to distinguish the valid and the erroneous information, a fundamental skill for the 21th´s century. Finally, the MMOLE can be an appropriate option to the third millennium pedagogical tools having the objective of creates an environment where the teacher and the students are sharing and creating knowledge and information.

Other reason to defend a completely different environment in the metarverse from the traditional school is the idea of an education built on the learning process. In this education scenario the teacher will structure the learning experience; he will be a resource and a consultant to the students. For example, suppose a topic would be poetry. The teacher divides a class, with kids between thirteen and fourteen years old, in to teams and ask to each team chose a kind of poetry and to prepare a presentation on this subject, covering the topics of history, definition, principal authors, formal characteristics, and a poem to be presented to the class. The Juliana´s team will be the first group to present the work. They decide to make a page about modernism, for that they will chose an avatar in the environment created by the school and will, with the teacher support, build an world about modernism poetry. This kind of experience seems to improve and develop important social skills demanded for the digital economy as "learning about peer relationships, about teamwork, about being critical, about to have fun online, about friendships across geographies, about standing up for what they think, and about how to effectively communicate their ideas." (Tapscott, 2009).

Conclusion

The experience of MMOLE, pointed by Yu (2009), shows the educational potential of the virtual world. In other hand, it is only an example. Would be also possible to create interactive games and several others environments to promote the learning and to allow the development of social skills, so important in ours times as, for example, the scenario proposed by this article.

Seeing this picture is possible to make a question about the future of the educational institutions and the teachers: these Metaverse environments can they replace them? This question could be answered with another question: Did the books, the papers and the writing system replace the educational institutions and finish with the teacher role as they were invented? No they just reformed and improved them. So it is important to put the metaverse in his properly place: a new pedagogical tool.

In other hand a teacher, parents and education consciousness making about the real needs of the third millennium is indispensable. In fact, even if they are attached to the old values, they must remember that the education role is, first of all, to prepare to the future. Thus, accepting or not the metaverse environments in the formal education doesn´t seem to be a choice anymore. In fact, do not to study or simply not knowing this kind of learning technology could be a social irresponsibility in front of the new digital economy challenges where the actually generation is growing up.

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Ontological-cognitive structures of the Metaverses

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Abstract:

This paper aims to bring forth some ontological elements that we believe are fundamental to a wider philosophical basis of the Metaverses. We start from some indications presented by physical experiments which reproduce virtual environments in real time, searching for its eidetic-methodological relations with genetic epistemology and construtivism, showing that the structures of physical interfaces, which are founded in virtual experiments, dialoguing with the concepts of body, mind, projection, cognition, and other concepts, which are present in the possible formulation of an ontology of the virtual worlds and the Metaverses. We conclude the paper with the idea of the necessity to think the issue of the ontological fundamentation of cyberspace and its *metaverses.*

Keywords: *ontology, metaphysics, metaverses, topophilosophy, construtivism, ground.*

Introduction

Metaverse is emergent. Its affirmation allows for the structuring of omnipresent aesthetical-digital experiences. In a widening of the concept of hypermedia of Manovich (2001), *metaverse* may be thought of as the setting in motion of the Wagnerian concept of *Total Opera*, with the difference that its characters identify themselves with their audience. In this metacontext, the evolution and transformation suffered by the concept of interface, in the *metaverse,* we are oriented to think it as *digital life forms(01)*. On the other hand, it will be inside the discussion of the plastic foundations of the concept of *metaverse* that we find Louro and Fraga (2009) presenting a rich discussion about the *mathematical-technological art,* in which universes and physical-virtual experiences semi-permeable, open their doors for a reflection about the fundamental cognitive structures that would be working underlying *men-machines-world* systems, designating operational paradigms present in *games,* in *hypermedias* and in systemic projects of *metaverses.* Initially we will discuss a few concepts that we find appropriate to the formulation of a possible *cognitive-corporal* structure which has an ontological status inside the digital world and, above all, in the *metaverses*. Right after that, we will present six moments of occurrence and manifestation of those structures in current projects, related to the *emergence of the metaverse,* for then, finally, to advance upon our perspective, that puts the question of the possibility of thinking ontologically the foundations of the parallel worlds, called *metaverses.* We start with a monadic element: the three-dimensional patterns..

Three-Dimensional Patterns

In Louro and Fraga (2009) we find a mathematical-artistical reference to the three-dimensional patterns(02) present and active in the interactive environments, submitted to a logical structure of physics´s simulation and, manifesting themselves as *cognitive structures.* The component replicability, which manifests itself in the association between patterns, as basic structure of second order, tends the configuration of composite and/or complex structures in the spatial-threedimensional organization of interactive environments. A *pattern* is a structure capable of component replicability in the production of three-dimensional worlds, such as the *metaverses.* That´s what Louro & Fraga (2009, 3) tells us when they say that the study of the patterns *is in itself* a key element to the understanding of the growing of the three-dimensional structures on cyberspace. According to the authors, there are specific kinds of patterns which are directly related to the development and expansion of the three-dimensional structure and its transformation into a timeline. One of these cases may be found in the description of digital and physical experiments proposed by Fraga (2007). In those, we understand that the idea of *three-dimensional* patterns may convert in material and/or virtual objects to Fraga (2007). Such structures have as their goal to incite *unusual experiences* in their users from the concept of affective computation of Picard (2000)(03), since they provoke the suspension of the

rational belief of a single reality (sic). Be tactile or almost tactile, the experiences offer a prototype of the futurity of holography and the total immersive interaction metaverses suggest.

Logical Structures

Now, if we think that the *patterns* can also be seen as complex logical structures which are based in other elementary logical structures(04), in the fashion of a three-dimensional construct, they work inside the organized, rational perspective of a *figural collection* (Piaget & Inhelder, 1975) which constitutes into ons of the bases of the construction of knowledge, including scientific knowledge. As *logical blocks* conceived by Hungarian mathematician Zoltan Paul Dienes(05) in the 1950s, they offer and can be the support for a special type of interaction which has as a spontaneous, "non-intentional" result the forming of cognitive structures responsible by the production of knowledge. Every learning, be it in the mathematics or in life, involve physical-representational and logical processes (Piaget, 1970, 1976 e 1971). *To open a door,* for example, may be thought of as a puzzle able to reveal the structure of a present pattern, not only in the virtual environment, but also in the logical-physical processes which inhabit the mind of the subject of the action. The return or retrival of the experience lived by the users in the form of the description of their actions and intentionalities, in which they explain and describe consecutive steps of their action (*to open a door*, for example) reveals an operative structure in the mind that takes to itself the responsibility and conduction of behavior (Piaget, 1977). The constructivist approach harmonizes itself with the philosophical reflection in our example. That becomes clear when we remember that Wittgenstein (1994) indicated us that to describe a game is to understand a game, and, as components of a logical language game to be played in a countless number of ways, the patterns are those minimal elements of a cognitive structure that, in a game, participates in the phenomenon of understanding. So, if I know how to play *this* certain game, I can understand *this* certain game. But it will be only entering the playing of the game, amidst an environment formed by the myriad of patterns, that the bigger cognitive structure of understanding will come.

Ontological logic

Working as Leibnizian *Monads(06)* gifted of the most refined *entelechya* possible, the three-dimensional computational patterns(07) organize representational worlds whose ultimate hunger can be expressed via the *metaverses.* The idea of monad serves as the basis of the Leibnizian logical thought, Express in the *Charateristica Universalis(08)* namely the organization of a universal symbolic language that should be free of the plurivocity of the ordinary languages. The concept of *Charateristica Universalis* and its organization in a *lingua sive characteristica* would take a symbolic, imagetic aspect. Leibniz´s thinking followed, in its central theses, and it was widely developed by the German philosopher Gottlob Frege (1879) in the creation of the *Begriffsschrift,* the *Conceptography,* equally with visual aspects, and, aiming above all for the dynamic relationship between the vision of the totality of the page-image-assertion and its propositional components, which served as basis to first-order logic. More recently, an approach of the monadological thought was retaken, in 1993, by Michael Heim, in *The metaphysics of virtual reality*. Comparing Leibniz´s *Calculus universalis* (Heim, 1993) with the logical system currently present in the computers, he calls this conjunction, metaphorically, *Leibniz´s electric language(09).* The *Leibniz´s electric language* would emulate the divine intelligence, resulting in the possibilities of simultaneity and omnipresence, elements found in cyberspace, and, we say, in the *metaverses.* Even though Hein used the word *metaphysics* in the weak sense of the term, new-age like, to designate its pop, fun meaning(10), the implicit ontological aspects in the question of the monadological grounding of cyberspace [and the *metaverses*] present very rich, instructive indications(11) That´s the case with the summoning for the dialogue of the question with Heidegger, MacLuhan, and Marcuse. That is, a logical basis of cyberspace and the metaverses would have much to gain if thought in the light of an ontological grounding of the world and of the *Dasein(12).*

Another approach of essential importance for a critical reflection of cyberspace and *metaverses* and, indicating the possibility of its ontological grounding, may be searched with the help of the thinking of the American philosopher Andrew Feenberg(13). In the path opened by Heidegger and Marcuse, he defends that technology must be thought in its constitution of the extension of technical systems and of power in society, both in their outlook technocratic control as resistance to it. If on the one hand the naïve and technocratic technological thinkings arm themselves against public pressue, sacrificing values and ignoring necessities, on the other hand we see that a critical reflection of the question of technology (and here cyberspace and the *metaverses* enter) equally shelter other beneficial potential that should be better thought. Well, postulating the neutrality of technology would be naive then. Assumed as neutral technology converted in technocracy would favor some certain ends and would be oriented to block others. Besides, we could include in this aspect a harder search by spontaneous organizations

through all society (in and out cyberspace) in favor of a *democratization* of a wider and wider technology, which would mean thinking in new ways of privileging the values excluded by technocracy and make them concrete in new technical arrangements that walk together with social, ethical, ecological needs of human as a whole. It´s in this sense that a critique of the essence of technology can´t be dismissed, as well as a concern with dialogue and its use by communities of users inserted in *holistic design* modes(14). Such a transformation carries with itself the affirmation of need of a transformation from down top and from the inner layers to the outer layers of the systems in usage. That would mean opening the technological structures to the interests and discussion of the communities – a situation that have been more and more realized based in organized communities of Web users. That leads to a certain technical choice instead of other, or, as we got used to see in the last half of the 20th Century, a technical choice instead of another one, social, political or ecological, determined for its time a political, ethical, social, cultural, and ecological meaning without precedent.

So, if we identify here the necessity of a philosophical reflection that states itself as capable of realize a critical and constructive dialogue with the technical thinking, that means a reflection that take into account the product, from Leibniz to Feenberg-Heim, must be perceived as a methodological program of thinking the aspects that are the closest to human, in which the communities of subjects really navigate, interact, communicate, and produce their transformations. They are located, the way we see it, in the scope of cyberspace and in the emergent *metaverses(15).*

The reagent surfaces and the plastic body of aesthetical manifestation in the metaverses

From 2003 to 2008, we realized a research program in which the central theme was the ontological grounding of the interactive three-dimensional discussing some aspects that we consider that are related here with the approaches already presented. Initially, in Petry (2003), we presented the possibility of thinking the work of three-dimensional modeling for three-dimensional interactive environments, such as game engines and *metaverses,* as high-level reflective activities. In that moment, *modeling an object* would equal the act of *thinking the thing* as such, in its constitution of *digital thing,* which opened the possibility to think, from hermeneutical phenomenology, the beginnings of a thought that problematized the groundings of digital makings, designated by us as *topophilosophy.*

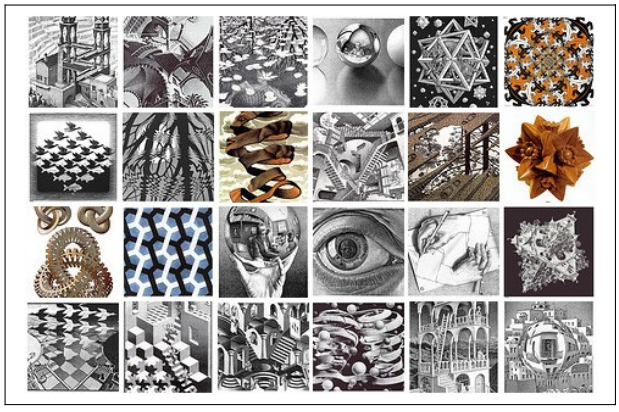
In our text, titled *Aspectos fenomenológicos da produção de mundos e objetos tridimensionais na hipermídia* [*Phenomenological aspects of the production of three-dimensional worlds and objects in the hypermedia*](Petry, 2006), from the phenomenology of Heidegger and Gadamer, we located some aspects of the hermeneutical fundamentation of the concept of topophilosophy as the key concept for the understanding of the digital processes that bridge artistic and computational processes. In that case, we assumed that a methodological reflection about the theme of three-dimensional modeling would be necessary to a better understanding of the current digital phenomena who inhabited the Web, such as games, hypermedias, and metaverses. The starting point was the Heideggerian concept of *aesthetical experience* as an *Erfahrung,* a changing experience in the full sense of the term, as much for the author-artist as for the collaborative user and navigator of digital environments. The concept of aesthetical experience guided us to a reflection about the *building, inhabiting, and thinking* (Heidegger, 1994a), which offer the possible ontological circumscription for the idea of building objects and environments inside a given digital environment. Such as in the German word *bauen,* to build its home equals mixing the colors for a painting and, equally, the transformation of an object giving it a subjective determination beyond the condition of simple thing. In that moment, we put the accent in the interrogation about the plastic dominion of the artistic space, and the possibility of the logical and mathematical intervention partaking of the reconfiguration of the artistic experience(16). In this context, the aesthetical experience of the production (by the artist-programmer) adds up to the possibility of the aesthetical experience of immersion (by the digital argonaut), in the quality of the possibility of an imersion gifted with sense, as much as for the locutionary manifest by its hypermedia production as for the elements of what´s left unsaid, its illocutionary elements, revealed by the interactive character of the same (agency, cf. Murray, 2003) and, possessed by its interactor.

That´s when the problematization of the *plastic body* in the modeling of three-dimensional characters was put to us as one of the aspects of the ontological question about cyberspace and the *metaverses*. In *O ciborgue e a arte da hipermídia* [*The cyborg and the art of hypermedia*] (Petry, 2007), dislocated to the context of the digital environments and the question about the new modes of being of the *Dasein,* our research has found its expression in the avatars and characters of the digital universes *metaverses(17).* in the form of three-dimensional cyborgs who inhabited the poetic worlds of the *Quantum Opera AlletSator(18).* If, from the advent of postmodernity, we started to face new modes of being of *Dasein,* it´s similarly to expect that, in the plane of digital art, such new forms the modes of being come to manifest

themselves. That´s the case of the construction and manifestation, into the plans of interactive worlds the inhabit cyberspace, avatars and cyborgs, taken as digital entities or, as Heim would say (1993), the *cyber entities.*

Finally, when we published the text *A im@gem pensa: aspectos quânticos da imagem cibernética*[*Im@ge think: quantum aspects of cyber image*] Petry (2008), we beagn a systematic project of an organized discussion of the ontological foundations of cyberspace. In this publication we present the possibility of understanding the synthesis image, that is, the digital image produced by and with 2D and 3D computational resources, as a *cognitive object.* It´s in this way that we are always taken to think the ontological-cognitive structures of the digital universe in which metaverses live as homes of the *digital Dasein.* In order to illustrate some ideas initially sketched here in the context of a research in progress, I will discuss four examples in which the idea of patterns is presented and indicate, in the light of the concepts articulated here, the conceptual value of those digital works. Finally, I will make some notes about two important metavers projects, both of which, opening space in its *Open Source* organization for academy research, fulfill the sacred mission of science taking us to new worlds of understanding.

The first example I wish to present comes the works in drawings and litographs of the artist [1] Maurits Cornelis Escher (1898-1972), known in the whole world as M. C. Escher(19), in imaginative sculptorial productions and lithographs:



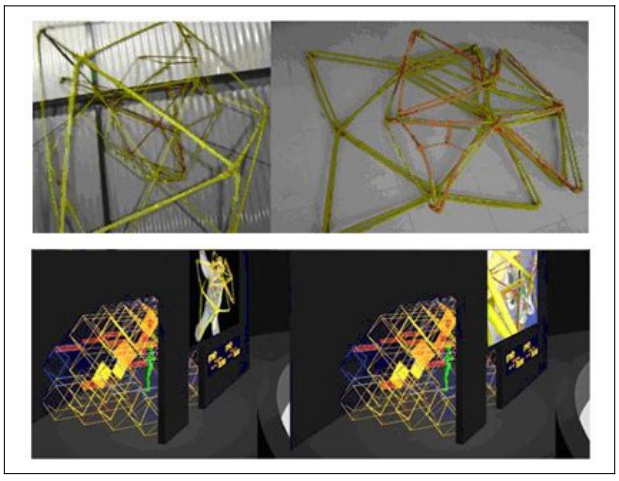
The artistic theme of the patterns in Escher is at the same time recurrent and deeply imaginative. Countless are the works that relate Escher´s art with mathematical reasearch and imaginative intuition(20) The Web paper *The Mathematical Art of M.C. Escher (1997-2009)(21)* shows relations between Escher´s art and mathematical imagination, inside which the (1) *regular division of the plane* (*tessellations*), the (2) *polyhedron,* the (3) *essays in simmetries* and the (4) *shapes that intersect planes* are identified here in our approach with the concept already presented of *pattern.* In Escher´s case, the *patterns* present themselvses as imaginative-artistic structures that has mathematical and three-dimensional potentialities(22).

The second example I would like to bring here is given by the work in [2] sculptorial projects which take into account the organic replicability of the sphere, by artist Tomas Saraceno(23). We observe that the dialogue between the sphere and the ropes that sustain them forming conical cords is worked inside the spirit of a *pattern* that made possible the demonstration of a sculpture that dialogues between replicability and organicity. Here, the sign of the mandala present in the works of Saraceno presents a possible experience at tactile immersion, in the fashion proposed by Fraga (2009), when she speaks of three-dimensional, stereoscopical and interactive simulations, referring to what is being produced in virtual realities in cyberspace. In the case of Saraceno´s work, similarly analyzed by Louro & Fraga (2009), everything leads us to believe that the artist seeks to fulfill a kind of return of the digital to the physical installation, producing the same paradoxical impact we experience with the objects described by Fraga (2009), as we can see in the image below:

Well, the thinking and making of the artist seeks to dialogue with the concept of cyberspace. In her words: "Like continental drift at the beginning of the world, the new cities will search for their positions in the air in order to find their place in the universe . . . [this structure is] capable of imagining more elastic and dynamic border rules (political, geographical, etc.) for a new space/cyberspace" .

Image and representation here join forces in a collaborative fashion in order to produce an aesthetical experience and a plastic body, such as what we observed previously, as well indicate the pertinence of Fraga´s thinking (2009) when she describes the process her own analytics of creation: "during the process, I analyze constantly the non-causal connections which emerge as sincronical events, in relation with dreams, mental images, and *insights*, as cited above, and I transform them into conditions and action, so I can do things (Heidegger, 1988)".

That´s in this sense that it´s called to our attention the [3] work dedicated to the associative dialogue between the eidetic-transcendental forms in empirical and virtual compositions which show themselves as ambient-objects by Brazilian artist Tânia Fraga(24). Fraga (2009) shows us the possibility that *scattered data during the creation period* can emerge in a work that, at the same time present sincronicities that result from logical operations, as well as are organized as demonstrations which produce paradoxical aesthetical experiences. As sparse bubbles, emerging and floating in the logical-creative active imagination of the artist, they organize themselves as liquid, mobile thoughts that, in their results of manifestation and presenticity (*Anwesenheit*), shows themselves as flexible patterns(25).



Well, the basilar structure presented above in Fraga´s work is the triangle. We can´t avoid to observe that this basilar structure, here described by us also as a pattern, is a minimal building structure of every three-dimensional shape produced by the 3D modeling softwares. The three-dimensional world is founded upon the variable and mutant harmony of the triangle, in idea that makes us develop all the reflection to the ontological indicators presented by Heim to cyberspace: the eidetic-transcendental forms defined by Plato and, in our case, by the eidetic-transcendental figure of the triangle(26).

Well, the triangle is the organizing matrix of the live-action experiment [4] *Hyposurface(27),* presented by its authors as a system of exposition in which the surface of the screen makes physical movements from forms, information and the interaction of subjects

A visit to the several videos featured by the *Hyposurface* team shows us the possibility of aesthetical-plastic manifestation, in which the metamorphic-chromatic wall not only presents articulated images from the triangular pattern, as it also capable of sinestesically involving the users of the interaction.

Every example, from [1] to [4] may be taken as effective demonstrations of *reagent surfaces* in which the *plastic body* puts as *aesthetical manifestation* that may inhabit the *metaverses*. That´s the case of the Open Source metaverse projects [5] *Project Wonderland* and [6] *Croquet Consortium(28).* As wonders of the human intellect of the digital age, *Wonderland* e *Croquet* present themselves as possibilities of collaborative development between researchers around all our geodesic and cognitive sphere. They have the capacity of realization of the ontological forethoughts indicated by us, both formally as well as from the aesthetical experiences denoted here from Escher, Saraceno, Fraga, etc.

Conclusion

World is everything that is the case..., but if the world doesn´t have an ontological grounding, it can only count as something that has no meaning for no mind. The ontological foundation of the *metaverses,* in the form of a

Mathema capable of transmissibility and reasonability becomes necessary and urgent. It´s in the precise sense that the present text has been developed: to alert for the importance of the ontological fundamentation of the *metaverses,* which shall be subject of discussion of the communities of developing and participating minds. Our modest example of the patterns*,* as logical-cognitives structures that are part, not only of the mental life and of nature, inhabit the space of the plastic body of the *metaverses*. As such, they open the door through the question of the ontological grounding of cyberspace and the *metaverses,* path that demands time and a work process non-determined *a priori.* A path that points out questions that in the current present moment, as in the saying of old Heraclitus, *neither reveal nor hide, but indicate.*

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NOTES

(01) Taking, for instance, also in the path of Manovich (2006), this idea is an extrapolation of the formulation of Wittgenstein´s language games (1994) as *life forms.* Such context of production of several digital life forms can be found in Leão(2005), Fraga (2007), and Prado (2007), for example.

(02) *Pattern:* from the French "*patron*", which, for its turn is derived from one of the meanings of the word "father" (*pater*). It designates a kind of recursive theme that incides upon objects or events. This word has several meanings, being used in computer science, art, psychology, psychoanalysis, etology, mathematics, among other sciences. The *patterns* are complex replicable structures that tend to organize a predicable (in meaning) structure, such as recursive algorithms (computer science), repeating images (art), behavioral schemes (psychology), compulsive repetitions (psychoanalysis), approaching rituals (etology), Golden Ratio (mathematics). Repetition, cycle, frequency, organization, manifestation, and transformation are some of the logical principles inherent and active in the *patterns*. The most basic examples of patterns that can be presented are the fractal structures of nature, such as Kepler´s *Snowflake* (Stewart, 1996).

(03) A review of the points of view of researcher Rosalind Picard was written by Causa, E. & Sosa, A. (2007), and it´s available at: http://www.proyecto-biopus.com.ar/textos/Computacion_Afectiva_Y_Arte_Interactivo-Emiliano_Causa-Andrea_Sosa.pdf

(04) Even a *pattern* is guided by rules, be they of association, permutation, et cetera, inasmuch as a curve is formed by a succession of points oriented (by an interval) from a given center. As we will say further in this paper, even language games have rules which determine their existence.

(05) See author´s website: http://www.zoltandienes.com. This Hungarian thinker developed the called logical blocks, and, in his site, we can find examples of applications between mathematics, art, and games. See, for instance, the text *Mathematics as an Art form: an essay about the stages of mathematics learning in an artistic evaluation of mathematical activity,* in the section *Zoltan Dienes' Mathematical Games.*

(06) *Monad:* key concept in Leibniz´s metaphysical philosophy, which designates the simple substance – from the greek μονάς, μόνος, which may be translated as "unique" or "simple". As such, the monad is a constitutive part of the composite, being itself without parts, therefore, indissoluble and indestructible. The modern concept of *pattern* hás a parental relationship with the Leibniz *Monad.*

(07) *Computational Patterns: in Brazil, they are discussed in Computer Science as logical patterns or computational patterns from the idea of Design patterns. In that sense, see: VLISSIDES, J., GAMMA, E., JOHNSON, R. & HELM, R. (2005). Padrões de Projeto: Soluções reutilizáveis para o software orientado a objeto. São Paulo. BOOKMAN C.Ed.*

(08) An example of the configuration of the *Characteristica Universalis* in the Web may be seen in Wikipedia: http://en.wikipedia.org/wiki/Characteristica_universalis

(09) According to the words of the philosopher: "Leibniz´s "electric language*"* operates by the emulation of divine intelligence. The divine knowledge has the simultaneity of omnipresence and, so that it can establish the Access divine to things, the global functions of the matrix interconnect, by means of a net in a kind of a current eternity, between the gaps of all language. Due to the access that does not necessarily need to be linear, cyberspace, in a first moment, doesn´t require a jump from one position to another in an orderly fashion. Science fiction writers have often imagined how it would be traveling at the speed of light. One of those writers, Isaac Asimov, described this travel as a "jump through hyperspace". When, in his fiction, a ship reaches light speed, Asimov states that it performs a special kind of jump. At that speed, it´s impossible to follow the discreet points of the distance traversed by it." (Heim, 1993, 95-96).

(10) See the interview with Heim about this point to Geert Lovink in 1994 in http://www.thing.desk.nl/bilwet/TXT/HEIM.INT

(11) As written by Heraclitus: *The lord of the Delphi Oracle neither reveals nor hides, but indicates.*

(12) Here we have in mind the workd of Heidegger, Marcuse, McLuhan, Heim, and Feenberg – in their productive elements for us to think an ontology of cyberspace and the metaverses.

(13) Feenberg is concerned about the possibilities of a philosophical reflection of technology. The philosopher must dialogue with science, not just react to it or discuss it naively. In *Critical Theory of Technology* (2002), he tells us that the philosophy of technology walked a long way since Heidegger and Marcuse. Even though the thoughts of those philosophers are inspiring, the task of finding answers to our problems and current questions must count with our own ability to think and create, without resort to previous formulas which were connected to modes already overridden by the socio-historical evolution of capitalism and of technique. So, he says: "Critical Theory has, above all, dedicated itself to interpret the world in the light of its potentialities. Those potentialities are identified by serious studies about what exists. The empirical research can, in this way, be more than a collection of facts and can shape a discussion of our times. The philosophy of technology can unite

these both extremes – potentiality and the effectiveness – rules and facts – in a way with which no other discipline can rival. It will be bold enough to face prejudice from disciplines that confine research and study in narrow channels and, thus, may open perspectives to the future". (Excerpt from Feenberg. A. (2002). *Critical Theory of Technology*. Oxford University Press).

(14) See the cases of the big communities of *metaverse* production gravitating around the engines *Croquet* and *Project Wonderland*, inside which the discussions, needs and works of the community of users that determines the *Open Source* ways of usage of technology.

(15) This methodological path is much more similar to another one, indicated by the German philosopher Karl-Otto Apel (2000), when he says that we should think the transformation of philosophy from Descartes to Husserl.

(16) More specifically, I came to the conclusion that it would be closer to art that we could find and locate truth, but, on the side of normal science, we would only have to count on method, systematization of the preconceived project of world. In this way, the appropriation of space in the spacialization of the artistic making leads man to inhabit, inside which to spacialize is to locate things, that is, to put him/herself beside them and there undertake an operative understanding, but not a machinical understanding. That would be the transit space of a possible topophilosohical reflection, in its due rigeur.

(17) If the definition of cyborg shelters a hybrid composition between the ***human corpus*** and the ***corpus of the technique,*** that means that we are dealing with a hybrid figure that, as inhabitant of both world at the same time, cannot belong exclusively to none of them. In that case, maybe the cyborg should be thought as an ***"in-between".*** Maybe that is its most interesting characteristic, and, at the same time, most enigmatic. To belong to the world of flesh puts it partially in co-participation of every passion of the flesh and, as belonging to the world of cybernetic technique, it puts him~her in part beyond a vast number of not fulfilled possibilities. Here, the Nietzschean ***superman*** is always remembered with a certain terrifying proprietyand, to a certain extent, scary. Many are those who feel compelled to assign the concept of cyborg to the pure dominion of ***dystopia,*** this situation of reflection that sees the destiny of man in a tragic consummation and adverse to any utopia and hope. But we can´t ignore that the possibility of technique that suggests us the idea of cyborg presents this possibility of hybridism to man. It presents initially into the world of the suplencies of the medications cited previously, both when they modify our states or even when they make us live longer than we deserve. It presents this possibility still when it affirms itself so strongly in the aid of prostheses to modern man, liberating him of suffering and potentializing its way of being in the world and also his pleasure. Here, the ***plastic body*** stated by Heidegger, in the ***A época da imagem do mundo*** structures in a transformation of the technique that takes him to postulate his ***cybernetic body,*** his ***I-cyborg.*** So, this ***I-cyborg*** is, certainly, a ***I-hybrid,*** a kind of "between" a before and a ***maybe after*** or, as we maybe say now along with Nietzsche: ***between man and superman (übermensch).***

(18) *AlletSator* is a Project of an interactive quantum Opera that is in its final development phase in a research group gathering researchers from Brazil and Portugal, among them Pedro Barbosa, Rui Torres, Rogério Cardoso dos Santos, and this author. Web address/wiki: www.telepoesis.net/alletsator/wiki. The wiki contains a vast methodological material of the group´s work and indicates its sources and image libraries that can complement this exposition.

(19) See an geral vision form: http://www.mcescher.com/, publicado e mantido pela *M.C. Escher Foundation* e pela *The M.C. Escher Company B.V.*

(20) An interesting list can be harvested from within the official website, in http://www-gap.dcs.st-and.ac.uk/~history/Mathematicians/Escher.html.

(21) Of author unidentified , from: http://www.mathacademy.com/pr/minitext/escher/index.asp

(22) In this case, Escher says: "In mathematical quarters, the regular division of the plane has been considered theoretically . . . Does this mean that it is an exclusively mathematical question? In my opinion, it does not. [Mathematicians] have opened the gate leading to an extensive domain, but they have not entered this domain themselves. By their very nature thay are more interested in the way in which the gate is opened than in the garden lying behind it". In: http://www.mathacademy.com/pr/minitext/escher/index.asp

(23) The work of the artist Tomas Saraceno can be seen in: http:// www.core.form-ula.com/2009/03/22/profile-tomas-saraceno/ - Access in 2009/03/16

(24) Described and presented in: http://www.cibercultura.org.br/tikiwiki/tiki-read_article.php?articleId=53 Access in 2009/03/17

(25) Says the artist and thinker: "The ability to detect connections between entre scattered data during the creation process is a faculty difficult to explain in words, because it results of nebulous sensations. These are sensations that occur like spars bubbles, emerging and floating in the mind, and that finally flow like intelligible ideas. I denominated as "to think liquid thoughts" (Fraga, 2003: 301-308) this faculty that leads to successive agencings of possibilities. It allows me to explore frontiers, agglutinating the logic thought – linear, fragmented, analytical, precise, and disciplined – with sensorial thinking – non-linear, synthetic hich presents itself as blocks, as perceptive totalities – with free and apparently indisciplined emotions and sensations. During the creation process, numercial data – with its functions, relations, and logical operations – are intermingled with the flexible patterns of sincronicities" (Fraga, 2009).

(26) In Plato´s *Timeus*: "In the first place, it´s obvious for everyone that fire, earth, water, and air are bodies, and that every body is solid. Every body is limited by surfaces and every rectilinear surface is composed by triangles".

(27) Available in: http://hyposurface.org/ Acesso em 2009/03/17]

(28) *Project Wonderland* can be accessed in: https://lg3d-wonderland.dev.java.net/. *Croquet Consortium*: http://www.opencroquet.org/.

The Ontological Aspects of Puzzles into Metaverses

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Abstract: The present text talks about the substantiation and usage of logic-mathematical puzzles inside the metaverses and its incidences as cognitive objects. Starting from the evolving path of hypermedia to the metaverses, it is introduced some formal criteria to reflect on the interactive context of the metaverses exemplified in the presentation and solution of logic-mathematical puzzles, taking as a paradigm example the metaverse experience of *Myst online*. It is concluded by the importance of the collaboration between the digital narrative and interactive problematical formulation for the research, production, knowledge and teaching-learning processes.
Keywords: metaverse, ontology, matematical logic, games, topophilosophy, etnocomputation.

Introduction: from the hypermedia to metaverses

Since the initial moments of computer history and personal computers[1], we can identify the existence of a whole development and cooperation path that connects collaboratively computer science and the narrative structures of western tradition. Amongst many and excellent reviews that were produced, we would like to enhance the ones accomplished by Murray (2003) and Manovich (2001), which points out by the hypermedia concept and accomplish a discussion of this concept in relation to the western tradition legacies of arts, literature, cinema and design. From the transposition of tradition content, like literature pieces, to the computational environment in the shape of regained text blocks capable of receiving search fields by words, until we reach the concept of cyberdrama postulated by Murray (2003) we have a rich path, which certainly will not be possible to contextualize completely in the present article's space. However, we let indicate the importance of the historical reference.

It is, however, the indication of the importance of the historical references that lead of the original experiments in the form of hypertexts, passing for interactive environments to the way point and click of the games Zork (release in 1980) and Myst (release in 1994), to arrive, in the turn of the third millennium, to the concept of metaverse, with games and highly complex interactive three-dimensional worlds digital, inside of which, problems logical-mathematicians (in the form of puzzles) they can be introduced and if to place as a cognitive space to player reach higher periods of training of understanding and rationality. The present paper focuses this problematic one of metaverse URU, in the series of the game Myst showing its relevance as logical-cognitive structure. For in such a way, we to trace a passage that, before description, must be taken as a way of the experience of thinking understood here inside the phenomenology.

The inaugurate paradigms of the experience with metaverses

In order to we context the importance of the origins this problematic of the metaverses in the context of the experience in cyberspace and the immersion the human being in the resolution of logical problems, teletransport ourselves them for the quarrel of hypermedia[2] in the context of cyberspace emergent, namely, breaking of the work of Lev Manovich (2001) in The Language of New Media.

As Manovich has indicated, the occurred mutations in the cyberspace, since the beginning of the 1990s were neither free, nor planned[3]. Not only its springing out, but also its progressive mutation is related to the emerging of digital paradigms[4] that determine the personal computer evolution means and its incorporation in human life and culture. As so, far from being an ordinary phenomena, the digital phenomenon, in this case having in mind its designation under the hypermedia field, has produced new cultural forms that has resituated themselves and continue to transform the western culture. These paradigms can be better understood when we have in mind their participation in games, and furthermore, in cyberspace with the emerge of metaverses.

Besides, according to Manovich, the 1990s were the years of the so called new media, in which we have the rising of numberless cultural objects that exemplify the new media potential, in the perspective of the computer usage, in the revealing of aesthetic shapes genuinely original and historically without any predecessors. Among these objects, two special ways are featured: they are two computer games, Doom[5] and Myst[6]. These two cultural and digital objects pass by their accomplishers and fans community, producing a series of elements that have added a new meaning to the idea that we had about concepts such as authors, communication and expressive languages potential.

As paradigms, they opened specific digital economy types inside the post-modern era. Inside each one of these paradigms we have special economies producing and determining its social, cultural, technological and conceptual effects (Pinto, 2005). These new type of economies, which are opened by the new ways of interfaces of both games are designed by Manovich (2001) as "cultural economies" that structure new ways of digital life. One of the examples of this turn produced by the new paradigms can be visualized when J. C. Herz says the following: "It was an idea that stipulated a new time. To release a thinner and free version (of the game) through the shareware sources, Internet and online services, followed by a complete, registered and for sale version of the software"[7].

And with this procedure, it is formally initiated the Demo Plays policy, the playable version of softwares, in which we show the product[8] potential. The Manovich analysis is supported by the studies of Michel de Certeau (1999), when he says that: "the producers define the basic structure of an object, and release some examples and tools to allow consumers to create their own versions, sharing it with other consumers".

From this type of economical politics, opens the path to establish new digital objects: the open source software, the free software and all the production and licenses group that it is reachable in the cyberspace. It will be this emphasis on this type of perspective of facing things that has allowed, in a short period of time that Internet converted into cyberspace or else, in a surfable and interactive space, as it was the project of the Web creator, Tim-Burnes Lee.

According to this perspective, one of the consequences that we have is that cyberspace has become progressively a place in which is made available an infinity of paths that are visualized mentally by the user as "environments to be visited". This was the idea presented by Robin Miller[9], when he said that they "were creating environments to be briefly followed" – lacking a better term, many have called this a game and the authors themselves called it like that because they lacked a better concept. With Manovich studies (2001) and Murray (2003), the fulminating light of the narrative concept is released on the cyberspace landscape. Games such as Doom, and above all Myst, constitute themselves as digital narrative, in navigable and interactive digital environment and, in particular, make public specific and powerful "cultural forms" sufficiently able to reshape a series of aspects of human life and culture.

Such as cyberspace navigation allows the introduction of the new cultural forms perspective and its respective economical policies, the navigable space in cyberspace (especially structured games over narratives), opens the possibility of understanding the digital universe and its revolution, not as opposite ruptures of the development of the western tradition of Gutenberg's culture, but as an extension of the human world, of being in a world and share with your similar being the living in narrative processes as powerful cultural forms, in which we identify here as metaverses.

According to Dannam[10], the Myst universe was created by the brothers Rand and Robyn Miller around 1987. Six years after hard working, in 1993, Myst was released, the first of a series of "serious games", quoted as an elegant scripting structure, concept design, and mystical ideas blended with an Art Noveau aesthetic, in a New Age reading and pictured in the interior of an extraordinary audio design. Certainly we can imagine that it was just a young game producers' dream, of accomplishing a project that materializes all its ideas and put in front of the user a digital narrative more likely to be the Shakespearian[11] method. We should now observe that the digital universe, not only the entertainment one, but fundamentally what it refers to the interaction protocols of machine men were pointed out by Myst, as digital aesthetic was by Apple.

Meanwhile, in Doom, another game pointed out by Manovich as paradigmatic, the rhythm is fast, whereas in Myst, it is slow, rhythmic by a expressive new age soundtrack. In the world of Myst, and we speak here mainly of Myst Original in 1993, "the player moves in the world literally step by step, discovering the narrative along the route". In this discovery the user soon verifies that the worlds of Myst I, full of landscapes and sound constructions were complete and profoundly empty. At the time (1993) it was about lonely worlds, in with the user was unleashed in a digital adventure in pursue of its puzzle. In Myst there aren't game levels, but complete and differentiated environments that offer a variety of situations, in which they present themselves as enigma to be solved.

From the resolution action of the puzzles, new faces of the narrative emerge. At them, the user accomplishes a tour in the pursuit of worlds and the solution of its mysteries. The essence of the game, in which resides in a terrific architecture and the navigation possibility inside it, making available the intervention of its paths, its destination. As in an anticipated dream by Schopenhauer (2007), the digital Argonaut mingles inside the navigable worlds of Doom and Must, and there their avatars live intensively in systematic conditions of proto-metaverses.

Characteristics of the navigable space in the metaverses from an experience with games

One of the differentiable game elements is its possibility of introducing into the plan of computerized human action, in the relation man-machine-world, that we can call the Discovery logic. Since its first version, Myst already initiates the proposal of introduction the digital Argonaut in the position of opening itself to the progressive apprehension of a logical discovery and, with that, assimilate more and more increasing complexity schemes inside a basic narrative of the game. With a delicate intellectual property, Manovich tells us that "the player moves in the world literally step by step, discovering the narrative along the route". This is a structure in which "the logic of the discovery is necessary". Each enigma or puzzle presented in Myst contributes to a resolution of a part of a mystery and allows you to advance in the understanding of the game, in the narrative comprehension and even in its navigation. In this process the subject of the navigation is persuaded to dedicate itself hours in front of the game and through the schemes accomplished inside the game, reinforces its "elementary logical structures", according to the ideas of Piaget (1970).

Another important aspect consists in the navigation structure. Myst organizes itself as a universe commanded by a navigation aesthetic that proposes a freedom of movement. The user can remain as long as he/she wants in each of the various worlds and, if that is the case, for the simple pleasure of walking through it, appreciating its landscapes, or even, accomplishing an intimate contact with the local cultures of the game. The authors themselves have declared that if they have not reached the status of the game, they would be simply satisfied by producing worlds in which we could just go by. This is one of the great qualities of Myst (Murray, 2003), the free navigation around digital worlds that the metaverse of Myst unleashes.

Along with an aesthetic of free navigation, we have an extremely generous and detailed exploration economy of the environment. This type of economy has as a result the development of the environment observation, of its details and characteristics. As a result, the analytical potential of the cybernaut is motivated inside the richness of the world's details and its objects that were abandoned to solitude: labs, libraries, galleries, refineries and a number of equipment are put to be explored. Many of them, already interactive in the first version of the game in 1993, in which will become more and more complete, complex and functional, each time the narrative in incremented with a new episode (the various versions of the game). In this case, the technological evolution of the computers and its processing capacity are followed by the interactive resources that are made available to the cybernaut agency and the transformation of the digital universe. Thus, to define a game based on the exploration economy is to define the knowledge progression of the man.

If the game characterizes itself for being based on an exploration aesthetic and an economy of exploration of its environment and objects, that does not mean that it does not introduces, from the narrative point of view, elements that put, even in a disguised way, obstacles to the user. The situation proposed to the cybernaut, expressed by the help request of the character Athrus to release him and his wife from prison, and yet discover which of his sons was the crazy responsible for such action, it updates dynamically the problematic of the hidden opponent in which you have to deal with. The logic, the solution for the enigmas and the cybernaut behavior are the only weapons that are available. Murray (2003) relates this script structure of Myst with the script structure produced by Shakespeare in theatrical plays.

Finally, our synthetic analysis allows us to situate ourselves in this metaverse inside a constructive perspective. There isn't a pre-data: the secrets and enigmas need to be found and solved so that we have the sequence of the central and tragic story. Inside this universe, in which today works in a open narrative in the WEB (URU live), the structure of the solution of the narrative, even better, its outcome, tends to offer multiple possibilities, including different endings, all of which are linked with the interactive behavior of the user. The strong factor that boosts the constructive fundament resides in the organization of the puzzles and in the independence of its solutions, not having a linear order to their resolution, but leaving the possibility of the manifestation of various player styles.

Mathematical Logic and Interactive Puzzles

If the design structure of Myst organizes itself as a navigable space (Manovich, 2001) opened in the production of a *even more variable narrative* (Murray, 2003), this means that the more we advance in the various versions of Myst, the more we find the progressive construction of a *discovery logic* (Tonéis & Petry, 2008) that assumes *Wagnerians* proportions. At one point we have here emergent phenomenon that become more and more evident if we are to be taken to suppose that they organize themselves from a fundamental structure of this world, we can say here, the metaverse that can be designed as the *aesthetic experience of metaverses*. At another point, this theme of *aesthetic experience* constitutes in a conceptual work object in the phenomenology (Gadamer, 1999; Petry, 2003; Tonéis & Petry, 2008). In this case the secret passion between the *aesthetic* and organization of *interactive puzzles* founded in the mathematical logic constitutes in one of the fundamental metaverse elements, such as our model example here, Myst. It is in this aspect that we think that the modern science game, not only allows the technical digital world but also reserves many surprises to the man. Regarding navigable and interactive adventures that we can allow in the numberless metaverses, they can open the possibility of challenges in which both

the logical and mathematical reasoning can be inextricably connected.

In Tonéis & Petry (2008), the central theme of the analysis is taken inside the question of the aesthetic experience, identified as the first form of constitution and reckoning of the living world. We have learnt with the hermeneutics phenomenology that each and every experience must be taken as an encounter: like a happening that touches us and invites us to discoveries. The personal experience is born from a reflexive process, when something happens to us, touches us, passes by us resulting in a transformation, because we understand that the reflexive act has a transformer character, and consequently, the actions to be followed. A cognitive discovery, a solution to a problem that has taken all of our attention, tends to generalize to our whole life the impact of its solution: therefore, the entire discovery matters in a reflective experience. Inside it we can observe that the importance of the significance of the objects by the individual is in considering that without this last one the process of the knowledge construction, in its wider conception, will be harmed. It will be in this sense that the *doing math* demands the emergency of investigating each Argonaut that really enters the means of the metaverse, or else, the process of developing and experience a group of characteristic processes of the math activity itself. The math activity is defined as a resolution of problems. In the usage of the digital universe, in the navigable space, in a metaverse, for example, we can invite the Argonauts to participate in the immersive narratives so that those story protagonists wish to proceed in their script overcoming challenges – puzzles – and in this way developing, in several levels, an ontological math, before calculation and algebra. It will be in this sense that this ontological opening in math or even in logic will be in the origin of the problem resolution, in reflective process application and action, etc… Such dynamism is, unquestionably, offered by Myst to its visitors[12].

It will be in these aspects that Myst is more than a dense and sophisticated game. When you understand the meaning that a game contains, the player has the responsibility to discover and take advantage of the several logical possibilities hidden in it. Development possibilities, mathematical logic reasoning that are capable to project its experience beyond mere leisure and/or pleasure.

While the Argonaut explores the spaces offered in the landscapes and environments of the metaverse, inside its alternate universe, it will be living unique experiences that will be able to be converted in the future in high level logic-mathematical structures. The experiences in the metaverse help the structuring of the capacity of problem solving. It is like this that, when developing a method to "escape the problem", to overcome this barrier or any other, that constitutes, progressively, in the way of acting positively in the construction of a mathematical reasoning, of a discovery logic (in which can have structural incidents in practical life).

Dominating the extension of verbal concepts and perceptive groups, restructuring itself logically, so, *coming from its own experiences*, actions and operations, the metaverse proposes its traveler an activity that establishes itself as a context of an autonomous activity, place in which it is demanded to discover itself (by the initiative of its actions) the relations and the notions of a complex network of meanings that constitutes its plot on the narrative, recreating them. When they are recreated, it is produced a new and personal knowledge! This is now founded in its own experiences, in the interaction with the environment, private and public – in the community. To know the real is also to configure it and to be able to reconfigure it.

As such, this means that, in other words, *to mean the real preserving the richness of the senses in the real*. Like Merleau-Ponty (2006) used to say, the senses relate themselves before the language. The representation is born in the necessity of understanding this real[13]. At the same time, not only in the mathematical symbolism, but also in the logical abstraction can be understood as the delicate fruits of an adaptation process (Piaget, 1970) – *assimilation* and *accommodation* – arising from singular experiences of a subject of experience (aesthetic).

It will be on this line of thought that the computer game studies and its applications have been object of systematic investigation inside this area of cultural and scientific examination. In this aspect, among many authors that currently have dedicated themselves to this new region of human thought and life, we remember here of the contributions of Mayer (1996), Miles (1999), Manovich (2001) and Murray (2003), among many others. It is like this that, by analyzing the game Myst, Miles proposes to discuss questions that are more general regarding the expressive possibilities of the multimedia environment. The present references in Myst include artistic works or traditions as diverse and rich as the Odyssey by Homer, the *gothic romance*, the *painting tradition*, the *filmic surrealism*, besides the, clearly, *interactive fiction* derivative from Borges[14]. To Miles, Myst represents the beginning of a new form of art – that synthesizes different means in new combinations – and, what is equally important, recovers and reinvents different ancient art forms that for long have been claimed obsolete" (1999: 309). This relation of recovery and rescue constitutes to Miles the most important research object.

It is on this sense that Myst opens a new paradigm of interface man/computer (Mayer, 1996). The conceptual hyper-realist proposal and the image refinery, the tridimensional effects, the textures and the perspectives of the scenery contribute to an intense immersive experience.

But it will be in the introduction and the emphasis given in the solution of the enigmas (*puzzles*) that will transform the metaverse of Myst into something absolutely differentiated and putting it, as an experience that simulates the difficulties and progresses that the individual faces in

its representations of the real world. And Murray (2003) reminds us that the "solution of the puzzles usually depends on subtle sound clues, rising the attention of the player to the meticulous sound project". The complete Myst project conspires to produce an essential connection between its visitor and the presented virtual world. When entering this *holodeck* the Argonaut converts himself in another element in the big puzzle that Myst is. Its first mission is to discover what to do and where to go. The clues will lead him to the discovery, in the virtual world, of its own potentialities in the resolution of problems and constructions of methodologies. The geometrical comprehensions of the spaces as well as the mental maps built while exploring are evidences of the creative potential existing in this parallel universe, Myst.

In the resolution of a puzzle we find an experience, and opportunity, a tool to logical organization of events and actions. Such organization can occur almost unconsciously, when it is about developed cognitive processes, due to the ease and familiarity with the world of Myst obtained by each visitor. What we expect at this point of out reflection is the comprehension of the mathematical experience in the resolution of a puzzle as being an attempt to formalize concept and actions taken during such resolution and so consciously understanding some concepts that are supporting such resolution.

As so in a comprehensive approach, we can say that here between a game the so called *conscious takeover* (Piaget, 1977), in which it focus on the action process that transforms an *scheme* into a *concept*, or else, going from the behavior of the resolution of the puzzle, to arrive at stages of generalization that get wider and more universal. Maybe that is the aspect to be initiated with the undefined practice to reach the *epistheme*[15] that the activity of solving puzzles can be compared to a Maieutics Socratic that, by means of investigation, the person will find the answers to the question that has been formulated and like this it will be reckoned the methods involved in its investigation. From the arguments presented, we cannot fail to glimpse in Myst new possibilities that emerge from the immersion in the virtual world, in the constriction of the abstractions and mathematical concepts that are present in the digital universe, and so, transport them to the mathematical language and a possible formalization or conceptualization: elements that can habituate the aesthetic experience inside the metaverses.

The context of the puzzles inside the metaverse experience in Myst online: URU

With the growing development of software and hardware in a way of always overcoming its predecessors, in processing speed, space for data storage, the digital universe became fundamental part of our living world[16]. It is almost impossible to designate how much we denominate in the virtual world to different people constituting in absolutely live experiences. We are connected beings; we keep in touch with the real time with the help of a virtual world, instant messages, chats, forums, etc. It will be in this path that Petry (2009) looks to present the emergency of the metaverse, from ontological elements, in which enable the structure of ubiquitous aesthetic-digital experience. From that point, "in an expansion of the concept of hypermedia by Manovich (2001), the metaverse can be thought as a collocation in a piece of the Wagnerian concept of *Total Opera,* with the difference that its characters identify with their audience." In this metacontext, the evolution and transformation suffered by the interface concept, at the metaverse we are taken to consider it as *digital life forms*[17] (Petry 2009). From that perspective, the digital universe can be thought in one continuous line with the daily life, like an extension or prolongation or, in a word, a metaverse. In fact, the continuous transformation that enables this process in the interior of digital life is one of the main denotative that there is "life in the digital universe" and that we can refer ourselves in the metaverses as new ways of man/machine interface.

The importance of an ontological look over the objects that conduct a more refined attention to the world that constitutes the metaverse conducts us in the direction of understanding the opening to this aesthetic experience, or else to a metaverse experience in its total, in this *world of infinite worlds* (Merleau-Ponty, 2006). This occurs in Myst, in various versions, in different levels of experience. Teletransporting evolutionally to its online version, Myst opens opportunities to the phenomenological sense of sharing with the other the experience: the "being-with". *Being an experience with them*, communicating internally with the world, with the body and with the others (Merleau-Ponty, 2006), designates the necessity of engaging in transforming attitudes and activities, of being in movement being *with them* instead of just being next to them. Like Heraclitus would say, "everything flows, everything changes"; so occurs with the digital universe, in constant metamorphosis. With that we can say that the metaverses constitute themselves in our projections of something more fundamental, something unique, something singular, in other words, transcending the material reality to the digital representation plane, we are equally taken in Myst to face our fundamental incompleteness and, from this finding, put ourselves in the condition of being capable of accomplish our transforming experiences. To reach a differentiated link to conscious, in which reciprocity is beyond the mere exchange, the simple feedback. In the online version of the game the Argonaut has the opportunity to broaden his experiences sharing the story with other protagonists.

Online Myst, URU[18], is a game in the multiplayer line, a game in which the explorers, like in other types of metaverses, have the possibility of creating their own avatars, selecting its characteristics that provides them a digital presence (*Digital Anwesenheit).* When, aside with their digital partners, the Argonaut from the metaverse enters in the great restoration council D'ni. Among other

adventures, we are invited to rediscover, restore and rebuild the ancient D'ni civilization and learn their story. The planned metaverse in URU live presents new surprises to the member of the Myst community. In function of the used engine characteristics and its planning for a communitarian environmental, at the real time multiuser style, the environment of URU live allows the possibility of your modification as time goes by. The Myst community analysts organize a list of characteristics of the URU live metaverse. The first consists in the fact that the metaverse organizes itself in navigation worlds with surreal environments that encourage the exploration. In second place, the high level of gameplay, due to the fact that there aren't any rules at first, levels, maps to be memorizes – only the navigation and the encounter with the community members that are inserted as data. The third element is the non-violence and the impossibility of having a user dying or being killed by another player. The fourth element is, and maybe here the most important one, the possibility of *volunteer interaction with other players,* different from the offline versions, in which solitude was the game's trademark. In fifth place e less important, we find the progressive introduction to the puzzles; to a group of them is reserved the task of supplying the necessary information to the digital inhabitants of the metaverse about the mysterious civilization D'ni; to another group of puzzles is reserved the role of inserting enigmas that must be solved so that the Argonaut deciphers the functioning of the worlds, its structures and mechanisms, enables passages to places in other Eras not yet explored. It will be at this fifth group, the puzzle group that we aim here, in which we will be questioning around its ontological constitution.

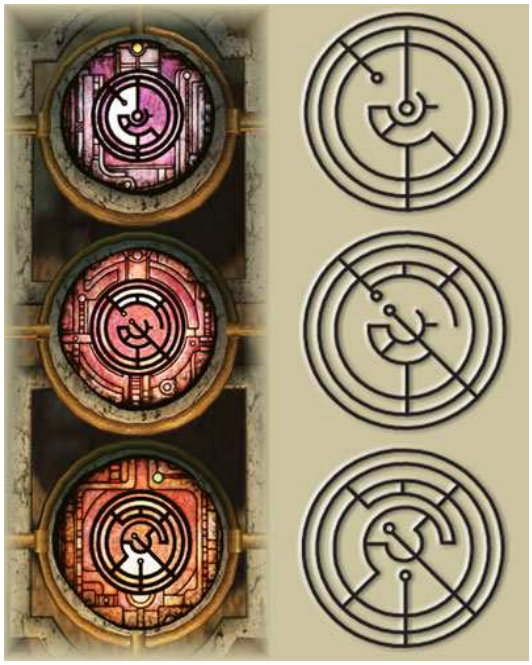
We will initially see that they are capable to be worked on by the new inhabitants of the D'ni civilization from communitarian strategies of multiplayer collaborative relation. As so, the possibility of the group solution of a problem – puzzle – opens new possibilities for discussion about problem solving shared in communities, once that in the experience we are more than one, we simple *are*. Here, inside the metaverse, the idea of the body, the unit moves to a collectivity sense, so we are. Myst online put us in a kind of a new *never-ending story*[19], with the story being continuously being renewed, with new possibilities in the story being inserted, by new members, by modifications in the environments, in new plots that are the product of collaboration – the essence of a new kind of *digital economy* that is powered with the advent of the metaverses: the online cooperation economy. It is the group of digital inhabitants that discuss and examine together the handling possibilities of the puzzles (in the following image) to give access to a superior installation tread.

It is in the *aesthetic communitarian experience* context, committed to the online puzzle resolution that emerges in the collective construction of the *D'ni* metaverse, going by the individual consideration and looking for dialogues with others and with the digital source. By being capable of exposing its line of thought, before it used to be inner and blurred, the Argonaut finds in the metaverse the possibility of sharing its ideas and theories with its journey fellows. This team united by the same ideal, to live the story, compromises with the ending of this very same, deepening in the processes of conceptualization, enriching the logic-mathematical thought in the encounter with the puzzle solving. In the interior of the metaverse experience they are the link, the connection to overcome the obstacle and initiate the walking towards the other. These are demonstration of ontological character of logic-mathematical structures present in the metaverses. The path is not ready, is not defined, they are created by walking, rising up along our course. Paradoxically, in a multiple and cooperative way, the adventures become much more singular, as the more people are involved in the experience, the more singular this one becomes.

A brave new World of educational metaverses: the narrative and the discovery context

The enigmas of Kadish Tolesa are among the most difficult ones in URU. Not only we have to imagine how to solve them, but we should also imagine how to interpret the clues. All the evidences are in this gallery – Kadish Tolesa – the question is, then, to study the panels, make detailed notes and sketches or even to examine the possible relation between them.

Something that is always present in Myst is to be always prepared to return to a determined spot to look once more at some details and to revisit some strategies. Something important to bare in mind to all the enigmas of Kadish is the fact that the master Guild Kadish knew how to omit information to seem more powerful to others. Consequently, the base to solve the enigmas is to preferably discover what is missing to our point of view. Here, the ontological investigation strategy indicates that at the phenomenal observation lets the Argonauts community fill the blank spaces in the proposed narrative. If we think that the blank spaces in the narrative must be completed, for example an X element, which will have a function of structure the sense deeply and profoundly, we can refer this narrative strategy ontologically to the developed tradition from, at least two developments: while Frege's logic teaches us that an empty space in a proposition comes to be filled by a logical object or a function to consequently obtain a sense and a denotation, on the other hand the hermeneutics phenomenology shows us that this very same process of logic meets its function of an reversed blackout that was submitted to the sealing of organization conditions of the world. In this case, it is cooperative in the making the narrative regular and unconscious by the accomplished processes that are revealed in its fundamental structures by the academic research of metaverse. It will be on this specific sense that we will introduce and discuss here the three telescopes puzzle in the Kadish metaverse. See the image representation below:



As the word telescope says in its usual sense, we have in Kadish three devices that have a double purpose: firstly to provide a proximate vision of a distant point and at the same time adjust them through concentric circles fired by buttons to align them among themselves, having as a final result of the alignment the triggering of doors with its correspondent passages. The three telescopes are close to each other. After an analysis, we turn the telescope device on and we look through an aim again. This is the first of three telescopes devices alike in Kadish, which altogether makes the puzzle reachable for our sight. Call it telescope one. The second telescope is located in a pavilion that is reached by taking the way from the connection that passes by the ascendant arch. The third telescope is situated next to the second one at a clearing on the floor.

Each telescope has three buttons in its base and each click in a specific button rotates the device rings. Each click in one of the buttons rotates the associated parts in the telescope – rings about 1/8 of the circle circumference.

With the objective of establishing properly each circuit, you need only to push the buttons you have the correspondent configuration in one of the panels (see the image above): Telescope 1 is situated on the top of the panel, telescope 2 in the middle of the panel and telescope three in the inferior part of the panel. In case there weren't any alteration in the device configuration (telescope 1), the correct alignment is reached, pressing the left button 4 times, the central button once, the right button five times, according to the table below:

	Left	Center	Right
Telescope 1	**4**	**1**	**5**

And resulting in the configuration exemplified by the following image:

On the second telescope, look through the scope display to see three keys that control the rotation of the device. From the initial state, press the right key three times for the correct alignment of this device. You do not have to touch the other keys. The behavior structure is diagramed in the following table:

	Left	Center	Right
Telescope 2	**0**	**0**	**3**

And according to the following image:

Now being at Telescope three, look through your display. From the initial state, the proper adjustment is reached by pressing the left key three times, the central key seven times and the right key three times, as shown in the next table:

	Left	Center	Right
Telescope 3	**3**	**7**	**3**

And according to the following image:

If telescopes 1 and 2 are adjusted correctly, we can see the movement in the back when this when this third telescope is adjusted and, when we step behind the display we can see that the door in the tree ahead was opened: the three telescopes puzzle is solved.

At first we identified combinations that involved three possible movements with buttons – right, central, left – and we have also verified the Kadish Tolesa gallery, finding many clues that could be useful in the resolution, the most evident one is the drawings in the wall, once that it represents the telescopes solutions, so what is left to the visitors is to be able to translate these images by looking at the scope display, hence the drawings are not that obvious. The key to the images is in the exploration of the blank spaces of the scope. So when visualizing the image in the gallery, we should relate to the telescope, however considering only linear formations. That is the reason why we advice to make notes or draw whatever is necessary from the gallery, or else, to return there as many times as necessary. Summing up, we will have the following combinations:

	Left	Center	Right
Telescope 1	**4**	**1**	**5**
Telescope 2	**0**	**0**	**3**
Telescope 3	**3**	**7**	**3**

The three Telescopes puzzle of Master Kadish can be analyzed, not only in logic but also mathematically. The analysis, on the other hand, has incidences and ontological basis and, from the metaverse point of view, it allows the organization of the take over of the epistemological conscious, allowing that the knowledge acquired inside the *aesthetic-logical experience* in the metaverse, obtains more global potentials in the lives of the members of the D'ni community. Such as a preparation for a resolution to other problems inside the metaverse, and also as ostentation of the groups' own personal reflexive abilities. Even that no member of the group comes to accomplish a logical-mathematical formalization of the puzzle, the developed steps in the problem resolution takes them to the situation that Piaget (1977) designs as the *conscious take over:* to know how to do something is just like knowing how to explain something to someone else – or else, in a *wittgensteinian* language, I know how to play this game, so I understand this game.

From the table above, at the mathematical point of view, we have verified that this can be compared to a square matrix of an order of three, and with that we focus on the particularities of the mathematical structure involved in the resolution of this puzzle. The values of the table, that represent the circular movements present themselves as odd

prime numbers even between 3 and 7, in other words, just the figure 4, compound number derivative from the only even prime, the number two, occurred only once. This reveals the nature of the movements in this game, the movements as being primary, movements that generate movements, like in this case, the opening of the door, as action and reaction.

Elements of the Fibonacci sequence are also revealed as present in the table (1, 1, 2, 3, 5, 8, 13...) what values even more the question of natural movement. Another relation that becomes the focus of our observation is the sum of the lines and columns of this table, because adding lines and columns, in the intersection we will have the same value, 26, which is composed by 13 multiplied by 2, in other words, two prime numbers between themselves.

Conclusion

The mathematical characterization of a puzzle is not only about the number conversion of the events, but in its ontology it constitutes exactly in the thinking exercise.

It is due to these characteristics that the frontiers between mathematics and logic become tenuous. According to Russel (1960) such separation became too delicate due to the nature of the logical demonstration with the usage of algebra and algebra resolutions from the conception of initial assumptions or even deductive structures. It is on this sense that he has created between 1900 and 1905 its famous *Types Theory* that sought to handle problems coming from the sets theory. If from one side, there exist classes more than things, what results in a paradox, the logical organization of a puzzle (as referred), tends to structure the analysis and the reasoning centered in formal conditions and procedural actions. In the sayings of Putnam (1988) the formalization does no have as a task the solution of the real problems or other things, but the task to serve as a sound instrument to enlighten the difficulties that can become clearer and operative from its systematic.

In this sense we can understand each button that works as logical positions (0 or 1) and so we would have a new binary table of the three telescopes situation.

The topological alignment of the three telescopes results in the opening of the door, the missing on this puzzle, can be compared to the interdimensional portal in Stargate[20]. Here we have the dialogue between the Web's digital metaverses with the filming metaverses. If through the portals of Stargate we can reach new worlds also by metaverses, we can teletransport ourselves to new metaverses. The procedural schemes that are functioning, not only in the Kadish telescope but also in the Stargate portal are formally identical: solar rotations around a central axis determine the conjunctions (alignments) of symbols (logical positions) that determine the triggering of unrevealed mechanisms at first.

From the metaverse experiencing point of view, the puzzle resolution implies in cognitive processes that result in comprehensive schemes. From the formal and phenomenological point of view the *understanding* precedes the *explanation* (Von Wright, 1979). Even that thematically situated in different philosophical traditions, we can observe that in the *metaverse aesthetic experience* both formal schemes can converge in a community. If the comprehension generally comes by means of a leap in the total vision of things and of the world, the relating, introducing and letting registers to the society movement is accomplished inside the explanation scheme. Our purpose in the present article sought the valorization of the aesthetic-ontological experience inside the metaverses and, by accomplishing the presentation and analysis of the URU metaverse in a modular puzzle. Our intellectual action does not have as a purpose to give the last word on the proposed theme. On the contrary, it seeks to route of questions that are situated in the range of our academic research. It occurs that, however, with the present article we could reach to demonstrate some elements of the logic-mathematical structure resident and alive in the *play the metaverse game*, having as a result the opening of a line of dialogue between new worlds and new possibilities.

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Notes:

(1) To see, for example, the work of Cléuzio Fonseca Filho, C. (2000). História da computação: teoria e tecnologia. São Paulo. LTR Editora. E-Book in <http://professores.faccat.br/assis/hcomp/hcomp.html>.

(2) The hypermedia concept has many definitions, since its context inside the computer science, going through the Design, and arriving at the culture and information theory. In a general aspect "les hypermédias, dans lesquels les informations ne sont pas seulement de type texte, mais également de type image, son, vidéo ou encore multimédia, ont vocation à présenter l'information . Dans les applications basées sur le Web, l'information est présentée selon une approche hypermédia, mais de plus, il est possible d'effectuer des traitements à travers l'interface Web. Dès lors, il n'est pas surprenant de constater que beaucoup de travaux de recherches sur les hypermédias ont été réalisés ou sont en cours de développement" (Hypermédias: <http://fr.wikipedia.org/wiki/Hypermédias>. On the side of culture and semiotics theory, we have Santaella (2000) telling us that: "far from being just a new technique, a new mean of preexisting content transmission, the hypermedia is, in reality, a new language in pursuit of itself".

(3) *Not free* means that those mutations are supported by a historicity that is revealing from a dialogue that crosses and trespasses a number or regions. *Not planned* points to the fact that they do not constitutes in the result of a unique and monolithically program of work and research, but they could be seen previously as an phenomena in which we have the multi determination of forces that reciprocally feed themselves. As so, they are related to discussions that binds in an intense dialogue and mutual influence in the multidisciplinary areas and internal crisis, to know, in the emergent computer science (Fonseca Filho, 2000), in the plastic arts that shows themselves as digital (Domingues, 2000), in the literature that recognizes as cyberliterate (Carmonam 1976; Barbosa, 1977) in the technical philosophy (Feenberg, 1999), in the cybernetic (Wiener, 1965), in the critical theory (Marcuse, 1964), in the communication (MacLuhan, 1964; Flusser, 1983), in the semiotics (Santaella, 2001; 2004), for example, in the mentalities history (Certeau, 1999 and Bairon, 2002) and in the hermeneutics philosophy (Heidegger, 1929 and Vattimo, 1985).

(4) The term digital paradigms is used by Manovich (2003) himself and it derives from its reading of science philosopher research, Thomas B. Khun, initiated in its paper Khun, T. (1978) *The structure of the scientific revolutions.* SP. Perspectiva. Wikipedia presents a very adequate definition of the concept: "The word paradigm (Greek: παράδειγμα (paradeigma),

composite from para- and the verb δείκνυμι "to show", as a whole -roughly- meaning "example")" [http://en.wikipedia.org/wiki/Paradigm]. From its concept formulation in the science philosophy, the term paradigm crosses today the human knowledge field, and in men's sciences, it is used by Manovich in the sense of a guiding model (of design), a type of a concept-object that stimulates and determines socio-cultural and technical developments. A study that shows the incidence of Khun's paradigm concept in human sciences and philosophy can be found in Stein, E.J. (1992). "The philosophical paradigms on the threshold of a new millennium". Estudos Leopoldenses. Série História, v. 28, p. 47-58.

(5) Link to *Doom*. See also: David, K. (2003): Masters of Doom: How Two Guys Created an Empire and Transformed Pop Culture. At Wikipedia we have a very interesting description: "Doom is a computer game released in 1993 by id Software, and one of the seminal titles of the first person shooter genre. Combining 3D graphics with graphical violence, it has become as controversial as hugely popular, with a shareware version release that is estimated to be played by 15 million people. Besides defining many first person shooter game elements, *Doom* has established a sub-culture by making games popular in networks and allowing expansions created by players (WADs). The game success has influenced the games boom in the 90s up to the point that these games were sometimes called Doom clones." The Doom franchise continued with *Doom II: Hell on Earth* (1994) and a number of patches as *Ultimate Doom* (1995), *Master Levels for Doom II* (1995), and *Final Doom* (1996). From: (http://pt.wikipedia.org/wiki/Doom).

(6) Nowadays, the base site for the worlds or metaverses of Myst is: <http://www.mystworlds.com/us/>. At Wikipedia we have a summary of the game: "Myst is a computer game of the adventure genre developed by Cyan and distributed by Brøderbund in 1993." It was originally developed by the Macintosh computers, but one year later it gained a Windows version. The game creation was directed by the Rand and Robyn Miller brothers. This game was one of the most famous among the adventure games, helping to disseminate the genre. Myst was considered a model to the game industry at the time by its attractive graphics at a time in which computer graphics resources were limited. It was between the most sold computer games during the whole 90s, encouraging the sequels productions: Riven, Exile, Revelation and End of Ages. Besides that, the game was reprinted twice in Myst Masterpiece Edition with better graphics and better sound and in Real Myst with 3D effects and other news. This game led also to book publication based on the game story, a MMORPG game called URU: Ages Beyond Myst and comic books" (http://pt.wikipedia.org/wiki/Myst).

(7) J.C. Herz is the author of Joystick Nation: How Videogames Ate Our Quarters, Won Our Hearts, and Rewired Our Minds (1977). Brown. Little. and of *Surfando na Internet – uma Aventura On-line* (1996). São Paulo. Domínio Público.

(8) The results of this new cultural economy politics: fifteen million copies of Doom were downloaded.

(9) Robin Miller, one of the brothers of the pair of authors of Myst, musician and writer, has published along with Rand Miller and David Wingrove, the compendium *The Myst Reader* (2004). New York. Hyperion, which contains a series of diary writing of Athrus about the Myst plot.

(10) Lorna Dannan is the nickname of an autonomous researcher of games and ciberliterature that maintains the biggest reference site about the Myst themes, the D'niHall, available at the electronic address: <http://www.dnihall.com>. The D'niHall space not only fights with a giant text-based, images and audio data bank, but it is also the basis of an international community of fans and researchers of the Myst saga.

(11) According to the legend that occurs in the international fan community, the game success wasn't predicted by its authors. In interviews years later, they have commented that they wanted to do something in which they would really be compromised, even if it was successful or not. Precise information around the immediate success of Myst is not precise. But in any case it appears that this digital product has arrived at the right time and that the CD-Rom users were just waiting for something like this. This impression, discussed in the specializes magazines and by literature seems to be confirmed by the fact that the first game's Christmas, in 1993, estimates that it got to 20 million dollars sale. Until today, according to information from another game student, Paulo Monteiro, the creator of the free expansion of the Myst Universe, called Ilathid (www.ilathid.com), the Myst success was eventually overcome in values, but not exceeded as a cultural phenomenon.

(12) It is at this aspect that, from Huizinga (1938), the own game conception is redirected to its fundamental aspects. According to the thinker, the game and the play constitutes themselves into absolutely primary life categories and, in this sense, as essential as reasoning – *Homo sapiens* – and the objects factoring – *Homo faber* – making it appear the denomination *Homo ludens*, in which means before any other hypothesis that the playful element that is present in the basis of the civilization appearance and development. This point of view tells us that the game is even previous of this culture and it rises from the game: "as a distinct and fundamental factor, present in everything that happens in the world (…) it is in the game and by the game that the civilization springs up and develops" (Huizinga,1990: preface). Game and culture constitutes in a cycle that is not possible to determine the beginning and the end.

(13) It is equally the case of Freud (1914) and Lacan (1953) studies that have identified the pre-linguistically stages in the anticipation of the human subjectivity.

(14) The Janos Biro Blog: "Jorge Luis Borges when writing, in 1941, a tale called '*El jardin de senderos que se bifurca*', marked the idea of interactive fiction twenty years before the first fiction interactive work was written. (In: <http://infoblarg.blogspot.com/2008/03/fico-interativa.html).
Victor Vasarely Zettm configuring another textualization also refers to Borges, but giving enphasis at the Biblioteca de Babel tale, referring other contributions, such as, Barthes, Joyce, Landow, etc." In:(http://www.unicamp.br/~hans/mh/config.html). Interactive science fiction at Wikipedia in: (http://en.wikipedia.org/wiki/Interactive_fiction).

(15) The real knowledge, different from opinion. The knowledge of causes that is necessarily true. A mixture of science and knowledge, by what it differs from the so called empirical sciences. A rational effort to substitute the opinion, lets, the knowledge around the quota. It is divided into praxis, technè, e theoria.

(16) It is our modest understanding that Dilthey could glimpse our days today and the metaverses that emerge at the horizon of human life, certainly would add an extra volume in its Diltheyniana, probably with the title: Teoria do mundo digital (2009) in complement with its Der Aufbau der geschichtlichen Welt in den Geisteswissenschaften (The building of the historical world in its spiritual science) (1910).

(17) Taking also, for example, at Manovich's path (2006), this

idea has constituted in an extrapolation of Wittgenstein (1994) game languages formulations ways of life. Such production context of several ways of digital lives can be found in Leão (2005), Fraga (2007) and Prado (2007), for example.

(18) According to the esD'ni portal information (from: http://www.coolwind.ws/esdni/htmls/esuru.html), the users that had the opportunity of navigating through the preliminary version of URU live have commented that the visual-graphic sensation is similar to waking inside a film.

(19) The Neverending Story is a cinema adaptation, of 1984, from the homonym book of Michael Ende. (Wikipedia, available at <http://pt.wikipedia.org/wiki/The_Neverending_Story>. Accessed in April 2nd 2009).

(20) The term Stargate refers to the American science fiction productions (of the "Space Opera" genre) that started with the motion picture Stargate, in 1994. The plot in all the productions goes around the Stargate premise, a superconductor device that allows time travel through the "subspace". (Wikipedia, available at <http://pt.wikipedia.org/wiki/Stargate>).

Virtual Learning for the management of successful SMEs in Europe

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The VITA project – Virtual Learning for the management of successful small and medium enterprises (SMEs) in Europe - presents an innovative approach to teach, learn and practice entrepreneurship and business management competences, based on the results of different projects, concerning Web 2.0-based and virtualization strategies.

VITA is under development, and will last 24 months. It aims to increase the capability of SMEs to adapt to European contexts, resorting to specific training, and increase adults employability, mobility and multicultural awareness, by means of: defining the European entrepreneur profile in terms of SME's management competences on the basis of needs analyses in collaboration with employees; defining courses, pedagogical approaches and evaluation tools addressing identified needs, upon the results of different projects, adapted to the characteristics of a virtual learning campus; conceiving a 3D virtual learning environment located in Second Life where learners will participate in collaborative learning experiences and will have the opportunity to test their competences in a safe application context by generating and managing a virtual SME; certifying e-learners in the basis of EQF (European Qualifications Framework) and ECVET (European Credit System for Vocational Education and Training) systems and other national qualification systems.

The origin of the project

VITA – Virtual Learning for the Management of Successful SMEs in Europe was proposed by a European consortium for the purpose of Lifelong Learning Programme (LLP), and in particular, for the actions Leonardo da Vinci Transfer of Innovation (LDV/TOI):

- Promoter: Escola Superior de Educacão de Beja/ Beja's Higher School of Education (Portugal);
- Scientific Coordinator: University of Tras-os-Montes e Alto Douro (Portugal);
- Bucharest Chamber of Commerce (Romania);
- bitmedia e-Learning solution GmbH & Co KG (Austria);
- Hyvinkaa-Riihimaki Vocational Adult Education Centre (Finland);
- IDEC S.A. (Greece);
- Dida Network Srl (Italy).

The consortium worked through the idea of using web tools to support the acquisition and use of knowledge, skills and qualifications in the management of small and medium businesses, by developing a methodology for a stimulant training experience for entrepreneurs.

As an LDV/TOI project, VITA will resort to the results and products from previews projects and valorise them into other contexts of implementation, new targets and (re)innovate methods and tools.

The partnership is composed by an heterogeneous group of entities representing academic and practical knowledge and expertise the fields crossed by the project, carrying their experience from validated projects, allowing the transference of:

1) Innovative and validated curricula and pedagogical methodologies in the field of SMEs' management;
2) Innovative results taken by education/training organisations in the virtual learning environments, both on-line (Second Life) and off-line (Innov8);
3) Innovative strategies to certify acquired competences.

In the end of the project, after 24 intensive months, partnership expects to have created conditions of impact in 3 European different systems: social, economic and technology sectors, by strengthening its capacity to answer challenges in the scope of Lisbon strategy objectives.

The relevance of the project: targeting SMEs, increasing competences, reinforcing digital literacy

Across the 27 members states of the European Union (EU), there are about 19.6 million small and medium-sized enterprises (SME), firms in the non-financial business economy, with up to 250 employees, representing 99.8% of all businesses and 67.1% of the non-financial business economy workforce – about 85 million jobs (2005 Eurostat data, acc. Schmiemann, 2008). These data show how important are SMEs and their success to the European economy. To support the growth and development of existing SMEs and promote the creation of new SMEs, the European Commission (EC) adopted in June 2008 the 'Small Business Act' for Europe, reflecting the EC political will to recognise the central role of SMEs in the EU economy, by providing a comprehensive SME policy framework for the EU and its Member States (European Commission Directorate-General for Enterprise, 2008).

Yet, in spite of this role, played by such firms in the European economy, there is a lack of specific training for people heading and/or managing SMEs, and the training that is available "tends to serve either start-ups or medium sized firms" (NJM European, 2000, p. 4). Thus, there is a challenge for Europe in the necessity to support entrepreneurs in fulfilling their ideas, in pursuing them.

European Commission has already promoted some strategies on this matter: modern SMEs policy for growth

and employment and the European Charter for Small Enterprises aim to ensure that all aspects of EU policy address the needs of SMEs.

But the need for more entrepreneurs in Europe reclaims the building of a more favourable climate in society for entrepreneurship. The principle is that the better understanding of the entrepreneurial environment amongst citizens in general, the more supportive they are likely to found enterprises… Education plays a crucial role in adressing this challenge successfully.

Why the need for more learning opportunities for SMEs managers?

All Member States are well aware of the need to integrate entrepreneurship training into the curriculum, but it is still far from universal across schools and further and higher education institutions. The European Commission is therefore working to encourage Member States to learn from each other's successes, and to develop a more systematic approach. The aim is that the education process in all Member States includes entrepreneurship education, so that potential entrepreneurs have a better skills base.

Among initiatives and techniques in use to foster entrepreneurship skills in schools and universities, the concept of "mini companies" has become widespread, and is growing in impact as a mean for school pupils to learn 'hands on' about how a company operates.

According to the Report A - Study and Analysis of Management Training Techniques for the Heads of SMEs, particularly Using the Information and Communication Technologies (ICTs) (2000), ordered by the DG Enterprise of the European Commission, there is a lack of specific training for heads of SMEs. Training needs for SMEs managers are related with the following problems:

- SME training tends to serve either start-ups or medium sized firms;
- executive training at business schools is often targeted at larger companies, and demands fairly strict timetables;
- there is a lack of best practice/expertise for training SME managers;
- there are no guides/standards on training delivery methods for SME managers;
- constraints on providers and their attitudes;
- SME managers are not a remunerative market;
- difficulty recruiting trainers with appropriate SME background.

Although the SME market is not a prime market for training providers there are opportunities and challenges in the lacks above, to which VITA aims to address.

The precept of the Lisbon European Council in March 2000 that every citizen should be equipped with the skills needed to live and work in the new Information Society was based on the recognition that the socio-economic potential of information technologies is directly related to their accessibility. In later European Councils, (i.e. Stockholm, Barcelona and Brussels) this message was reiterated, with particular stress on the contribution of Information and Communication Technology (ICT) skills to labour-market employability.

The Commission set up a Working Group on ICT in education and training to define the key issues, identify and exchange innovative teaching and learning practices and to make policy recommendations. In its 2003 progress report the Working Group on ICT recommended embedding ICT policies and strategies into long-term educational objectives, to ensure new support services for education, to empower and support educational actors in the process of change, and, finally, to develop research, establish new indicators and provide access to results.

The DG Enterprise Report (2000) expresses that ICT is used as a support tool in training delivery to SME managers by several providers. The use of on-line learning environments is proven to have several advantages in the training of SMEs' heads.

Nevertheless, in the specific field of SMEs, much provision is low quality ('books on the screen'), and remains a large need for content, as for pedagogical, technical and commercial aspects in ICT based learning,. Current challenges in the field are related with:

- Rigidity in navigation through the material;
- Lack of human interaction with e-trainer and other e-learners;
- Prior knowledge of ICT techniques;
- Appropriate ICT Infrastructure.

Concrete Aims and Objectives

The partnership will use the available knowledge from EU recommendations, policy for SMEs and experiences already promoted in member states, such as the use of "mini-companies", e-learning curricula for SMEs and virtual training experiences to develop a learning strategy specially designed for the needs of SMEs' managers.

Main aims for the project are:

- to increase the capability of SMEs to adapt to an European context, resorting to a specific training module for SMEs managers, and
- to increase employability by certifying learning acquired in virtual environments.

Those aims will in turn be made visible by the following objectives:

1. To define the European entrepreneur profile in terms SME's management competences on the basis of needs analyses in collaboration with employees;

2. Define courses, pedagogical approaches and evaluation tools addressing identified needs, upon the results of different projects, adapted to the characteristics of a virtual learning campus;
3. To develop a common curricula for a SME's management;
4. To conceive a 3D virtual learning environment where learners will participate in collaborative training experience.
5. To carry out a set of learning sessions in the virtual campus to work the curricula plan with the participants;
6. Learners will apply their achievements in a practical apprenticeship, by generating and managing a virtual SME, situated in the Second Life Platform ("mini virtual companies").
7. To certified the learning experience in the basis of EQF and ECVET systems and deliver.
8. To raise the awareness of employers to the relevance of e-learning and to value the European certification.

VITA's targets and their needs

VITA will target directly the following groups:

1. Adults (older than 18 years) qualified with secondary school level, specially addressing their needs in what concerns to:
   - get a facilitated access to the labour market and the need to get a vocational specialization after the secondary school;
   - increase communication and collaboration skills as basis to be successful adaptation to work approaches in companies;
   - rise levels of digital literacy;
   - transform their learning outcomes into applicable competences in the job required functions;
   - get in touch with multicultural environments, where multilinguistic competences are developed.
2. Employers in the scope of SMEs' sector, specially addressing their needs in:
   - increasing the presence of sustainable SMEs into the economic market, by resorting to specialized workforce;
   - recognising learning experiences (out of school) as core input to the employers performance;
   - reading and understanding European systems of qualification and certification along with their operational tools (EQF, Europass, ECVET).
3. Indirectly this proposal will have impact in e-trainers, e-tutors, all the users of Second Life, decision makers in Education and Training systems, SMEs' owners, SMEs' employees and managers.

Methodology and Work plan

The Project is organised in 8 work packages, during the whole life-cycle. These activity packs are related to the 4 main phases or stages of the Project development:

1. Acknowledgement
2. Conception
3. Action
4. Evaluation and Valorisation

During the first phase of the project – **Acknowledgment** - partners will collect data in each of the participant countries regarding the SMEs' needs in terms of competence for managers. All data will be then synthesised in a Transnational Report, allowing comparison of elements: identification of transversal needs and competence requirements for the European SME manager.

Based in national networks of SMEs supporting the project (around 50 SMEs per country), each partner will carry out a research plan aiming to answer the question: "What does your company need from a technical manager?"

Research plan, population and results will be described and discussed in National Reports, which will be the basis for a European perspective of SMEs management needs, identifying common and different needs between countries, for the definition of guiding principles for the development of training curriculum and for the outlining of European Profile of SMEs manager.

The **conception phase** includes:

- development of an e-learning training curricula addressing the SMEs' manager and
- building the virtual campus infrastructure in Second Life platform.

Planning the whole course to be delivered in the virtual campus will be based in a transference approach of several products about training managers and session planning for web environments, already tested and applied by institutions represented in the partnership.

At the same time, the team will be involved in the creation of a fully functional prototype of a virtual campus where the training will be delivered.

The function of this prototype is to demonstrate how each element will function and how the user will interact with the material. The prototype will also demonstrate the proposal interface, functionality and screen layout.

The prototype will pass a technical trial covering: graphic content, functionality, cross-compatibility, web compliance for people with disabilities and cost-benefits.

As for the **action phase**, its concerns both training (delivering the training module) on virtual environment and learners' practical apprenticeship.

The training process must consider the following pedagogical principles:

- give learners the sense of usability of learning;
- acknowledge the principles of continuous evaluation and feedback;
- apply diversified learning methods and activities to enhance learning;
- include practice exercise and "problem-solving" based learning activities;
- complement training sessions with other communication and tutorship mechanisms;
- promote interaction, exchange and team-work between learners;
- make the best use of available resources;
- lead group processes, gradually building a community

The practical apprenticeship is based in an on-line/virtual tutorship strategy, as fluid, situated and dynamic process: tutorship is distributed and negotiated among all participants depending on personal competences, made relevant by the nature of the task; tutorship is shaped constantly around the needs of the e-learner/virtual community.

This methodology, based on self-regulated learning stands on the following principles, applied to e-tutor role:

- "guide on the side" instead of "guide in the centre", depending on the conceptual level of participants;
- design regular, manageable feedback loop;
- lead group processes, gradually building a community;
- resort to mediated communication;
- negotiate processes where actions and objects acquire specific meanings in the interaction between e-tutors and e-learners: the tutor is lead by the learner to consider valuable aspects referring to the functionality of virtual objects;
- share community management;
- act as scientific and technical consultant/expert;
- be a cultural mediator;
- show flexibility to accept e-learners' initiatives.

In the end of the SME management "simulation", e-learners will get a qualitative and quantitative evaluation about their learning achievement, corresponding to a certificate. This certificate will be valid in labour market was a recognition of their competences as SMEs' managers. In complement each certificate is completedwith the e-learner portfolio reflecting evidences of such competences, created and collected during experience.

The **Evaluation and Valorisation** stage is related to the use of project results, namely their integration in the intervened sectors. This will include certification of e-learners, exploitation of good practices, negotiation with potentials users and beneficiaries. For these purposes, e-utors, in collaboration with the consortium will select some learning experiences, regarding achievements of virtual apprenticeships, results of virtual SMEs managed by e-learners and create an inventory of those experiences.

Added value in the European Context

There are already several organisations implementing learning experiences through Second Life, however these are internal projects of the organisations that are performing those. In the contrary this proposal is based on a transnational and collaborative work with impact in a large European target.

Learning environments will act as a meeting point for the participants from each partner country, allowing a common experience. The European value of the proposal is highlighted through the entire project, from its aims, to its expected results and the point of impact:

- increase the competiveness of SMEs, by generating an exchange network of companies to participate in the project;
- define the profile the European SMEs' manager, regarding the European specific economic market (challenges and requirements) in the scope of Lisbon objectives;
- contribute for the sustainability and growth conditions for SMEs in Europe, by increasing management competences in the labour force;
- settle a curriculum for SMEs which must be adjustable and flexible in the scope of European Certification tools: ECVET, Europass, EQF;
- training institutions, governmental bodies responsible for the Training and SMEs macro measures will be able to resort to results to perform changes for the development of these sectors;
- enhancing the use of ICT and on-line platforms in the learning situations, showing that these are useful tools to increase participation and motivation of different targets publics Lifelong Learning opportunities. ICT based training contributes to the inclusion of all learning

opportunities and do not constitute a barrier to access it;

- promote the employability in SMEs;
- contribute to the mobility culture within adult students and employees;
- contribute to the recognition of competences acquired in informal and non formal contexts, specially by employers, through the certification of learning achieved in VITA training and apprenticeship.

Conclusion

The main goal of the VITA project is to promote the acquisition of management competences in a group of adults (older than 18 with secondary school level), through a virtual learning experience. These competences are an added value for these people' employability and entrepreneurship, and these are strongly linked with the strengthening of SMEs market.

This project is an opportunity for adults to learn how to take business risks and to be creative in the SMEs market, as fresh managers believing in the growth and competitiveness capacity of their companies.

VITA will present a learning experience where adults will have opportunity to develop specific competences for their work as SMEs managers, considering the processes they must be able to deal in order to promote the sustainable progress of the companies. Such practical competences will be worked out according to active and pragmatic learning styles, learning by doing problem-centred approaches that offer flexibility to the participants. Trials for testing and adjusting skills will be promoted in the shape of a practical apprenticeship through the creation and maintenance of virtual SMEs.

Motivation, expectation of success, creativity, learning from failure and self-confidence on the part of managers' on their own management skills will provide the opportunity for great learning achievements, in order to bring to the SMEs improved management ability in the real economic world. This will be further supported by a valid certification of those within the European qualification and mobility tools – the European Qualification Framework, the Europass and the European Credit System for Vocational Education and Training.

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Digital-Virtual Living Space (ECODI) RICESU: A Net Experience with Second Life Metaverse Technology

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Abstract: This paper provides the project ECODI-RICESU, the Digital-Education Research Group — GP e-du UNISINOS/CNPq — developed for the Catholic Network of Higher Education Institutions - RICESU. To develop the project it was used the Second Life Metaverse - SL, in which it was earlier constructed an island, RICESU island with 3D graphical representation of the RICESU digital-virtual headquarters and many projects this network has developed. This paper describes the experience of developing this project, including two education processes in Metaverse SL and discusses ECODI-RICESU setting up.

Keywords: Digital-Virtual Living Space (ECODI), Metaverse, education processes, teaching and learning.

Introduction

Nowadays different kinds of social organisations have used Web-based technologies to create new information, communication, interaction and living spaces[1], which may enable the configuration of digital-virtual social networks.[2] These technologies open up the traditional spaces and notions of space and time, giving for complex network[3] flowing characteristics[4] So distance education has lately grown significantly, and it has been enabled by diversity and fast technological evolution associated with improvement in telecommunication infrastructure, which enables opening up education offers for a greater number of subjects. It is in this context that we have observed the development of educational proposals coming up with the use of traditional Learning Virtual Environments (LVEs) in the nineties, such as FirstClass, Blackboard, Learning Space, Virtual U, WebCT, Universite, AulaNet, TelEduc, LVE-UNISINOS, among others and, most recently, Moodle, which incorporates Web 2.0 tools, but in which the main way of interaction still is by use of textual language till the present processes of online education in the heart of 3D Web through the use of metaverses such as Eduverse, There, SL, etc. where the prevailing language in interaction is the graphical one, besides gestural, oral and textual one. However, every emerging technology must be explored by educators, so that they may investigate their potential to develop teaching and learning process. With this in mind, GP e-du UNISINOS/CNPq developed the project ECODI-RICESU proposed by RICESU.

Catholic Network of Higher Education Institutions – RICESU

The Catholic Network of Higher Education Institutions is set up in the logic of networks, tying up Catholic Network of Higher Education Institutions from different kinds and areas in Brazil, which together began to construct a virtual learning community and develop their actions through 'the Project methodology'. This network aims at encouraging the setting up of micro-networks and acting in the field of Digital Education by sharing and providing new learning spaces mediated by Digital Technologies, enabling the Brazilian educational community to take part in permanent learning and education environments in different fields of knowledge. Grounded on presuppositions favouring the human learning and development in interaction with Digital Technologies, has sought, by creating synergy in the Catholic Networks composing it, RICESU has sought to share resources, produce knowledge, facilitate communication, create spaces for interacting,

collaborating and cooperating, open up education spaces, develop collective actions and encourage online initiatives to emerge able to help and enable teaching and learning process in the covenanted universities. Through their actions, the Network has encouraged and invested in developing projects that may help in the educative process and that may be in tune with excellence criteria the Network has pursued. So RICESU has been materialised as a community behaving according to a humanist and ethic spirit. Engaged with diversity and pluralism of ideas it is designed to develop critical thinking, solidarity, cooperation and autonomy by constructing knowledge, and develop processes and products based on interaction and educational innovation.

RICESU is run by an Administrative Committee composed by a representative of every Catholic Network integrating it, which is appointed by his/her dean. This Committee by a bylaw ruling it, elects by simple voting a coordinator, an associate coordinator, and a document manager, who begin to respond for the administrative and financial management for the Network[5] for a period of two years. The Committee actions have been developed from elaboration of a plan and assisted by CNHE deans integrating the Network. Its work is achieved through mechanisms of communication and virtual interaction and working meetings that may be both in physical presence and in a digital virtual presence, using different digital technologies.

The global planning for actions is unfolded as projects which are assumed by Administrative Committee members according to their availability, interests, relationships and competence they have identified in the coverage area of projects, thus becoming virtual practice micro-communities. This micro-community has its own organisation, determination of rules and functioning dynamics, created and modified in a continuous process of deliberate actions and interactions with only member subjects. One or more managers of the community run each project. The current RICESU project portfolio includes the Colabor@ magazine (electronic magazine with editorial team), the digital content library (theses, dissertations and magazine papers for associated Catholic Networks or third parties) and Web-shaped material developed for graduate courses. Communication, availability of material and periodic, systematic presentation of the process for development of each project are performed by way of a discussion list, a restricted-access area in the RICESU and LVE site every Administrative Committee member has access to.

Presential working meetings are devoted to: political and strategic planning of the Network; knowledge socialisation; estimate of the work done and possible correction of paths; and prospects of new domestic projects and actions. There is a moment designed for making 'Thematic forums' aiming at feeding the Administrative Committee to play the role of qualified consulting agency in the EAD area in the respective Catholic Network.

Metaverse Online Education

Online education may be divided in three generations: Web 1.0 Online Education, chiefly focusing on content and in the way this was organised, produced and made available to be consumed by the subject; Web 2.0 Online Education providing communication by use of different types of software enabling the subject to construct and be an author and producer, rather than mere consumer of contents. In this context, the bases is interaction, in collaboration and cooperation, and Web 3.0 Online Education emerging as a novel possibility for online Education, shaping different Metaverse technologies enabling the construction of 3D digital virtual worlds in the world of Web 2.0 tools. For Schlemmer (2008),

> Web3D emerges with a host of possibilities in the context of TDV development enabling to create 3D graphical online environments. We may mention Metaverse technologies, which enable to create 3D-DVW and ECODIs, hybrids in LVEs, games, 3D-DVW, virtual communities, among others. In the educational context these novel possibilities may represent innovation significant for online education processes (Schlemmer, 2008, p. 7).

For Schlemmer and Backes (2008), Metaverse is a term that is constituted in the cyberspace and is 'materialised' by creating 3D digital virtual worlds, where one can immerse through avatar's telepresence and where different spaces to live and live together are represented in 3D, enabling 'parallel worlds' to emerge. Klastrup (2003, p. 3) has suggested that a 3D digital virtual world definition needs

> to depict many types of virtual worlds (both social worlds and games), depict what distinguishes virtual worlds from virtual environments (non-permanent or access-restricted) and virtual communities (merely focusing first on social interaction), emphasizing both interaction aspects: user/user and user/world, depict what distinguishes these virtual worlds from other kinds of imagined worlds (such as novels and films), which are no liveable environments, and finally, emphasizing the fact that the virtual world is a world that is shared with multiple users (synchronous communication) and therefore other users are also taken as producing it. (KLASTRUP, 2003, p. 3)

So 3D digital virtual worlds are digital-virtual spaces enabling communication in different languages: textual, oral gestural and graphical. Avatars represent subjects, and the result from their interactions is the materialisation of these spaces.

The Project Called ECODI-RICESU — Digital-Virtual Living Space

ECODI-RICESU is a developing and shaping project performed by the Digital-Education Research Group (GP e-du UNISINOS/CNPq)[6] linked to the research line of teacher training, teacher background and teacher mediation in the Postgraduate Program in Education at UNISINOS. The project included two stages: the first one has been the acquisition of an island in Metaverse SL for creating RICESU Island, which came into being with the creation of different 3D Digital-Virtual Spaces (EDV3D) for a common use of RICESU designed to enable ECODI to come into being to enable Virtual Living Community and CVP development in the context of Digital Education and particularly Metaverse Online Education.

In the second stage one has provided two training processes for teachers/researchers/professionals in CNHEs integrating RICESU, aiming at creating institutional skill 'knobs' to develop Metaverse educational proposals, thus contributing to development of both local and online actions, making a micro-network (micro-community) so as to create a novel GT, the ECODI-RICESU.

Building RICESU Island

After having owned an island in Metaverse SL, we have conducted an evaluation to choose the kind of space to be constructed, based on the project proposed for RICESU. With these elements, a proposal in the very island was developed, land and vegetation were shaped, and urban architectural planning and technical didactical teaching for Ricesu Island were developed. In the sequence, the proposal was adapted to suggestions by the Administrative Committee and the project was performed. The whole construction was thought in terms of this environment, which is digital-virtual, without reproducing/simulating physical constructions. As RICESU already had a well known visual identity (web site, banners, folders, etc.), it was necessary to apply this design to digital-virtual constructions. So, based on this visual identity and RICESU mission, a Living Centre was modelled for Network-developed projects. We have created two plans: a horizontal and a vertical one, with the idea of enabling some common spaces in the Network to occupy only the centre to give more space for CNHEs in the Network and develop novel institutional projects.

Applying colours and shapes in SL-developed 3D models, CC was becoming a wide space for avatars to easily move and fly. In the internal Living Centre, there were other spaces, such as a café, a small auditorium, CNHE kiosks and teleports. In the following pictures are RICESU Island map and Living Centre.

Figure 1: Ricesu Island Map

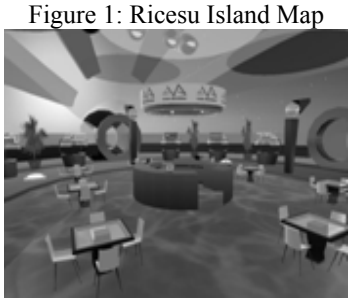


Figure 2: Living Centre

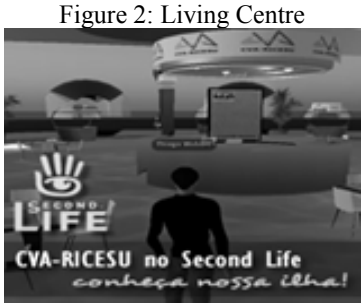


Figure 3: Living Centre

After creating Living Centre, we built the Digital Library, which gives access to the Network depository, available on the Web, and the space for education processes, anticipated in ECODI-RICESU project. This space was initially designed to simulate a 'sandbox' (spaces designed for free construction in 3D digital virtual worlds). However, the need to provide teaching materials kept it available.

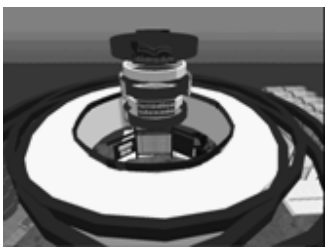


Figure 4: Digital Library

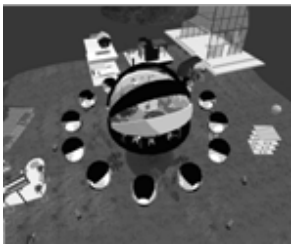


Figure 5: Ricesu island general plan: Yellow, black and golden preserving the visual identity

Scripts were applied in different objects as to enable avatars to interact with the world. Lines marking the space designed for individual CNHE constructions were added. Finally, it was necessary to rework the terrain to adequately adapt to the general space, as well as define the teleport unit and its divisions throughout the island.

Education processes

After creating the RICESU Island, that is, the digital-virtual representation of the RICESU 'headquarters', as well as projects in the Network, both educational processes were offered so as to develop skills related to 3D Digital-Virtual Spaces and SL Metaverse construction to create institutional skill 'knobs' to develop Metaverse educational proposals, thus contributing to development of both local (in the respective CNHEs integrating the Network) and online (RICESU context) actions. GP e-du orientation by which every CNHE should appoint a pedagogy teacher, one from the technological field (3D design and programming) and one from the architectural field for them to begin what could become a Metaverse Development and Research Centre and its respective CNHE. So there were 13 teams, one of each CNHE, summing up 39 physically distant members acting together in a digitally virtually presential way in the RICESU Island context in the 3D-Digital Virtual World SL.

In addition to guiding teachers responsible for education processes, 3 teams with GP e-du members were formed. Each team included a master student and a scholarship holder for scientific skills, both responsible for four CNHEs, while one of the teams was responsible for five CNHEs. These teams played the major role of assisting the participants' learning process. GP e-du designed the whole methodology and materials (texts, videotapes, challenges, etc.) used in both education processes, which provided a need to create particular objects in the space designed for the education process, such as an integrating panel (help, bulletin, meeting chart, orientations, screen, virtualtheque, diary, forum, teleport units, etc.).

Participants use also the 'Trunk' of one's CNHE as a space to develop education processes, where they lodged challenges satisfied and the space designed for one's CNHE, where they developed learning projects. These spaces may be seen on the figures below. In the education process, in addition to the Metaverse SL, many types of technology were used, such as blogs, discussion forums, Youtube, etc.).

Figure 6: Integrating panel - Avatars in the first education process

Figure 7: Avatars constructing challenges in the course space

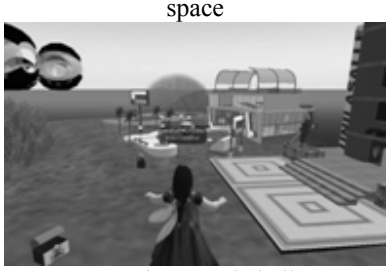


Figure 8: CNHE Trunk to send challenges and CNHE space to develop learning projects

The first education process 'DIGITAL EDUCATION: 3D-DVW construction in Metaverse Second Life'

> it is shaped as a space for exploring, experimenting and configuring/constructing 3D Digital-Virtual Worlds (3D-DVW) in the Metaverse Second Life (SL), cut through by reflective processes about learning and possibilities for this technology in teaching practice. (GP E-Du, 2008, p. 1)

This education process aimed at: enabling one to understand the concept of Metaverse, 3D-DVW, Island; creating and exploring avatar possibilities in Metaverse SL; discussing the concepts of telepresence and teleport; enabling one to explore and experiment possibilities of configuring/constructing 3D Digital Virtual World (Islands); encouraging one to learn basic procedures to construct 3D objects; and encouraging one to learn basic commands to programme scripts to create actions for objects in SL. The methodology used occurred in the

following way: there was a one-week adaptation period in which, through a discussion list designed for the education process, participants received a welcoming file, introduction, schedule and general guidance about how to develop the education process; a file distributing adviser teams throughout CNHE, tutorials (register, installing, first access, configurations, coming to know RICESU Island and the course space) and introducing texts. During the week, every participant entered the course space, in RICESU Island, exploring it according to his/her needs.

After adaptation, problematising methodology was used through challenges and learning project methodology. Different interactive spaces and the integrating panel through which participants could access different tools to assist solving of challenge and learning projects developed in the education process became available to them at this moment. The constant support and assessment of education process was performed in synchronous and asynchronous meetings through interactions in many spaces; through the portfolio of challenges lodged in the CNHE 'Trunk'; through the development of the learning project in the space designed for every CNHE, in addition to 'learning diaries' (recordings of experiences in the education process, satisfied learning, challenges e difficulties met, the way how they were solved and feelings towards them), aiming at cause reflection, conscience taking and metacognition about experienced construction.

For teacher-advisors, 'learning diaries' allow assisting and assessing the education process to regulate it and better satisfying the participants' needs. These diaries were lodged in the Integrating Panel, which was available in the course space. As an integrating and systematising activity, development of the learning project was proposed, and this was using the learned knowledge to construct an institutional space for their respective CNHEs. This education process summed up 40 hour classes, divided in six 2-hour synchronous meetings, summing up 12 hour classes and weekly asynchronous meetings summing up 28 hour classes.

The second education process 'DIGITAL EDUCATION: 3D Digital Virtual World, using Second Life as an educational possibility to form ECODI'

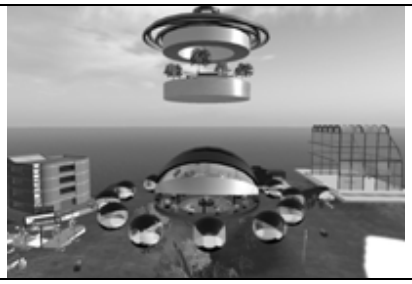
> it is shaped as a space for exploring, experimenting and configuring/constructing 3D Digital-Virtual Worlds (3D-DVW) in the Metaverse Second Life (SL), cut through by reflective processes about learning and possibilities for this technology in teaching practice. (GP E-Du, 2008, p. 1)

This education process aimed at: enabling knowledge construction that may allow development of planning necessary for setting up ECODI; encouraging the creation of a living space for interaction among subjects represented by avatars and Metaverse SL tools; and perceiving its use pedagogical possibilities, taking into account autonomy, self-production and collaboration and cooperation by/among subjects.

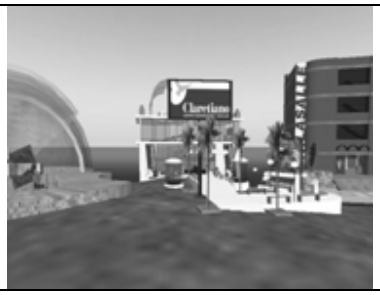
Both methodology used in the education process and assistance and assessment followed the proposal for the former education process offered. Challenges were development of the Technical-Didactic-Pedagogic Planning (3D-DVW TDPP for every CNHE linked to the Institutional Pedagogic Project); Urban Architectural Planning (Digital-Virtual Space UAP for every CNHE); Planning CNHE space use in the Island; and the integrating and systematising activity was the performance of these settings of planning, in the register of didactic-pedagogical possibilities in 3D-DVW and ECODI creation. So participating subjects have constructed their own CNHE educational spaces based on their individual needs and studies about 3D-DVW Technical-Didactic-Pedagogic Planning; on Digital-Virtual Space Urban Architectural Planning in CNHE; on Planning CNHE space use in the Island; on SL interaction processes; on didactic-pedagogical possibilities identified when creating 3D-DVW; on studies of autonomy, collaboration, cooperation and solidarity; and on self-production and construction of the living space by interactions and creation of ECODI.

This second education process has summed up 40 hour classes divided in synchronous and asynchronous meetings. Each two-hour meeting occurred on every 15 days, summing up 10 hour classes. Asynchronous meetings were four hours long every week in a total of 30 hour classes.

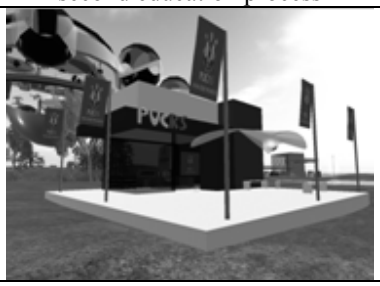
So every CNHE has created its own space in line with its needs and learning developed in education processes, and RICESU Island was conquering new spaces, adapting and changing itself everyday from interactions and constructions participating subjects performed in both education processes. Today when we stroll on RICESU Island we see constructions representing different learning developments by subjects who participated in education processes, and these developments were integrated to constructions representing shared spaces on the Network. These elements make up the landscape constructed in online collaboration and cooperation.



Picture 9 bird's eye view of RICESU Island after the second education process



Picture 10 bird's eye view of RICESU Island after the second education process



Picture 11 bird's eye view of RICESU Island after the second education process

Setting up an ECODI in RICESU context

The term ECODI was first used by Schlemmer in 2006 in the context of GP e-du UNISINOS/CNPq, but it has been shaped during its theoretical ripening, emerging from research since 1998 about the use of different TDVs in teaching and learning process, from an interactionist/constructivist/systemic perspective that takes technologies as empowering social cognitive and affective development. Thus the term ECODI represents a synthesis of theoretical constructions and establishment of relationships and articulations from result for different researches on the last 10 years. For SCHLEMMER et al. (2006, p. 8); SCHLEMMER (2008, p. 24); SCHLEMMER (2009, p. 143), an ECODI includes

> * different integrated Digital Technologies (DTs) such as: Learning Virtual Environments (LVEs), 3D Virtual Worlds (3D-DVW where interaction occurs among avatar-represented subjects, 'virtual humans' or bots), communicative agents (interaction-created -and programmed ACs), among others, which together favour different ways of communication (written language — text and imagetic language — figures, gestural language — movement and oral language —talk and sound), gathering every language in only one interactive space;
> * communication and interaction flow among subjects present in this space and;
> * interaction flow between subjects and the environment, that is, the very technological space.

An ECODI fundamentally presupposes a kind of interaction that may allow subjects (according to their ontogeny) 'living' in this space to shape it in a particular collaborative and cooperative way, that is, through his/her living and living together.

So effecting ECODI-RICESU has occurred on RICESU Island constructed in Metaverse SL where interactions have been among avatar-represented subjects through different ways of communication (graphic, gestural, oral and textual languages), through the flow of communication and interaction among subjects present in that space, and through the flow between subjects and environment, that is, the very technological space.

Interaction among avatar-represented subjects allowed them to shape the space in a particular collaborative and cooperative way, through his/her living and living together. We believe that through subjects' action and interaction in this educational space, which allowed living and living together, the appropriation of this space occurred, subjects came to understand it, giving meanings in teaching and learning process, which can significantly enable innovation on the online educational context.

Notes

[1] For Maturana and Varela (2002) living spaces are configured through interactive flows among living beings and between the living creature and environment, which enables changing living beings and the environment in the daily living with emotions, perceptions, disturbances and disturbance compensations. That is, in the educational context, the educator has his/her own space to live with students, and students also have their own space they receive through interactions; so educator and students shape and share a living space where all of them are co-teachers and co-learners. When this shared living space is not configured, only information transmission occurs with no changing of students and no construction of knowledge (Backes, 2006, p. 54-55).

[2] By and large, social networks and tied to the web of relations. 'Network is a set of interconnected knobs ... open structures able to expand in an unlimited way integrating new knobs as long as they can communicate in the Web, that is, as long as they share the same communicating codes ...' (Castells, 1999, p. 497-498).

[3] A complex network can be understood as a network whose structure does not follow a regular pattern, the structure is not determinant, but rather changing in time and space, and all elements of the network is subject to interdependencies in which the effect goes further beyond the range of each of them.

[4] Emphasis on interactivity among localities breaks down space patterns of behaviour in a fluid network of interchanges making the basis for flowing spaces that are

'the material organisation for social practices of shared time working through the flow'. (Castells, 1999, p. 436).

[5] Today the VLC-RICESU administrative and financial management is on Dom Bosco Catholic University (UCDB) and its headquarters on Santos Catholic University (UNISANTOS)

[6] GP e-du focuses on research about TDVE teaching and learning process. http://www.unisinos.br/pesquisa/educacao-digital

ISLA DE LA SALUD PROJECT, a Second Life tool of the Spanish Society of Family and Community Medicine (SEMFYC)

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"ISLA DE LA SALUD" (Heath Island) is a SEMFYC's project focused in exploring Second Life's (SL) as a tool for professional communication, their contribution to other professional's training and individualized development, and health education. Launched from an innovative, open, rigorous and multidisciplinary standpoint there has been a continous development for almost two years. Formative tools have been provided for the island users. A free consultation medical service has been attended. SL use, medical/clinic for medicine professionals, communicational training, and medical oriented technology are all courses completed within the SEMFYC's virtual SL installations. The island holds continuos meetings of several internal workgroups, otherwise quite difficult to arrange due to travelling and timetable issues. It also held part of the activities of the 2008 SEMFYC National Congress. Recently, a monthly cultural activity has been programmed, starting with poetry lectures and music live concerts. All of these activities are supported with wide publicity actions both in SL and RL, scoping not only the association's members, but any SL user who might find the island interesting. Within the last twelve months, a sustained number of more than 450 island regular and active users, plus more than 600 science community members visits during national wide acts.

[1] Coalition of Citizens with Chronic Illnesses.
[2] Patient's Spanish Forum
[3] Spanish Association of Patients with Crohn's disease and Ulcerative Colitis

Introduction

SEMFYC (acronym of *Sociedad Española de Medicina Familiar y Comunitaria*, Spanish Society of Family and Community Medicine) is scientific society that gathers almost 20.000 family doctors, being the most important society in Spain and the second one in Europe.

Its main objetives are to represent its sector and to manage the knowledge related with Family Medicine and First Attention in connection to other enviroments in which doctors also work, such as investigation, urgencies or medicine managing. Its national spread, its more than 800 experts organized in continuos workgroups, and its more than 700 in Programs (Communication, Preventive Activities, Community, Humana Program, Emergencies) require strong infrastructure efforts, with quite relevant economical costs when those experts have to be physically present.

Along another work path, SEMFYC is in contact with most important patient societies, pursuing to benefit family doctors' image, to contribute to a better health education and a stronger participation of patients in their own health issues and habits. Therefore, SEMFYC holds several agreements and projects with other organizations such as *Coalición De Ciudadanos Con Enfermedades Crónicas*[1], *Foro Español de Pacientes*[2], or *OCU* and specific illness associations, like *Fibromialgias* or *AECC*[3].

Within the analysis of tools capable of adding an extra value to all the precedent activities, Second Life was regarded as an adequate metaverse for fulfilling communication and colaboration needs among professionals, for live information sharing, for on-line

general and specific training, and as a possible means to reach patients who's profiles show a low use of medical services, such as youth. The result of this analysis was hiring a SL sim, and settling SEMFYC's Isla De La Salud.

The Isla De La Salud began production planning in June, 2007, partnered with *Coalición De Ciudadanos Con Enfermedades Crónicas*. Since then, 9 in-world workgroups (featuring 266 members of the Society) have been created, and collaboration links have been stablished with 6 in-world groups devoted to arts, culture and science.

Objectives

- To create a Health Area, in spanish language within SL, to ease patient's access to health education and their participation in health proceedings.

- To generate a low cost and useful communication tool to be used by professionals of different medical backgounds and spreaded through national and international geography.

- To provide with a face-to-face platform, usable from professionals' homes.
- To achieve a national technological leadership through tool innovation.
- To create a multidisciplinar enviroment for several health related areas.
- Enhace and update the professional profile of family doctors.
- Achieve significant economival savings.

Land creation

Island development was divided into two phases.

Phase 1

With the purpose of seeding a future professional community, the island was designed under the following characteristics:

- As similar as possible to tangible/real enviroments.
- Friendly enviroment.
- Easy transport within the island. Mainly walking, or with easy-to-use teleport systems.
- Plenty of statical information.

In order to accelerate user's metaverse related traits, more than 50 in-world workshops where conducted. Once a critical mass of professionals learned the basics skills of SL handling, making them capable of training future newbie users, phase 2 was started. It took 15 months to reach an estimated quantity of 120 trained users, which up to this moment has shown to be an adequate critical mass level.

Phase 2

The island was completely redesigned, this time focused in low resources use, in area isolation for several concurrent activities, in lag reduction, in user's low cpu load, and in full parcel administration on behalf of users. On the graphical side, design are kept simple and functional. Smooth behaviour of the full system is a high priority, specially during the events.

The following installations have been built:

- Palace of Congress
- Main auditorium and exposition room
- CEO's and Directive building, isolated and private
- Auxiliar auditorium
- Debate and streaming room
- Telehub
- Medical consulting room, isolated and private
- Workgroup and program activities skyboxes
- Newbie training area, with fligt circuit
- Relax area
- Reserved parcels for colaborators presence (forthcoming project)

Up to this moment, access to the island is free and open to any SL user.

Internal communication

Chasing the objective of using SL as a communication channel between professionals, the island has supported the following procedures and/or events:

- Society's managing (board of directors meetings, both in SL exclusively and RL+SL combinations)
- Workgroup managment (3dr-4th Worlds Workgroup, Health and Communication Workgroup, PACAP)
- Organizing and managing both SL and RL congresses and events (First International SL Family Congress, XXVIII Annual National SEMFYC Congress in 2008, 2009 SEMFYC National Comunications Congress Ibiza)
- SL especific project meetings
- Brainstorming and creative sessions
- SAAP quality control meetings

First Family and Community Medicine Second Life International Congress

From 19 to 22 November 2008 the XXVIII SEMFYC Congress was held in Madrid. It gathered more than 4.000 professionals on-site.

Attendees had the oportunity of participating in multiple scientific activities, such as debates, round tables, forums, lectures and workshops (including a SL introductory on-site workshop), plus aknowledging the latest and most recent innovations, news and investigation results in Primary Care. At the same time and as complementary event, the First Family and Community Medicine International Congress in Second Life was also held.

Thanks to the Second Life enviroment, professionals who could not travel to the congress or with a preference for inmersive tools could participate in any/both events simultaneously. It was an innovative and successful experience. More than 600 participants, both national and international, attended in this way.

The virtual congress allowed to attend the three main RL lectures. The Web 2.0 round table event was a complete RL +SL experience, as both sides could participate. 120 information posters were uploaded to the SL installations. As an experiment, two of them were defended from SL exclusively, and besides the nerves of the defendants, this event was a complete success, with a mixed audience formed by attendees present both en SL and RL via a screen projection. International family medicine works where also disposed in the virtual enviroment, such as the Vasco Da Gama (WONCA) activities.

One of the most significant examples of SL congress activities was the two hours radiology workshop, where 15 SL attendees actively participate, while a RL audience could watch live.

A full information section was created in the congress website (www.semfyc.es) in spanish and english, to assist the avatar creation process, congress inscription and communications and paper submissions.

Health care educational activities

This area of the island's activities has been divided into two different subprojects. Static information, and the consultation skybox.

Static information

Over 70 posters were placed in the main public area. This posters contained general information and advises about the most common pathologies within population. They have been removed while new areas are added to the present virtual buildings structure.

Medical consultation office

In RL, adolescents do not attend *real-world* consultations as frequently as they should, as they belong to a generation in which their Health Centre is not a clear reference towards solving their doubts or worries. Even more, many times this appointments are done with/through an adult, which means that they do not count with as much freedom as they would like.

SL is an enviroment where adolecents and recent legal adults find the anonymity they need for such issues, and of a natural use for them. Therefore, the island counts with an ongoing project, wich is a consultation office where this popultion sector can get the proper information for preventing the most common health problems (sex health, drugs, risky habits). This has becomed its main objective.

Over a year, it worked with a fixed timetable and two collaborators, family doctors who belonged to the SEMFYC's Adolescent Expertise Group. No appointment was needed.

A publicity campaign was driven. More than 100 impacts achived, ranging from national press, radio and specific media.

The result of this campaing has been lower than expected, though the users of this service showed themselves satified with it. Therefore, and after a survey amont potential users, it has been accounted that from the island's phase 2, future users were to make an appointment through instant messaging or email contact.

The next steps of this subproject are:

- a second survey for further service optimization
- e-mailing campaing to education centres in order to notify about the service, insisting in its potential for adolescents and young adults
- stablishing links with other islands related to patients and/or illnesses
- activities with the capacity of attracting users with this profile
- group activities for supporting patients who will to quite smoking
- consultation for patients with chronic pathologies
- educational gaming activities open to any audience, such as the Environment, Health and Behaviour Gymkhana in collaboration with the OpenScience (Ciència Oberta) association.

Professional training activities

Since February 2009, a set of activities for medicine professionals has been started, focused on family doctors or related specialities, but open to any professional with a significant level of interest.

The average number of participants in each activity has been of 20 avatars, and the tools employed have been: interactive methodologies, educational games, diapositives, videos and role-playing.

Up to the present date, subjects included have been:

- Practical use of empathy
- Adolescent constultation for family doctors
- Communication within the work team
- Negotiation and conflict management

In collaboration with *Escuela Andaluza de Salud Pública de Granada* 2 workshops and 2 rounded tables have been carried out about Health Care Management within SL. They keep beeing celbrated every first Thursday of each month. In this institution, SL and SEMFYC's island has turned to be a very useful tool for tutoring Clinical Communication Expertise Diploma pupils.

The next programmed subjects and activities are:

- Personality disorder consultation

- Health and sexuality
- Medical and health care content gymkhana

Cultural activities

According to the objective of attracting other knowledge communities of interest to the Society, a cultural subproject has been started. Open to anybody who wanted to attend, its success oblished to limit to a maximun of 30 avatars, for a higher number of these could represent a problem to the speakers, who were new to metaverses.

Tools employed were similar to the professional training activities.

These cultural activites have been:

- Poetry and short story lecture in relation to human emotions
- Classical flute live concert
- Darwin and his influence in medicine lecture
- 3 different photography expositions
- Basic photography skills workshop
- Advanced photography skills workshop

Some of the Society professionals have taken part in other cultural SL groups and activities.

Statistics

Collected for a span slightly wider than a year, the following charts show the evolution of the island use up to the moment.

Fig.1: Island's events

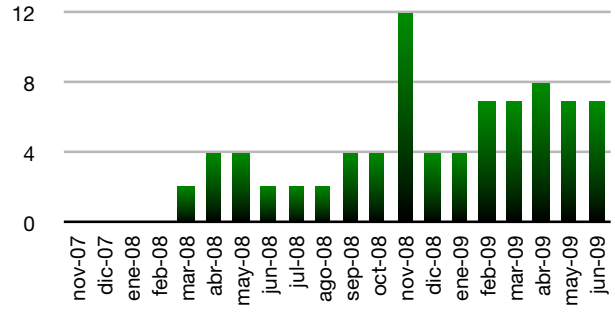

Fig.2: Island's traffic metrics

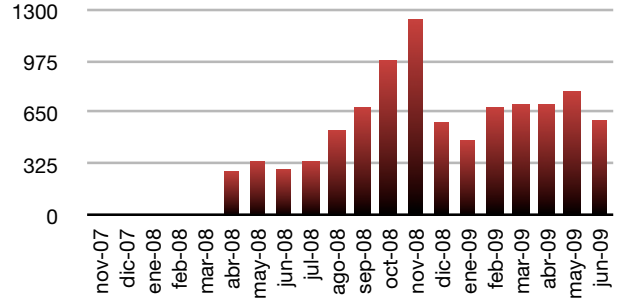

Fig.3: unique avatars

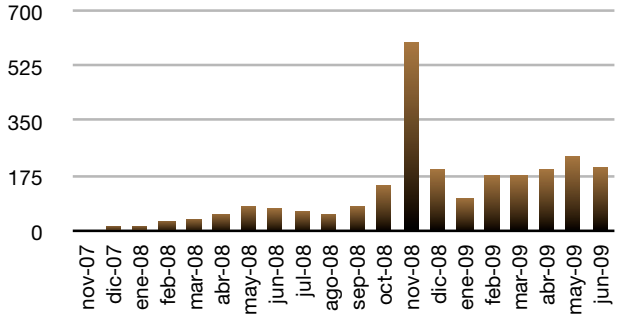

Fig.4: general info group members

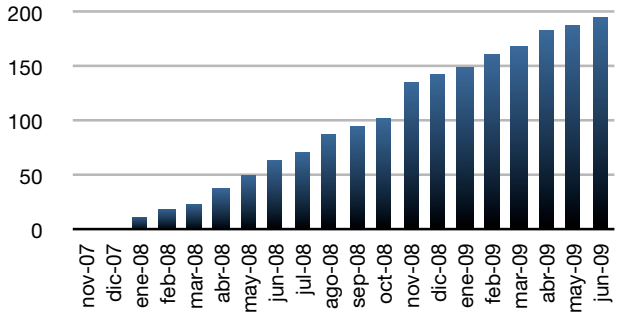

Figure 1 shows both educational events and November's congress. Unluckly, work meetings and boards cannot be accounted as we did not keep track of them. Though we can grant that **at least** two meetings where held per month from June 2008 onwards. Therefore, 104 (80+24) is the minimum number of events.

Figure 2 reflects the traffic flux variations as Linden Lab's statistics measures them.

Figure 3 details our own data collection of unique avatars who visited the island each month.

Figure 4 shows the total number of avatars who enlist the main group, through wich the island activities are publicised (in-world).

Results

Regarding to the main objectives, we believe that the following have been achieved:

- A low cost tool was stablished.
- Our heath professionals gradually take the habit of using face-to-face tools using SL as their initiation path.
- A multidisciplinar enviroment was seeded, as the island favours synergetic relationships between several healh specialties.
- Achieve significant economical savings. Estimated savings are a 30% per event up to the present moment.

And the following have been partialy reached:

- To create a Health Area, in spanish language within SL, to ease patient's access to health education and their participation in health proceedings.
- To achieve a national technological leadership through tool innovation.
- Enhace and update the professional profile of family doctors.

Conclusions and accounted limitations

Its face-to-face characteristics, audio-location features and user-avatar identification, along with its low cost, makes SL a first line tool for our Society. It complies with the workmate gathering, workgroups and program needs. Education and training is accomplished in a very suitable manner. And it promotes a friendly and close image of the family doctor in several enviroments.

Simultaneosly, the statistics of the island show a very intense per-event use of the installations, which is consistent with the actual proportion of users. The majority of them are professionals who use our island for professional purposes.

Limitations found on such an intense use of the island are:

- lack of new technologies possibilities knowledge among general population. Lack of knowledge about the enviroment.
- technological barrier for a section of the family doctors community. Lack of a fluent use of computers.
- inadequate computer processing capacity on behalf of some of the new users.
- lack of time to get involved with this new media.
- scarce or no native development of other stablished educational tools such as PowePoint, Moodle, Keynote.
- space perception and camera freedon affect to group communication dynamics, rendering useless some of the most common RL communication techniques. Non-verbal techniques intensely accuse this limitation.

Fortunately, it seems that the limitations observed to the present date will gradually disappear as older professionals retire, and younger ones occupy their place. Regarding to the sofware issue, it seems that efficient and stable solutions will be provided in a mid-term period, for the academic and educational use of metaverses is rapidly increasing.

Project's future evolution

Current subprojects will be continued and sustained, plus two new lines of new content.

- Maximize the use of the island, offering land and installations to other knowledge creation and management groups. Event holding offers to these groups.
- Virtual congress promotion as a increasing close future possibility.

Document changes

After being accepted by the SLACTIONS 2009 Organization, this document has gone under the following changes.

1. Grammar and spelling checks.
2. Some texts have been moved to a **conclusions** section, where they suit better. Merged with **accounted limitations** section.
3. Included a **statistics** section.
4. Included a **results** section.

Multimedia Design Manipulation Using Second Life in Education

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As technology evolves, educators always look for new and effective e-learning platform that can increase student's learning interest and outcome. Second Life (SL) is one of the most famous platforms that attract global educators due to its outstanding features in user-generated content and global community in the virtual world. As more and more institutions create their virtual campus inside the SL world, virtual conferences, libraries, museums, classes are held inside SL. On the other hand, different kinds of case studies and researches are conducted. Some educators may claim that SL is a general educational platform while some may think that SL only works as expected on specific types of students, for example, groups who have more technological background, gaming experience or multimedia manipulation skills. This paper presented a case study on a particular group of design students, who are learning multimedia design and trying to get familiar with related technologies. The aim is to look into the case whether SL is effective and efficient to this type of students with qualitative analysis. This study may also be treated as a foundation of comparing teaching and learning effectiveness and efficiency in SL for students from different disciplines.

Introduction

In the past 20 years, a learning theory called Situated Learning (Lave & Wenger, 1991) has been developed. Lave thinks that learning is situated, that is, as it normally occurs, learning is embedded within activity, context and culture. Social interaction is a critical component of situated learning, as learners become involved in the "community of practice". When learner moves from the periphery of this community to its center, they become more active and engaged within the culture and hence assume to acquire certain beliefs and behaviors comprising the community. Situated learning is also usually unintentional rather than deliberated. Lave & Wenger (1991) call this a process of "legitimate peripheral participation". Other studies from Brown et al. (1989) and Collins et al (1989) also emphasized the importance of introducing a new method which focuses on active perception over concepts and representation.

Educators thus try to teach by means of providing environments or situations with minimal guidance of the learning criteria or objectives. Information technology (IT) is believed to work well with the concept of situated learning. As IT and the Internet evolve, educators become more willing to integrate IT into curriculum, as they think that if the integration is done properly, students can learn both IT and non-IT disciplines such as language, arts or science simultaneously through situated learning. E-learning is thus becoming increasingly well-known in tertiary education. Most of the institutions do have some kinds of central strategies for e-learning or even in the process of developing one (OECD, 2005). Universities are interested in improving their on-campus courses by using e-learning to increase learning flexibility and offer more content. E-learning covers wide range of systems, from using students' account to access course work or materials online, to offering a course or programme entirely online.

E-learning is commonly adopted in modules or segments of a course at undergraduate level, while a whole programme using e-learning can be found more commonly at postgraduate level (OECD, 2005). Due to the development cost and consistency of e-learning services provided in an institution, large portion of the services is provided by a Learning Management Systems (LMS). LMS is a piece of software for administrating and delivering teaching and learning activities in tertiary education. The main function of LMS is to provide web

services for sharing course materials and carry out assessments, as well as offering basic interaction services like email, discussion broad and chat room, but they are commonly just used as document repositories (Kemp & Livingstone, 2006). Moreover, most of the educational content deployed on LMS is static documents like lecture slides and notes, while they lack integration with situated learning concept and interactive multimedia content, which is known to be valuable in student learning process, especially for difficult topics (Laurillard, 1997).

Multi-User Virtual Environment

E-learning using LMS has the advantages of easy to use, easy to access and systematic resources management. However, the lack of multimedia and social content stops the system to enhance learning initiation, motivation and the lack of "situation" in LMS also depresses educators who intend to integrate e-learning with situated learning. In recent years, some educators come up with ideas of transforming existing platforms to provide rich multimedia experience, together with open-ended content creation and large global community, called Multi-User Virtual Environment (MUVE). The aim is to use MUVE as an immersive learning environment to provide a new perspective of implementing situated learning or other learning methods through the use of latest technology.

The earliest virtual worlds are text-based and requiring low-bandwidth, called Multi-User Dungeons (MUDs). MUDs like LambdaMOO (Rex, 1997) allow user to expand and alter how the server behaves to all users by writing scripts. More recently, as computer graphics technology makes 3D virtual world possible, MUVEs becomes rich in multimedia elements, like audio, video, 3D animation and visual effects. MUVEs also allow multiple simultaneous participants to access the virtual contexts and to interact with digital artifacts. Inside the virtual world, users are represented as a form of "avatar". They can freely explore the virtual world, communicate with other participants, form global communities, organize collaborative events and freely create their own interactive content. Famous examples of MUVE are Second Life (Linden Lab, 2003) and Active Worlds (1997).

The learning advantages in MUVE can be demonstrated by studies of Massively Multi-player Online Gaming (MMOGaming), one kind of videogame experience similar to a representation of MUVE. Educational study by Gee (2003) shows that well-designed videogames allows players to actively contribute their knowledge and to create their own learning experiences. Similar studies also show that learning in MMOGaming can be treated as a social practice, where players participated in problem solving activities and collaborative interactions (Steinkuehler, 2004), which is similar to the concept of situated learning. The open-ended content creation, and relatively low content development cost also attract educators to adopt MUVEs as new e-learning platform.

In order to gain advantages from both traditional LMS and MUVEs, recent approaches try to combine the both. Application like SLOODLE (Kemp & Livingstone, 2006), which integrate web-based course management systems into virtual environment, is proposed to benefit both social interaction capabilities and asynchronous communication and persistent document storage control.

Second Life

Second Life (SL), launched by Linden Lab in 2003, is a famous example of MUVE. In MMOGaming, users access to the virtual world by a proprietary client who interacts with virtual contents. Users are treated as virtual residents of SL and are allowed to create and customize their own avatar, design their own content, interact with others, launch businesses, collaborate and perform educational activities. Players can buy virtual region (island) from Linden Lab and have full control of their islands. Unlike thematic games, such as World of Warcraft, players are completely free to create their own objects, mounting interactions to the environment, and establishing rules on their own lands.

The outstanding features of Second Life attract different kinds of users from all parts of the world, while not limited only to general game players, but also extended to companies, businessman and educators. More enchanting possibilities in the virtual world are still being discovered by those SL residents. For instance, IBM held a Virtual World Conference and Annual Meeting in SL, National Oceanic and Atmospheric Administration (NOAA) used SL as a marketing channel to reach new audiences, and many global organizations like Walt Disney, Intel, World Bank have their own island or shop in SL.

On the educational side, The New Media Consortium (NMC), a non-profit consortium of learning, launched one of the largest education projects in SL to encourage the use of technologies in supporting teaching, learning, research and creative expressions, while over 150 institutions, including MIT, Harvard and Yale Princeton, build their virtual campus or hold virtual class in SL to promote their school and provide opportunity for distance learning (Linden Lab, 2003).

Previous Studies

Case studies of how SL can be used as educational platform were done from many different aspects. National University of Singapore co-built an online virtual campus in SL with students to inspire their creativity, problem solving and communication skills (Wah & Gwee, 2008). Global Kids, a non-profit-making educational organization, held a Camp Global Kids in the Teen Second Life to study the possibility of bringing a global youth development

model into virtual world (Feldman, 2006). Johnson & Johnson (2006) also adopted SL to present a case study of a new model of using virtual world in experimental education.

This paper presented a case study of holding a few task-based sessions targeted at a class of multimedia-discipline students in the SL virtual campus of the Hong Kong Polytechnic University (HKPolyU Campus). Other forms of educational exercises focusing on project-based learning can also be found elsewhere (Wright, 2007).

The case study in this paper focuses on experimenting and analyzing the effect of learning in virtual environment to a specific group of students. Assignment results and student comments are collected for qualitative analysis. The final section provides the conclusion, potential improvement of e-course design and future development of virtual campus of the institution and related course.

HKPolyU Campus

HKPolyU Campus aims to provide a new virtual campus (Figure 1) to enhance the learning experience of students at the Hong Kong Polytechnic University through the development and deployment of four functional spaces within the 3D online world of SL: Teaching & Learning, Assessment, Resources and Design.

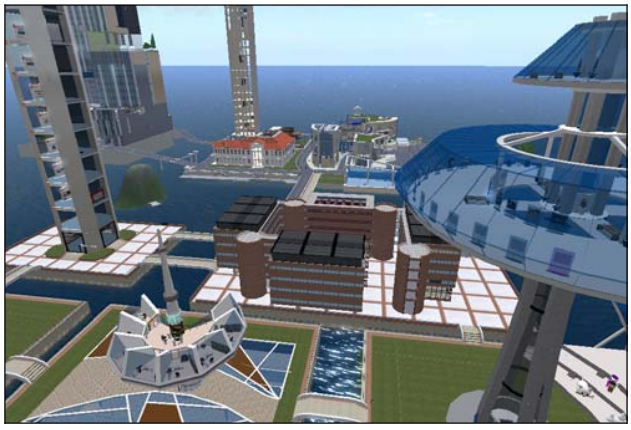

Figure 1: HKPolyU Campus

Within the Teaching and Learning space, interactive and experiential teaching and learning solutions are developed that increase independent learning by students while maximizing peer group and student-teacher interaction opportunities.

In the Assessment space, new forms of interaction, online assessment and student feedback are produced and validated for future large-scale deployment.

The Resources space sets up structures for information delivery while also developing safe-guards to protect intellectual property rights.

The Design space acts as a knowledge sharing hub among staff and students. It is established for idea exchange and mutual support, while aiming to provide a platform to cultivate good practices, new tools, teaching and learning approaches, and knowledge sharing.

Target Students

The sample group of students is studying under a programme of High Diploma in Multimedia Design and Technology under the School of Design in the Hong Kong Polytechnic University. The programme focuses on core knowledge and practical skills in multimedia production. Students are expected to have creativity within design disciplines, develop awareness of multimedia technology practices and acquire techniques in identifying, analyzing and solving multimedia design problems. Particularly in the subject of "Digital Media", students are required to acquire various computer skills in media representation, identify the implication of multimedia work in design and technical aspects, apply technical knowledge in criteria-based projects, and compose pieces of multimedia work by organizing and manipulating media elements.

Tasks in the SL session were designed by applying the situated learning concept. The tasks aim to teach several artistic representation skills by making use of SL environment and resources provided by HKPolyU Campus and elsewhere in the way of giving situations for their participation and practice.

Task Details

The whole module included four tasks, each having their own learning objectives and marking criteria. The students were divided into two groups. Within a two week period, each student needed to complete two out of the four tasks, each of these was structured as a three hour session.

There were a total of 133 participants in this module. Introduction and training session on basic SL knowledge and control were given to the class before the task sessions commenced. In the following subsections, the description of activities, learning objectives, assessment criteria and corresponding work by students will be presented.

Task 1: Outfit Design

The learning objective of this task was to experiment costume design and "mix-n-match" character outfit inside the virtual world. Students were asked to design their avatars with any theme they like. References for free items were provided to assist students in locating external resources in customizing their avatars. Finally, the students needed to setup a few camera angles to take snapshots on the avatars showcasing their outfit design.

Since this was one of the very first tasks they performed under the environment of SL, the students were expected to get themselves familiar with the interfaces and navigate

around the space to explore different virtual elements. The other expected outcomes of this task were to allow students to experiment the basic object interactions and to manipulate two dimensional media graphics in design. Their final designs were then assessed by creativity of the idea, manipulation of design elements and consistency of overall theme. Some of their outputs are shown in Figure 2 – 4. The snapshots showed students' sense in outfit design even under restricted resources in the avatar inventory. It also demonstrated their ability in manipulating multimedia elements successfully under the virtual environment, of which the students had just learnt to use this interface for a very short period of time.

Figure 2: Student's work from Outfit Design task

Figure 3: Student's work from Outfit Design task

Figure 4: Student's work from Outfit Design task

Task 2: Photography and Editing

The learning objective of this task was to experiment the build-in environmental effects and to try out framing and photography inside virtual world, together with practices on post-editing skills in other multimedia software.

By exploring through the HKPolyU Campus or HKPolyU Resort area in SL, students had to find some good positions and to design their best framing and camera angles. Resources were provided in HKPolyU Campus for photography reference. Students were then tried to experience several snapshots using the time control function provided by SL Environment Editor. Then use some imaging tools, such as Adobe Photoshop to retouch the snapshots if necessary. The photos were then imported into Adobe After Effect to create a 5 seconds movie showcasing the locations with visual effects with changing environment.

Similar to the previous task, this was one of the very first tasks for the second group of students. The expectation to the students was also to allow them get familiar with the interfaces and environment. This task introduced a bit further to the students about the manipulation of media across different software platforms. Their final design were assessed by framing of the snapshots, use of environmental effects, post-editing and the design of mood and atmosphere in the final movie. Although the expected task output of this one was just a bit different from the previous one, the aim of both was to let the students to get hands-on experience inside this virtual environment. Part of the results from this task is shown in Figure 5 – 8. From the results, students showed their technique in constructing a frame to setup the mood and atmosphere together with taking certain photographic angle to accomplish their theme. Particularly, students also made use of the environmental control function in creating the scene, which could extend the possibility of scenario design.

Figure 5: Student's work from Photography and Editing task

Figure 6: Student's work from Photography and Editing task

Figure 7: Student's work from Photography and Editing task

Figure 8: Student's work from Photography and Editing task

Task 3: Character Design

The learning objective of this task was to experiment monster or character design by using basic primitives in another way of manipulation in modeling control.

First of all, students required to visit a tower of tutorials teaching how to manipulate 3D objects inside SL. Students then designed and built their own monster or character model in the "Free Design Area" – one of the teaching islands at the HKPolyU Campus. Finally, students were asked to take a few snapshots to showcase their design.

As this task was assigned to student in the second week of the module, the students were expected to have already got the fundamental knowledge in using SL. The level of difficulty in this task was then built upon the sensation in three dimensional spaces. Before conducting this task, the students had already got a bit experience before in manipulating 3D objects in standard software, like, Autodesk Maya. By working on this task, the students were expected to apply their skills and knowledge in tackling design problems under a different three dimensional virtual environment. The final design was assessed by creativity of the idea, manipulation in 3D and consistency of overall theme. Figure 9 – 12 showed some of the students' work. Though only basic primitives can be used to build model in SL, SL provides a good and convenient environment for students to practice and experiment basic 3D modeling. Students also showed their creativity on setting basic color and texture to create and match their own combination of forms for designing their character models.

Figure 9: Student's work from Character Design task

Figure 10: Student's work from Character Design task

Figure 11: Student's work from Character Design task

Figure 12: Student's work from Character Design task

Task 4: Visual Effects Design

The learning objective of this task was to experiment the control of visual effects at a stage venue by trying to design and create mood and atmosphere for shooting an object with desirable photographic framing.

Students were asked to enter the School of Design teaching area of the HKPolyU Campus. A stage was setup in a virtual building where students needed to use a virtual visual effect control panel to create their own lighting controls on color, pattern and effects in order to create the mood and atmosphere. A number of pre-built object were given for students to put onto the stage. Snapshots were then taken by choosing desirable camera angles.

Similar to the previous task, this task was given in the second week of the module. Students were expected to have the experience in manipulating objects within the SL environment. In that case, this task was built to further enhance their skills and techniques in taking control of interactive objects. The final design was assessed by the use of visual effects in creating the mood and atmosphere together with the framing of snapshots. Figure 13 – 16 demonstrated the stage settings by students working in this task. These works also showed the skills student learnt in combining various visual effects, and integrating different lighting with character motion set for taking photo at desired angles.

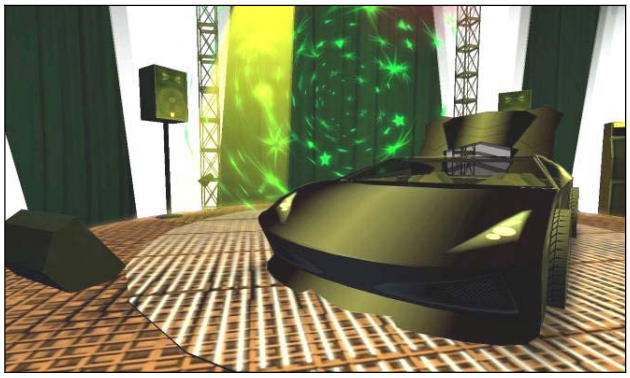

Figure 13: Student's work from Visual Effect Design task

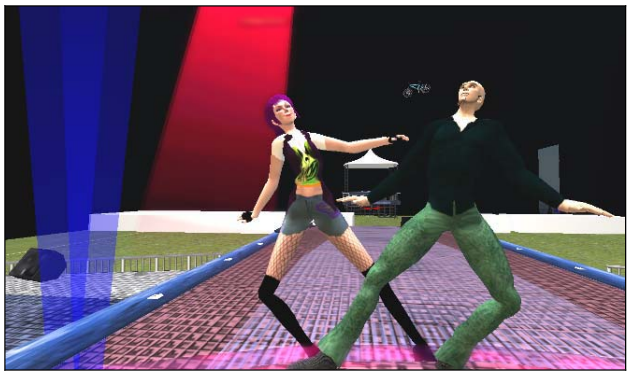

Figure 14: Student's work from Visual Effect Design task

Figure 15: Student's work from Visual Effect Design task

Figure 16: Student's work from Visual Effect Design task

In conclusion, students showed their ability in learning the manipulation and control of objects and interaction under the virtual environment. Although the time was limited, they demonstrated the skills through their final design. Everything happened and finished just within a short period of time may due to their background discipline, which helped a lot in the initial stage when getting familiar with the interfaces. At the same time, they also showed positive attitude, enjoyable experience and active exploration in using SL as a learning environment.

Discussion and Analysis

As a learning platform, it is important to have features that motivates student to learn, to experience, to experiment, and to explore further. On top of this, the platform should not distract students from their learning objectives, or affect their learning outcome and efficiency. For the analysis of this learning process, feedback on students after using SL as a new e-learning environment, particularly in multimedia discipline, was collected.

The works of students, in a total of six hours SL sessions, showed that most of them could finish their tasks in time with satisfactory quality. This also showed that SL contributed as a new learning platform targeting at the students in an efficient way.

From the feedback, students commonly enjoyed the learning process of using SL as a new platform. Some were appreciated on the avatar's customization function provided in SL. As a group of students learning in multimedia design and technology discipline, they thought that SL could provide a good environment for conducting design experiments and could train their technical skill on multimedia manipulation. Some thought that "it seems like an upgraded version of 'The Sims'". That means SL has some kinds of features that are comparable to the students gaming experience. This is definitely a plus for the student to get participated and motivated in the learning process by

adapting to the new environment in a much quicker way. Some expressed that "I can go somewhere that really exists in reality and I can take photos with my friends". They commonly felt that the world of SL was attractive in turning them to explore some new places.

In general, due to their background profile in multimedia discipline, the students are strongly interested in using SL and have a smooth learning curve in picking up the usage of this new platform. In this case study, we can say that SL is an effective learning environment for students under multimedia discipline.

On the other hand, some students felt that there are difficulties in searching for free stuff to dress up the avatar. This may due to the unfamiliar navigation control within the environment, which hinder the students in exploring SL. Some also expressed that the user interface was too complicated and they often needed a long time to search for a certain function button. The most frustrating experience was the relatively slow response on SL, which was also pointed out by other studies like James & Mark (2007), Stenio et al. (2007) and Varvello et al. (2008) that SL produced much larger network traffic compared to other common Networked Virtual Environment (NVE), especially in area that with high density of avatars and objects.

Conclusions and Improvements

This case study aims to analyze the learning effects of using virtual environment of SL on a group of students under multimedia discipline. We want to observe if the virtual world provides advantages and special attractiveness to that group of student. Furthermore, we try to conclude whether this learning environment is a good platform for conducting multimedia experiment and exploration in obtaining experience of design manipulation.

Task results and feedback show that multimedia students feel quite comfortable in using the game-like environment on learning. Under this environment, they demonstrate active participation in exploring the virtual world. On top of this, they also show the efficiency in completing the task with quality due to their background profile of design sense and multimedia skills. Their previous gaming experience may also provide advantage for them to get familiar with the interface of SL and manage their interactivity. As a result, distraction from conducting the required task cannot be observed. In conclusion, SL can be said to be an effective and efficient learning system with respect to our target students in this case study.

Under the consideration of any further improvements, the difficulties in handling the functional interface and navigation control can be solved when students are allowed to spend longer time in the SL world, together with some further guidance. The problem of surfing the space in search of items and resources can be improved by providing hints of criteria and even a directory of places for them to obtain the experience at the first place. The network response is one of the key concerns when educators decide whether to adopt SL or not. The problem in high network traffic of SL may need improvement in traffic model of the back-end server system, which is usually not the scope controllable by general educator users.

As we believe e-learning is discipline-dependent, that means the learning process results in a different way if different background profile of students are subjected to use the same type of learning environment. This introduces a second factor that may affect the efficiency of using virtual environment as learning platform. At this moment, we can only conclude the fact that teaching and learning in our case study is effective and efficient to students of multimedia discipline. The study presented may further extend to draw a relationship between students from different disciplines and how favorable is learning in virtual environment like SL by performing more comparative case studies under the perspective of effectiveness and efficiency analysis.

ACKNOWLEDGMENTS

The current research work is a part of a collaboration project across different departments as a whole supported by a grant from the e-Learning Development and Support Section under the university. The authors gratefully acknowledge all the research project team members for supporting the said teaching and learning activities in using SL as the platform. Acknowledgement should also be given to teaching staff and students of the subject Digital Media in participating the teaching and learning process.

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Nonprofit activities and fundraising

Channels of Communication and Divulgation for Science in Virtual Worlds, Open Science Group Project

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Open Science, creating channels of communication between Science, Environment and People.

Introduction

CiOb-Open Science it's a non-profit association, founded on 2008 in the Faculty of Biology of the University of Barcelona, with the intention to approach science and environment to society through a fresh, dynamic and clear language.

The idea arises from the necessity to foment a communication channel that serves to approach science to people.

Objective

The main objective of Open Science is to promote the investigation, the divulgation and the education of sciences and environment by means of debates, conferences, seminaries, articles and exhibitions, among others, that imply the scientific community and the public into a feed-back.

For it we will use strategies of continuous innovation in the search of communicative systems that can facilitate that the scientific language arrives from more fluid and clear way to the people.

On the other hand, also we fomented the collaboration with other projects and use different disciplines, like arts, enriching the message, demonstrating that science is not something isolated that belongs to a minority, but that hides behind each thing which we see, even in ourselves, our body, our brain… We are science, without knowing it.

Platforms, formats and supports

Website, audio-visual, publications, virtual worlds (metaverses) or videogames are some of the channels we are using and exploring, including here Second Life's application.

Open Science in Second Life

We started our activity in virtual worlds (VW) nearly a year ago as the result of writing a news article for our website about the uses of Second Life for educators and non-profit organizations (Noke Yuitza, 2008, *Education and New Technologies*, http://web.mac.com/mononoke7/CIENCIA_OBERTA/Science_News/Entradas/2008/10/9_Educación_y_Nuevas_Tecnologías%3A_Second_Life.html). The Open Science Group is the name of our project inside this application that consists in exploring new channels for the divulgation of the sciences. Open Science's website and Virtual Worlds coordinator Eva Bonastre, under the avatar of Noke Yuitza, is the one in charge of this project.

Open Science Group Project inside Second Life

The project has the following sub-projects that we are running since October 2008: Science and People, The Creative Lab, Cultural Interchange, SL People and Virtual Feelings. We tend to integrate these ones into a same event to promote creativity and intercultural dialogue.

Some of our future projects for 2009 and 2010 are: Art and Technology, The Mystery of the Sleeping Avatars, Animal Cartoons and Environment, Health and Behaviour Gymkhana.

Science and People

Science and People is a cycle of events, as seminars and debates, that counts on two parts: in one hand we've got the

scientific part, directed by an expert, in the other, the social one, running by a social evolved person. The objective is to approach the scientific knowledge to the people using the social experiences, implications and benefits as a mirror of the applications of the science to the life.

Events included in this project that we have done:

- *Cancer, Cell Cycle and Checkpoints*, Seminar and Open Debate, (November 2008, English). Pica clip, from Digi S Lab and alter ego of the PhD Leticia Cito, gave this seminar about cancer research. Leticia Cito is senior scientist of the CROM where she investigates the stomach cancer. Her supervisor, Alfa Roux, also was attending as a special guest. On the other hand, Fayandria Foley, from the American Cancer Society, told us her experience with melanoma cancer and also about how the people with this disease can face cancer. After the seminar, started a public debate about actual lines of investigation and support to the affected and their families.

The seminar was filmed and can be seen in these addresses:

http://www.youtube.com/watch?v=afxH1VOOiOE

http://www.youtube.com/watch?v=02_FETsta-M

http://www.youtube.com/watch?v=WUiilwvnjlM

- *The Neuroscience of the Drugs*, Seminar and Open Debate (November 2008, English and Spanish). Pippas Papp discussed the scientific aspect of the effect of drugs on neurology as teacher of Histology and Neuroscience at college in Portugal. Discussing the societal affects was Urkum Hultcrantz, from Comunidad Virtual del Conocimiento, who have worked helping drug addicts. Sexiamor Aabye, owner of No Drogas! Un SL Sin Drogas, was attending too as a special guess. After the seminar, started a public debate about the social problem of the drugs, their legalization and the business of some people in Second Life around the illegal drugs consumption.

The videos can be watched in:

http://www.youtube.com/watch?v=NCdPul1cmc8

CONCLUSIONS

The people understand better science themes when can see the social applications and implications and can ask about and give it's own opinion. The experience was too positive, especially in the debates, when we could see a high participation of the people that were attending.

The Creative Lab

The Creative Lab was born as an innovating experiment in cultural events. It's a channel for Second Life's groups of different disciplines related to the culture, the science and the education. The two objectives: to foment the interchange of information and to harness the intergroup experiences.

Events included in this project that we have done:

- *The Neuroscience of the Drugs* Seminar (November 2008, Spanish). Place, scenography, audivisual and graphic for the event in collaboration with TeknoArtia and Comunidad Virtual del Conocimiento. Collaboration in the organization of Drogas No group.

Figure 1: Neuroscience of the Drugs's graph.

- *Think the Art, Origins Conference* (Desember 2008). Graphic, artistic intervention and ambiance in collaboration with TeknoArtia. Sound recording in charge of CVC's group.

Figure 2: Think the Art, Origins's graph.

- *Stop Malaria Spot* (January 2009). Filmed and edited with the collaboration of TeknoArtia
- *Interview to Maximo Eames, of the USMP* (January 2009). Video-interview in collaboration with TeknoArtia and the University of San Martin de Porres, Perú, in Second Life.
- International Women's Day (March 2009): *The Invisibility of the Women in the Art History* Conference and *Stories of Women in History* Lectures and Debate. Organized with De-Generad@s and in collaboration with TeknoArtia.
- *Virtual Feelings* Cycle of Debates (April-May 2009). Artistic performances, ambiance and streaming in collaboration with TeknoArtia. Collaboration in the organization of De-Generad@s group.
- Advising in technologies of the communication for the Museum Karura Art Centre.

CONCLUSIONS

Although our group is obtaining good results in intergroup experiences (finding collaborations, realizing events and interchanging knowledge and information), if there isn't a direct implication of Open Science, the other groups still just using the Creative Lab as a channel for the promotion of their events. We are working in new strategies for promote better the relations between groups.

Cultural Interchange

The Cultural Interchange project consists in to create and generate a channel of interaction between the English community (include the countries with English as the official language) and the Spanish one (include the countries were Spanish is the official language).

Events included in this project that we have done:

- *Ants* (Desember 2008). Exposition that we did in November in the Faculty of Biology of the University of Barcelona in Catalan and that later we transferred to TLE's Zoo Museum in Second Life in tree languages: Catalan, Spanish and English.
- *The Neuroscience of the Drugs* Seminars (November 2008). This event was fist did in english in the USA's sim The Learning Experience and a week later in Spanish in the Spanish sim TeKnoArtia.
- *Virtual Feelings* (February 2009, April-May 2009). Debate in English in TLE, cycle of debates in Spanish in TKA.

CONCLUSIONS

The experience is positive, but we have to observe in one way that Spanish community is more open to have this type of intercultural interchange than English one and that the timetable differences between Europeans and Americans difficult also this.

SL People

The SL People project is a serie of interviews to people that are using this application to promote education, arts and sciences. We publish this interviews in our website.

Events included in this project that we have done:

- Noke Yuitza, Desember 2008, *Interview to the artist Maria Grot*, http://web.mac.com/mononoke7/CIENCIA_OBERTA/Open_Science-SL/Entradas/2008/12/5_Entrevista_a_María_GrotPor_Noke_Yuitza.html
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CONCLUSIONS

The website interviews have helped to the promotion of the people interviewed, our self promotion and Second Life application as a possible channel for education, arts and sciences.

Virtual Feelings

Technology is changing our way of communication. Applications as Second Life do than people from different parts of the world being in touch, helping them to interchange information. But can the technology also change our way of feel? Can we virtualize our feelings? The Virtual Feelings project consists in investigate the effects of the uses of the virtual worlds over our emotions and the human capacity of adaptation and integration to them.

Until now, we have done a cycle of debates runned by Izabelith Vella, the SL alter ego of the sexologist Flavia Limone, from De-Generad@os, under the name of:

- *Virtual Feelings Debate* (in TLE in February 2009)
- *Virtual Feelings Cycle of Debates* (in TKA in April-May 2009). This cycle included four debates: *Virtual Appearance, Virtual Love, Virtual Art and Virtual Sex*. We had as special guest who was attending too, the psychotherapist Kubrick Wylie.

Figure 3: Virtual Feelings' graph.

CONCLUSIONS

"The feelings cannot be virtual cause behind the avatar there's a person who lives the experience as a real one" and "Second Life is a channel to share relationships and emotions" were two of the sentences more repeated during the five debates, the English one and the four in the Spanish cycle.

By the moment our conclusions are:

- That there are no cultural differences between these two cultural communities in how they perceive the way of feel in Virtual Worlds.
- That the SL's community is worried about and like this thematic (these debates were the one's with more quorum and participation we had had until this moment)
- And that the perception of the emotions in VW is probably related to mirror's neurons, the ones that are implicated in the learning process, the capacity to recognize the emotions in the other individuals and to empathy with these (V.S. Ramachandran, *Mirror neurons and imitation learning as the driving force behind "the great leap forward" in human evolution,* http://www.esnips.com/doc/0b04a5db-f56e-4a38-8df1-88275cb19085/MIRROR-NEURONS-and-imitation-learning-as-the-driving-force-behind-the-great-leap-forward-in-human-evolution-(Ramachandran)-(english--español).

New Projects

For 2009 and 2010 we are planning the following projects: *Ants, The Book of the Exhibition* (SL's publication), The Mystery of the Sleeping Avatars (a investigation-game about VW technologies), Sci-O and Animal Cartoons (periodic magazines), Art and Technology and Environment, Health and Behaviour Gymkhana (both last inside The Creative Lab project).

Final Conclusions

As our experience is too short related to VW, we haven't arrive yet to our final conclusions, but by the moment the use of Second Life as a channel for our activities and get our objectives are in general positive, saving certain technological problems of the application (lag, bugs, etc.).

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PHOTOGRAPHYC AND AUDIVISUAL MATERIAL

Open Science's Flickr:

http://www.flickr.com/photos/open_science

CiOb TV, Mogulus (go to On Deman Library, then to Open Science in Second Life):

http://www.livestream.com/open_science?origin=embedplayer

TKA TV, Mogulus (go to On Deman Library):

http://www.livestream.com/teknoartia?origin=embedplayer

Youtube:

http://www.youtube.com/watch?v=afxH1VOOiOE

http://www.youtube.com/watch?v=02_FETsta-M

Figure 4: CiOb TV.

Social Sciences studies in or through metaverse platforms

Brands and Consumption in virtual worlds

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Virtual worlds, such as Second Life, are rapidly becoming recognized as a technology of substantial future importance for marketers and advertisers due to the great growth of Computer Mediated Communication (CMC). In recent years virtual worlds have become highly interactive, collaborative and commercial; these worlds would have the potential to be new channels for marketing content and products, integrating 'v-commerce', or 'virtual e-commerce'. Virtual Worlds clearly demonstrate how the boundaries between the physical and the virtual are becoming more fluid as individuals are interacting with digitally constructed entities. This paper aims to explore the literature in order to illuminate some of the issues related to consumption in virtual worlds and offer a better understanding of virtual participants' consumption practices.

1. Introduction

"*Computer-mediated communication is not just a tool; It is at once technology, medium, and engine of social relations. It not only structures social relations, it is the space within which the relations occur and the tool that individuals use to enter that space.*"

Steven G. Jones

CyberSociety 2.0, 1998: p. 11-12

With the diffusion of computer and information technologies throughout businesses and homes, the field of marketing has transformed significantly. Worldwide, people have adopted the Internet as an information, communication, transaction, and distribution channel. Because the Internet connects people and disseminates information at an unprecedented speed and scope, it is clear that also its impact as an online social network and knowledge reservoir is profound (De Valck, 2005).

The recent advances in Computer Mediated Communication (CMC) has led to instant communication that ceases to be restricted by traditional understandings of space and time, but it is also possible to identify the infringement of the virtual realm on to our physical space[1]. In fact, the physical and virtual realms are becoming increasingly difficult to separate due to less frequent face-to-face contact (Ward, 1999). Due to the great growth of Computer Mediated Communication, online virtual worlds are rapidly becoming recognized as a technology of substantial future importance for marketers and advertisers (Hemp, 2006). The phrase 'Virtual World' refers to a 3 Dimensional computer-generated environment that appears similar to 'real' world, often developed to supply online entertainment and social networking for users (Barnes, 2007). In recent years virtual worlds have become highly interactive, collaborative and commercial. There are more than one hundred virtual worlds, and more are under development (Barnes, 2007). In our definition, virtual worlds are open-ended virtual interaction platforms or 'experience worlds'; therefore, goals are not prescribed, and virtual worlds are not games in the traditional sense. For instance, game-oriented environments, such as Worlds of Warcraft, Sims Online and Everquest would be excluded from our definition. Current virtual worlds would have the potential to be new channels for marketing content and products, integrating 'v-commerce', or 'virtual e-commerce'. Virtual Worlds clearly demonstrate how the boundaries between the physical and the virtual are becoming more fluid as individuals are interacting with digitally constructed entities. This paper is going to specifically focus on *Second Life (SL)*, which is the best

known virtual world. It is an immersive 3-D virtual world created by its Residents (users) (developed by Linden Research).

Given the uncertain ontological status of avatars' needs, the meaning of their consumption practices is going to be explored in this paper in the context of the lived-experiences of consumers who live their life in the virtual worlds.

2. Background Information

2.1 What is Brand?

A brand can be defined as an asset that does not have physical existence and the value of which cannot be determined exactly unless it becomes the subject of a specific business transaction of sale and acquisition (Seetharaman et al, 2001). The other definition that can be used is 'a name, term, sign, symbol or design or a combination of them, intended to identify goods or services of one seller; or a group of sellers, and to differentiate them form those of competitors'. The legal term for brand is trademark. A brand may identify one item, a family of items, or all items of that seller. If used for the firm as a whole, the preferred term is trade name. (Marketing Power, 2007).

2.2 A Brief History of Branding

The first *Journal of Marketing* article on the topic of 'brand' can be traced back to H. D. Wolfe's 1942 "Techniques of Appraising Brand Preference and Brand Consciousness by Consumer Interviewing", with several other articles on brands and branding appearing in the popular literature even earlier in the 20th century. While some thirty brand and branding articles appeared in the top three consumer behaviour journals (*Journal of Consumer Research, journal of Marketing, Journal of Marketing Research*) from 1942 to 1969, branding as a major topic of study in the marketing discipline, began in earnest in the 1970's. Books and journal articles have tackled the topic of branding from a variety of perspectives. Specifically, a good portion of the research on brand is devoted to building a better understanding in the areas of brand choice (or preference), brand switching, brand loyalty and brand extensions.

As Marketing's study of branding has progressed, so too has the usage of branding by managers. Several popular journals, including *Brandweek*, *Brand Marketing* and *Brands and their Companies* have been mainstays for marketing management during the last two decades (Moore & Reid, 2008).

2.3 A Brief History of Consumption

The historical community, following the leads of Braudel and the example of McKendrick et al, has recognized that the 'great transformation' of the West included not just an 'industrial revolution' but also a 'consumer revolution'. This consumer revolution represents not just a change in tastes, preferences, and buying habits, but a fundamental shift in the culture of the early modern and modern world. Modern consumption was the cause and consequence of so many social changes that its emergence marked nothing less the transformation of the Western world.

There are three important episodes in the history of consumption: the consumer boom in sixteenth-century England, consumption in the eighteenth century and consumption in the nineteenth century.

In the last quarter of the sixteenth century, a spectacular consumer boom occurred. The noblemen of Elizabethan England began to spend with a new enthusiasm, on a new scale. The consumer revolution served as cause and consequence of the transformation of Elizabethan England. Caught up in Elizabeth's strategic use of consumption as an instrument of government, Elizabethan noblemen were forced in patterns of noticeable consumption that had deep consequences for their families and localities. Spending more and more for their own immediate purposes, these noblemen withdraw from their reciprocal contracts with the family and the locality. For the family, this withdrawal had the effect of helping to narrow its scope and corporateness. For the locality, it had the effect of diminishing the influence of the super ordinate (McCracken, 1988).

In the eighteenth century, consumption has moved a little closer to the centre of the historical stage. Merchants were now marketers and the masters of diffusion effects and new media of communication. The number of goods was increasing steadily and they could be bought in more places on more opportunities than before. The transformation power of fashion now touched more product categories and the rate of fashion change had increased. This involved more frequent purchase and a wider scope of social knowledge. Now the consumption was a mass activity. The epidemic metaphor used by contemporaries was apt. The virus that had restricted itself to a minor aristocratic community had now infected everyone (McCracken, 1988).

By the nineteenth century the consumer revolution had established itself as a permanent social fact. The dynamic dialectic that bound consumer change and social change was now a structural reality. In fact, this revolution had even found an institution locus, a place of its own, the department store. This new institution helped change the nature of aesthetics by which goods were marketed, introducing powerfully persuasive techniques in film and décor that are being refined. The department store also changed the very nature of the place in which people consume, what they consumed, the information they needed to consume, and the styles of life to which this new consumption was devoted (McCracken, 1988).

3. Literature Review

3.1 Virtual Worlds

Virtual Worlds (VW) "are computer-moderated, persistent environments through and with which multiple individuals may interact simultaneously. In order to make these environments persuasive, such systems always present to their players an illusion that encourages the acceptance of familiar concepts such as *place*, *inhabitant* and *object*. Therefore, it is usual to refer to these virtual items in the same way that one refers to real items – as "a castle" or "a shopkeeper" or "a book", rather than as "an interpretation of bits" (Bartle, 2004).

Many of these virtual worlds are actually commercially driven role playing games, or Massive Multiplayer Role Playing Games (MMORPG's) which can be defined as " highly graphical 3-D videogames played online, allowing individuals, through their self-created digital characters or "avatars," to interact not only with the gaming software (the designed environment of the game and the computer-controlled characters within it) but with other players' avatars as well. These cyberworlds are persistent social and material worlds, loosely structured by open-ended (fantasy) narratives, where players are largely free to do as they please – slay overgrown butterflies, siege cities, barter goods in town, or scalp raw materials off the local flora and fauna. These Virtual Worlds are complex places, with a complexity that sometimes can even be seen as similar as the real world's.

According to Castronova (2001), a Virtual World or VW is a computer program with 3 defining features:

- Interactivity: it exists on one computer but can be accessed remotely (i.e. by an internet connection) and simultaneously by a large number of people, with the command inputs of one person affecting the command results of other people.
- Physicality: people access the program through an interface that simulates a first-person physical environment on their computer screen; the environment is generally rules by the natural laws of Earth and is characterized by scarcity of resources.
- Persistence: the program continues to run whether anyone is using it or not; it remembers the location of people and things, as well as the ownership of objects.

These virtual worlds exhibit most of the traits we associate with the Earth world: economic transactions, interpersonal relationships, organic political institutions, and so on. A human being experiences these worlds through an avatar, which is the representation of the self in a given physical medium. Most worlds allow an agent to choose what kind of avatar she or he will inhabit, allowing a person with any kind of Earth body to inhabit a completely different body in the virtual world (Castronova, 2003).

The word 'avatar' derives from the Sanskrit word Avatāra, meaning 'descent' and usually implies a deliberate descent into mortal realms for special purposes. On the web avatars are graphical representations of characters – people – and are used in various applications including chat, instant messaging, blogs, games and virtual communities (Barnes & Mattsson, 2008). 'Virtual World Avatars' (VWA) are three-dimensional anthropomorphic representations of people, including related in-world behaviour and paraphernalia, for the purposes of interaction within virtual worlds.

As the phenomenon continues to grow, the aggregate amount of time devoted to shared virtual reality spaces seems likely to rise from today's tens of thousands of person-years into the hundreds of thousands or perhaps millions. The physical representation of the self in virtual reality – the avatar – is an important aspect of the choice problem, as we would expect that people would gravitate toward those worlds that offer them their ideal avatars (Castronova, 2003).

To enter a virtual world, the user is first connected to the server via the Internet. Once the connection is established, the user enters a program that allows them to choose an avatar for themselves. In all of the main virtual worlds, one can spend an extremely long time at this first stage, choosing the appearance of the avatar as well as its abilities. Avatars, like their human counterparts, express themselves through appearance and body language (Adrian, 2007).

Most of these virtual worlds have a firm basis for commercial development, including an in-world currency, customization of avatars and objects, concepts of property ownership, text and/or voice communication and many different marketplaces and communities (Castronova, 2005; Good, 2007; Manninen & Kujanpää, 2007). Virtual Worlds offer extraordinarily flexibility and potential for brand-building. Tools for promotion include, for example, product placement of 3D objects (similar to product brands, like beverages, as seen in films), real-world analogs (such as billboards and radio), advergames (mini-games or mini-worlds, with some element of advertising), and cross-promotion (such as coupons, dancing or camping in SL) (Vedrashko, 2006)

3.2 Brands and Consumer Goods in Virtual Worlds in the Context of Consumer Culture

Consumption and culture have an unprecedented relationship in the modern world. By 'culture' we mean the ideas and activities with which we interpret and construct our world (McCraken, 1988). By 'consumption' we broadly mean the processes by which consumer goods are created, bought, and used. Consumption is shaped, driven, and controlled at every point by entirely cultural enterprise. The consumer goods on which consumers dedicate time,

attention, and income are charged with cultural meaning. Consumers use the meaning of consumer goods in order to express cultural categories and values, develop ideals, create and sustain life-styles, construct concepts of the self, and create (and survive) social changes.

Much contemporary consumption is playful and imaginative (Gabriel & Lang, 1995). McCraken (1988) and Campbell (1987) advocate that consumer goods might be perceived as resources with which to build imagined "better" lives. For instance, people may envisage that if they had a particular car or clothes their lives would be better. This means that consumer goods give individuals hope that imagined ideals are attainable, acting as "bridges" to them, without ever in fact fully achieving them. In this sense, commodities offer pleasures of the imagination. The actual pleasure is in the dream that the consumer good symbolically represents. Dreams may be framed and encouraged by the media, including advertising (Campbell, 1987). Virtual worlds are attractive to people who inhabit media-created ideal worlds in their imagination and some of these simulations include the signs of significance to individuals in 'real' life: branded consumer goods. Virtual worlds, due to the fact that they are a form of play, make us escape from our 'everyday lives'. Therefore there are many virtual world participants separating their 'real' lives from their virtual lives, considering that there may be more than one reality that they can now live in.

Martin (2004) in his exploration of a fantasy trading card game explains that: 'the real provides a necessary basis for creating a fantastic milieu that absorbs the consumer'. Aspects of reality are required in order for the imagination to be evoked. The aspects of reality used to evoke the imaginary may vary, but they may also include brands as ideas that we are used to daydreaming about. Hence, brands may 'connect' fantasies to individuals' everyday experiences. What an individual sees on the screen is realistic just because they know those brands as real brands.

In virtual worlds consumers are taking the initiative and adopting alter egos that are anything but under wraps, marketers can segment, reach, and influence them directly. In fact, it is important for companies to think about more than the potentially rich market of the virtual world and consider the potential customer-the avatar.

In Second Life there are clothing designers that have been approached by real-world fashion houses, and at least one business makes real-world versions of furniture based on virtual "furni" designed by Second Life residents.

At this point we need to point out that in the mall of a virtual world, an avatar can try on and try out real-world clothing brands or styles in front of the virtual friends that the individual behind the avatar typically couldn't afford or wouldn't dare to wear. In case this avatar gets good reviews for her/his buddies and if she/he becomes comfortable with the idea of wearing a particular outfit, a purchase in the real-world may follow.

3.3 The Virtual World Second Life (SL)

This paper specifically focuses on *Second Life (SL)*, which is the best known virtual world. It is an immersive 3-D virtual world created by its Residents (users) (developed by Linden Research). The Residents are able to interact with each other through motional avatars, providing an advanced level of a social network service combined with general aspects of a metaverse. Everybody's avatar runs around together in a virtual environment, complete with oceans and trees and houses and animals. They can explore, meet other Residents, socialize, participate in individual and group activities, create and trade items (virtual property) and services from one another. Avatars can take whatever form and appearance and manifest whatever personality that a user desires. Every avatar can point at people and things, to drive virtual motorcycles, or to run up to someone and hug them. Residents can own property, create objects and animations, form relationships with one another, and engage in virtually any type of transaction or interaction imaginable. They can communicate with one another by typing local public chat messages, typing private, global instant messages, and even by voice. The can also navigate the landscape by walking, flying, or instantly teleporting from one location to another, among other means. There's an easy-to-learn programming language you can use to tell the system to make something for you in a certain way. Making things costs virtual money, of course. So people make outfits and cars, and even houses, and they trade them back and forth, trying to save up their $L to do more building when it strikes their fancy (Castronova, 2008).

Second Life is not a game since there really isn't any game to it at all. You just go *there* and talk to people, make friends, and build stuff that you might trade around for $L, using the money to buy other things. For most of the millions of people who have begun to spend time within avatar-mediated communication systems, their encounter with this technology is not viewed as an encounter with a technology at all, but rather as a move into a new society, albeit one that operates under unusual circumstances. The circumstances change from world to world – in some, like Second Life, users build houses, in others they hunt dragons – but the common theme is sociality. These are new places for human communities, but they have grown to the point where they have begun to merge with communities – and markets -- outside cyberspace (Castronova, 2008).

Since opening to the public in 2003, it has grown explosively and today is inhabited by millions of Residents from around the globe. It has grown rapidly from 2 million residents in January 2006 to more than 9 million residents in August 2007. Some 1.3 million people ran the official

software and logged-in to *Second Life* in March 2007, an increase of 46 percent in the number of active residents from January 2007 (ComScore, 2007). In March 2007, 61 percent of active Second Life residents were from Europe (16 percent from Germany), compared to 19 percent from North America, and 13 percent from the Asia Pacific. Additionally, 61 percent of residents were male while 39 percent were female (ComScore, 2007).

3.3.1 Real Life (RL) Brands in SL

This virtual world has more than 100 real life brands (Kzero, 2007), including those in sectors such as:

- Auto (e.g., Mercedes, Mazda, Toyota and Pontiac),
- Media (e.g., AOL, Reuters and Sony BMG),
- Tourism/Travel (e.g., STA Travel),
- Consumer electronics (e.g., Intel, Dell, Apple, Nokia and Sony),
- Consumer goods (e.g. Reebok , Adidas and American Apparel),
- Telecommunications (e.g. Vodafone and Telus),
- Finance (e.g. ABN Amro and ING)

There are two types of accounts that a Resident in Second Life might have: Basic and Premium. Basic accounts are free. Premium Residents pay a recurring fee to buy land directly from Linden Lab, and receive a weekly allowance of Linden Dollars called a "stipend". Premium Residents aren't the only ones who are contributing to the economy, however. Since its inception more than 90,000 unique Residents have bought currency on the exchange. Basic Residents account for significant economic activity.

3.5 The Economics of the SL Community

The SL economy is a vital part of the game experience. Second Life has its own currency, the Linden Dollar. Linden Dollars may be purchased and sold for real world money through a variety of exchanges at a rate that fluctuates according to market supply and demand. The value of Linden Dollar is L$267.48 per US$1.00 in average-value varies from L$264.00 to L$275.00. So the value of one L$1.00 is US$0.00374. Residents can use Linden Dollars to purchase property, goods, or services from one another, to make purchases through automated vendors in a variety of stores, and for many other types of transactions. The prices of property, goods, and services are similarly driven principally by market conditions.

In September 2006, the virtual world had a GDP of US$64 million, based on residents being able to sell pretty much anything they create within the metaverse, as long as they can find a buyer. While the SL currency is known as the L$, these can be exchanged for real-life US dollars with Second Life creator Linden Lab (Sudhaman, 2006).

As figure 1 shows, the amount of resident owned land has increased 10 times in the last two years.

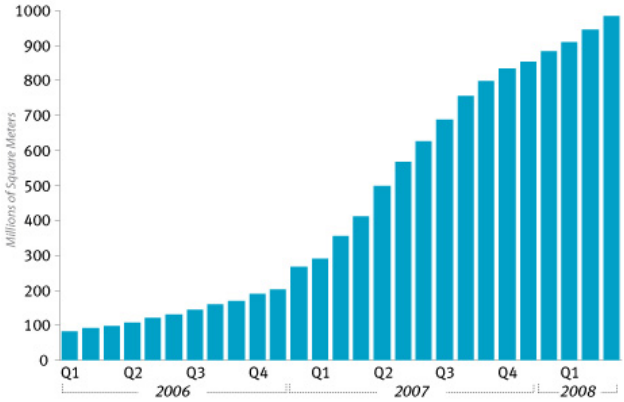

Figure 1: Amount of resident owned land
Source: Second Life Official website (2008)

3.6 Virtual Experience & Virtual Consumption

Due to the fact that consumption is a central aspect of contemporary life, it has been greatly appreciated by researchers of various fields not only within consumer behavior, or more broadly marketing, but also in sociology, psychology and anthropology.

With the dynamic development of information technology and the proliferation of interactive media with the Internet at the front position, the ways in which people consume started to change. Consequently, consumers were introduced to new ways of consuming physical goods and their digitized equivalents such as e-books, e-journals, mp3 music, etc (Kedzior, 2007).

Virtual game communities are considered one of the most promising online game models – incorporating traditional computer games into the context of collaborative virtual environments. Thousands of participants may not only interact with each other, but they may also buy and sell virtual items in a virtual community. Such goods are bought and sold using real money. According to DFC Intelligence (2005), the revenue from trading virtual assets in virtual game communities will reach $1.8 billion by 2009. The emergence and increasing popularity of three-dimensional animated virtual worlds such as *Second Life* has set new stages for consumption. Being highly immersive, these environments represent lively consumption spaces not only for consumption activities but also for other manifestations of consumerism such as consumer activism, resistance and consumer creativity (Kedzior, 2007).

According to Firat and Venkatesh (1995), consumer-controlled avatars engage in many consumption activities such as shopping, trading, socializing at a club, etc. In that sense virtual consumption demonstrates an aspect of

'hyperreality', where members of the culture realize, construct and live the simulation. As Rheingold (1991) notes, 'real' describes a specific set of experiences; namely, those that are lived through the body, without the intervention of computer technology. Simulating these embodied experiences comprises virtual reality, and these simulations are hyperreal. As such, these experiences may be realistic, a state that is like real, but not really real.

Similar to the physical world, consumption in a virtual environment is often connected to spending hypothetically virtual money. As we have mentioned earlier, Second Life has its own form of economy and virtual money might be exchanged into "real" money and vice versa. As a result, the line between real and virtual has become blurred. Due to the new character of virtual worlds little remains known about the nature of such consumption (Kedzior, 2007).

The big question that arises at this point is why people buy virtual items with real money. According to Second Life Residents' views about this issue, they shop and buy by appearance. They ask themselves 'How do I look?' How will I blend in?'. Appearance and attractiveness is important to them. Additionally they explained a bit more about the 'blend in' thing. An SL Resident specifically gave me an example in order to explain it better telling me: "Go to a Rock club for example or Black Hearts [and] take a look at what everyone else is wearing..those two have different cultures of clients, different styles and people change to 'fit in' as they perceive it". Asking him what exactly Black Hearts is he easily told me that Black Heart Café is a popular dance club in SL.

3.7 What is Real and what is Virtual?

Recent works have characterized our late-twentieth-century lives and social structures as hyperreal, or moving closer to the virtual; many scholars theorizing about cyberspace and computer-mediated communication focus on the difficulty of determining what is real and what is virtual, or on the blurring of the two in or through various technologies (e.g. Benedikt, 1991; Rheingold, 1991, 1993).

According to MacKinnon (1998), "*The primary difference between the real and the virtually real is the interposition of some mediating and transforming agent or interface between the senses and the shared perception*" (p. 4). MacKinnon seems to define real as that which is experienced by the senses and virtually real as that experience which encounters something between its existence and our senses. Most probably he means a computer, but he could also mean displays, or a mirror. More significantly, there is a standard reality out there, and something is happening to it. Howard Rheingold (1991) writes that computers "*are only beginning to approach the point where people might confuse simulations with reality. Computation and display technology are converging on hyperreal simulation capability. [Through this capability, we] will be able to put on a headset, or walk into a media room, and surround ourselves in a responsive simulation of startling verisimilitude….That point of convergence is important enough to contemplate in advance of its arrival. The day computer simulations become so realistic that people cannot distinguish them from not simulated reality we are in for changes"* (p. 388).

At this point we need to point out that virtual realities such as the Internet encourage people to see virtual as real and vice versa, or to accept the virtual as an adequate way to experience various places and others. For example, when in Second Life, I can seem to walk through a forest, without actually going there; I can share significant discussions with people from all around the world that care about me online, so I might not feel 'forced' to accept or get along with people who live close to me.

4. Conclusions and recommendations and further research

Thanks to the recent advances in Computer Mediated Communication (CMC) the physical and virtual realms are becoming increasingly difficult to separate due to less frequent face-to-face contact. In recent years virtual worlds have become highly interactive, collaborative and commercial. Current virtual worlds, such as Second Life, would have the potential to be new channels for marketing content and products, integrating 'v-commerce', or 'virtual e-commerce'.

Most of these virtual worlds have a firm basis for commercial development, including an in-world currency, customization of avatars and objects, concepts of property ownership, text and/or voice communication and many different marketplaces and communities. They offer extraordinarily flexibility and potential for brand-building.

In addition, much contemporary consumption is playful and imaginative, which means that that consumer goods might be perceived as resources with which to build imagined "better" lives.

The role of these complex worlds as tools that individuals use to make sense of their lives in a consumer society is worth further consideration. Further studies may consider how the brands are perceived by virtual participants and whether there is an interaction between Real Life consumer behavior and Second Life consumer behavior.

A very important question that arises is whether the avatars are going to actually buy real-world products that are marketed in virtual worlds, effectively purchasing real-world goods for the individual behind the avatar, just as those individuals buy virtual-world stuff for them or not.

Could an avatar who is spending Linden Dollars in order to buy a virtual shirt from a designer clothing store in Second Life be attracted, while visiting an in-world Gap

retailer store for example, to click on a cash register and use her/his credit card in order to buy a real-world Gap sweater that would be shipped to the real person's doorstep? This research agenda is a very important one as the use of interactive entertainment continues to grow.

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Notes

1 By physical space we mean the activity that takes place in the traditional sociological field; the physical world (Berger, 1963). It has been proposed that for some internet users the activity that takes place in text-based virtual space is experienced as a reality (Watson, 1997) and that the virtual space simulates the physical world to the extent that the virtual space is experienced as 'more real' than the physical world (Dery, 1996). I accept that the virtual is enclosed with the physical and vice versa, but I support that the value of virtual space exists in its ability to improve the transformation of individual's physical, political and social lives.

Deviance in virtual worlds: The ethical and legal dilemmas of living a Second Life

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Abstract: As everyday life becomes more and more mediatised, virtual environments like Second Life are regarded as an alternative version of reality offering an escape from the anxiety and insecurity of late modernity (Young, 2007). With anonymity and identity play being the key elements of their virtual, 'unofficial' existence, Second Life 'residents' can easily take a 'moral holiday' and indulge in a 'carnival of leisure' (Presdee, 2000), in which the boundaries of order are frequently crossed. As a result, the Second Life experience often translates into a deviant one, which includes 'conventional' cyber-crimes, consensual 'fantasy crimes' and a kind of anti-social behaviour known as 'griefing' (Brenner, 2008; Elliott, 2008). Although cyber-crimes have more evident physical-world ramifications than other in-world deviant behaviours, this does not mean that the latter should be dismissed as 'just virtual' and thus, insignificant. And that is because the social interactions taking place within Second Life involve real people who 'extend' their selves (McLuhan, 2001[1964]) from the terrestrial to the virtual world and project their deepest concerns and desires onto their iconic alter-egos (Guest, 2007; McKenna, 2007). Reversing Durkheim's (2003[1895]) example of a 'society of saints', the current project sees Second Life deviance as an indispensable part of a 'society of (virtual) sinners', that is, as a way through which its members reaffirm their moral boundaries and promote their cohesion. The researcher aspires to look into the mechanisms employed by both the administrators (Linden Lab) and the Second Life residents for the construction and management of deviant identities within the virtual world in question. The study will take the form of a virtual ethnography, which will include observational methods, in-depth interviews and focus groups.

A. Escape from the 'desert of the real'

In an attempt to escape the burden of anxiety and insecurity in late modernity (Young, 2007), people of the 21st century often prefer the virtual reality of the media to the 'desert of the real' (Baudrillard, 1988). They are seeking human contact, but not too much (Greer, 2004). They want to live on the edge, but without taking any significant risks. And the only way to do so is by crossing the line between reality and virtuality (Guest, 2007). The Internet is probably the medium that meets best this contemporary need to interact, but at the same time keep a distance. In fact, through social networks, blogs, chat rooms, massively multi-player online role-playing games (MMORPGs) and virtual worlds like Second Life, users try to construct alternative narratives in order to bring back meaning to their fragmented existence and ease the vertigo of late modernity (Young, 2007); in particular, such environments allow their 'inhabitants' to live a second 'unofficial' life (Bakhtin, 1984), away from the responsibilities and the problems of the first one, to communicate with like-minded people (Wall, 2007) and to create imagined communities (Anderson, 1983; Greer, 2004). And, as the post-modern mediatisation of everyday life renders the distinction between the real and the virtual meaningless (Shields, 2003; Aas, 2007), there is no reason why social interaction taking place in such virtual spaces should be considered less real, and consequently, less significant, than its physical-world counterpart (Spence, 2008).

Due to the impersonality of online communication, impression management is much easier in virtual environments than in physical ones. Consequently, while online, these so-called 'netizens' (Hauben and Hauben, 1997) -i.e. citizens of the Net- can either disclose their physical-world identities or create new ones. In fact, in an era where states become more and more obsessed with surveillance, anonymity and role-playing in online environments seem extremely appealing (Bugeja, 2007). It is precisely this anonymity as well as the supposed lack of consequences for the material world that provide users with a pretext to take a 'moral holiday', i.e. to liberate themselves from first-life restrictions and to indulge in a virtual 'carnival of leisure' (Presdee, 2000), in which the boundaries of order are frequently crossed (Williams, 2006; Guest, 2007).

B. Deviance in the virtual world of Second Life

According to Durkheim (2003[1895]), deviance is an indispensable part of every society, even of a 'society of saints'. By defining who is deviant and who is not, citizens draw a social boundary between right and wrong and thus, reaffirm the moral ties that bind them. As a result, deviance promotes social cohesion. But if deviance is normal rather than pathological within a society of saints, then the same applies to the exact opposite case scenario, that is, to a potential 'society of (virtual) sinners', where anonymity rules and anything goes (Bugeja, 2007; Fass, 2007). Within such a society, whose members are prone to virtual sinning (Guest, 2007), only the gravest deviant acts are regarded as unacceptable.

In particular, within the virtual world of Second Life, there are various types of deviant behaviour, which, depending on the way they are perceived by the virtual community and the administrators (i.e. Linden Lab), can be classified into three different, but at the same time interrelated, categories (Brenner, 2001, 2008; Elliott, 2008):

1. The 'conventional' cyber-crimes of identity theft, intellectual property violations, phishing, pyramid schemes, fraud, cyber-bullying, circulation of pornographic material involving minors and so on. Such crimes have tangible -usually financial- consequences in the physical world. Apart from the Second Life platform, they can also be committed elsewhere in cyberspace or in the physical world and that is exactly why they should not be considered indicative of the Second Life deviance. On the contrary, Grabosky (2001) is right to regard them as nothing but 'old wines in new bottles' which the existing legal framework can effectively deal with without any additional -more specialised- regulations.

2. Fantasy crimes: contrary to the conventional cyber-crimes, whose perpetrators usually seek to make a first-life profit out of their acts, fantasy crimes are quasi-crimes aiming to satisfy the perpetrators' darkest desires. The latter often include acts which in terrestrial life would probably be considered repulsive and morally unacceptable, but, in virtual life, seem quite appealing. Despite the lack of official data, it takes no more than a few visits in the virtual world in question as well as a look at the relevant (yet unofficial) online polls (e.g. SLPopularPlaces.com) to realise that the 'dark side' of Second Life is far more popular than its 'bright' one. In particular, avatars are much keener on having virtual sex and hatching pranks than exploring other (more promising) aspects of the metaverse (Fass, 2007). As a result, business, memorial and educational sites are usually empty, while virtual strip-clubs, prisons, bdsm (Bondage and Discipline, Dominance and Submission, Sadism and Masochism) and combat sites where, in the context of role-playing, avatars consent to be raped and roasted [or even pay for it (Mohney, 2006; Second Life Herald, 2007)] are so crowded that they push Linden Lab's servers to their limits.

Of course, in order to avoid making any generalised assumptions, it is worth noting that business (or education) sites are focused on scheduled events, while sites of deviance on generic, anytime interactions. However, even if the in-world site of Sky News, for example, on occasion gets as many -or even more-

visitors than a deviant one, this is the exception and not the rule. Thus, in everyday Second Life, sites of deviance are more popular than business ones, not only in terms of the total number of visitors, but also and more importantly, in terms of frequency of visits and time spent on the former compared to the latter (Fass, 2007; Guest, 2007). Besides, managers of companies like Coca-Cola, Reebok, Scion etc, who have spent a lot of money on building their virtual stores, also acknowledge that their in-world sites are not that popular; but, instead of considering their Second Life activities a bad investment, they regard themselves as pioneers. And that is because Second Life is such a popular and promising virtual space that they just 'want to be there', no matter what (Rose, 2007). Finally, irrespective of the questionable popularity of in-world business sites, it is the residents' propensity to misbehave that matters the most; deviant acts can be committed anywhere in the grid (business sites included) and not exclusively in places that encourage them. Indicative is the case of the Second Life millionaire Anshe Chung whose in-world CNET interview was sabotaged by a virtual 'terrorist' group called Patriotic Nigras, when she was assaulted by flying animated phalluses (Terdiman, 2007).

Most of these fantasy crimes are consensual and if they are not, they constitute part of a wider anti-social behaviour known as 'griefing'. Thus, as Durkheim (2003) would argue, in the context of Second Life, the pathological becomes normal because its residents regard it as such. In that sense, within this virtual world, there is often a clear deviation from first-life norms and values. However, this does not mean that such (virtual) environments are a-normative, but that 'the normative comes from within, only to the extent that [their] virtual inhabitants accept or reject it' (Brown, 2003: 171). Despite the individualistic nature of fantasy crime, it is imperative for the Second Life residents to confirm their unity via the demonisation not of those who deviate in general, but of those whose deviant acts pose a threat to the virtual community's welfare, i.e. of the griefers. This demonisation process includes, amongst other things, the creation of vigilante anti-griefer groups such as the 'Griefer Slayers', the 'Griefer Elimination Squad' and the comic-book inspired 'Justice League Unlimited'.

If they find themselves in trouble, residents always have the option to teleport somewhere else, but they usually choose not to, as such an easy way out would violate the rules of role-playing (Brenner, 2008). Trying to keep its promise not to limit the residents' imagination (*Your world, your imagination*), Linden Lab does not condemn fantasy crimes, unless they involve child or child-like avatars (e.g. fairies). Nevertheless, despite the administrators' disapproval of virtual paedophilia, the Second Life Herald reports that sex groups dedicated to this so-called 'age-play' grow 1% per week (Mistral, 2007).

3. Griefing: the term 'griefing' is used to describe a particular kind of anti-social behaviour that can significantly disrupt another resident's Second Life experience (Dibbell, 2008). However, such a definition is quite vague, as what disrupts a resident's in-world experience can be quite subjective. According to a resident, interviewed by Boellstorff (2008) in his study of the Second Life culture, a griefer is no longer someone who threatens the grid's stability, but anyone you disagree with. In that sense, 'griefing' has become a useless umbrella term, something which renders the detection of actual griefing problematic. It is, therefore, imperative that the preceding definition be clarified.

In order to be regarded as griefing, an in-word behaviour needs to have two basic features: first of all, it needs to be *intentional*, that is, the perpetrator needs to have total control over his actions (Foo and Koivisto, 2004; Robins and Bell, 2008). In that sense, accidental bumps and pushes, which are quite common amongst new residents who cannot yet control their avatars' movements very well, should not be considered griefing (Gregson, 2007, cited in Elliott, 2008). Moreover, contrary to the fantasy crimes of the preceding category, griefing is *non-consensual*, i.e. the victim does not accept or take any kind of pleasure in being attacked (Brenner, 2008). Thus, griefing constitutes a hybrid of fantasy crime and cyber-crime. In particular, the act of griefing itself is a non-consensual fantasy crime, which can at times have tangible (emotional or financial) first-life ramifications. Reuveni (2007, cited in Bugeja, 2007) argues that, since more and more users tend to conceptualise their virtual presence as a 'way of being', victims of virtual harassment may suffer physical-world trauma and anger. Furthermore, the griefers' actions can also take the form of a denial-of-service attack; such an attack causes financial loss to the companies investing large sums of money to promote their products or provide their services through Second Life by overloading or damaging Linden Lab's servers (Brenner, 2008; Elliott, 2008).

As far as the perpetrators' motives are concerned, griefing can be likened to a virtual battle for power (University of Nottingham, 2007) and is thus, not that different from teasing and bullying (Foo and Koivisto, 2004). In addition to random cases of griefing targeted at individuals, there are also many organised griefers whose attacks constitute a form of 'cyber-terrorism' that puts the harmony of the virtual society at stake (Dibbell, 2008). Although griefer groups such as the W-Hats, the Patriotic Nigras, the Voted 5 etc identify themselves as 'goons' rather than 'cyber-terrorists', they embrace the latter title only in order to show the ludicrousness of it (Guest, 2007). They attack the grid from within so as to ridicule the perception of Second Life as 'serious business' and to convince residents that they should not neglect their real lives for a meaningless online game. And they do so, by making use of various in-jokes, code

words and taboos that allow them to enjoy the havoc they cause all the way through. Based on a weird sense of humour, their pranks can take various forms such as assault, harassment, indecency, racist-sexist-homophobic insults and so on. This isolated pathology turned into an in-world fully-fledged sub-culture (Dibbell, 2008) can be found in the webpages of Encyclopedia Dramatica and Something Awful[1], whose slogans ("In lulz[2] we trust" and "The Internet makes you stupid" respectively) are pretty straightforward and indicative of the way the preceding groups perceive their virtual existence.

C. Research questions:

The current project aims to answer the following research question:

What are the mechanisms of acquisition and management of deviant identities operating within the Second Life community?

Specific research questions include:

- How do Second Life residents perceive their virtual existence?
- Is it possible to discern the nature of deviance in Second Life?
- What motivates Second Life residents to misbehave and how does anonymity, experience and role-playing affect their decision to do so?
- Do the virtual community and the Second Life administrators define 'deviance' in the same way?
- To what extent can Second Life be considered 'norm and value-free' and what are the formal and informal mechanisms of social control operating in-world?
- What forms of justice and punishment operate in Second Life, and are they effective?

D. Methodology:

The researcher will conduct an ethnographic study of the virtual world of Second Life, which will be carried out using multiple approaches to data collection. Data will be gathered using secondary sources, observation, in-depth interviews and focus groups. The research approach will be largely qualitative.

Given that the 'reality' of Second Life is 'revealed' only to its residents, the researcher will join this virtual community in order to "conduct […] fairly unobtrusive observations" (Jorgensen, 1989: 16). After familiarising himself with this virtual environment, he will be able to observe and record not only other residents' attitudes, but also his own reactions, which will constitute an essential element of his participant observation (Bryman, 2004; Payne and Payne, 2004). During the latter, the researcher will conduct a series of 'informal' interviews in the form of casual conversations with other residents regarding their Second Life experience. Such conversations will facilitate further stages of research (in-depth interviews and focus groups) as they are likely to illuminate in-world issues and debates of which he was unaware before entering the grid, and so could not have taken into account. The pool of research subjects will initially include all residents. First of all, the researcher will look at popular sites, events and leisure activities in Second Life in order to identify an appropriate research sample. Further exploration will establish whether a particular virtual community (e.g. residents of a specific region or members of a particular group) will be chosen or whether subjects will be considered across all such boundaries (Ostrander and Stephens, 2007).

The ethnographer will inform his research subjects about his objectives in advance; he will also disclose his role as researcher and include a brief overview of his project in his avatar's Profile tab. Although he could take advantage of Second Life's identity play and remain anonymous during his participant observation, it is much preferable not to do so, not just for ethical, but for practical reasons as well (Williams, 2006). As Rymaszewski et al (2008) point out in Second Life's official guide, although deception is part of the virtual world in question, many residents take their in-world relationships quite seriously and do not like being lied to. An a priori disclosure of the researcher's identity may slightly affect the residents' attitude by causing the so-called 'Hawthorne effect' (Payne and Payne, 2004: 107, 167), but, at the same time, it will inspire confidence in the researcher's face and thus, prevent any future research problems (e.g. mistrust, unwillingness to cooperate), which he is much more likely to face in case he reveals his true intentions in a later stage.

Moreover, the researcher will conduct a series of in-depth, semi-structured interviews with:

a) the administrators of Second Life,

b) members of closed communities of particular interest (e.g. Neufreistadt, a virtual community which polices itself),

c) representatives of the Metaverse Republic, a promising organisation in the process of formation, which aspires to provide enforceable dispute resolution to Second Life, and finally,

[1] Encyclopedia Dramatica: http://encyclopediadramatica.com/Main_Page

Something Awful: http://www.somethingawful.com/

[2] According to a *New York Times* article about Internet trolling, "lulz" is a corruption of "lol" or "laugh out loud" meaning the joy of disrupting another's emotional equilibrium (Schwartz, 2008).

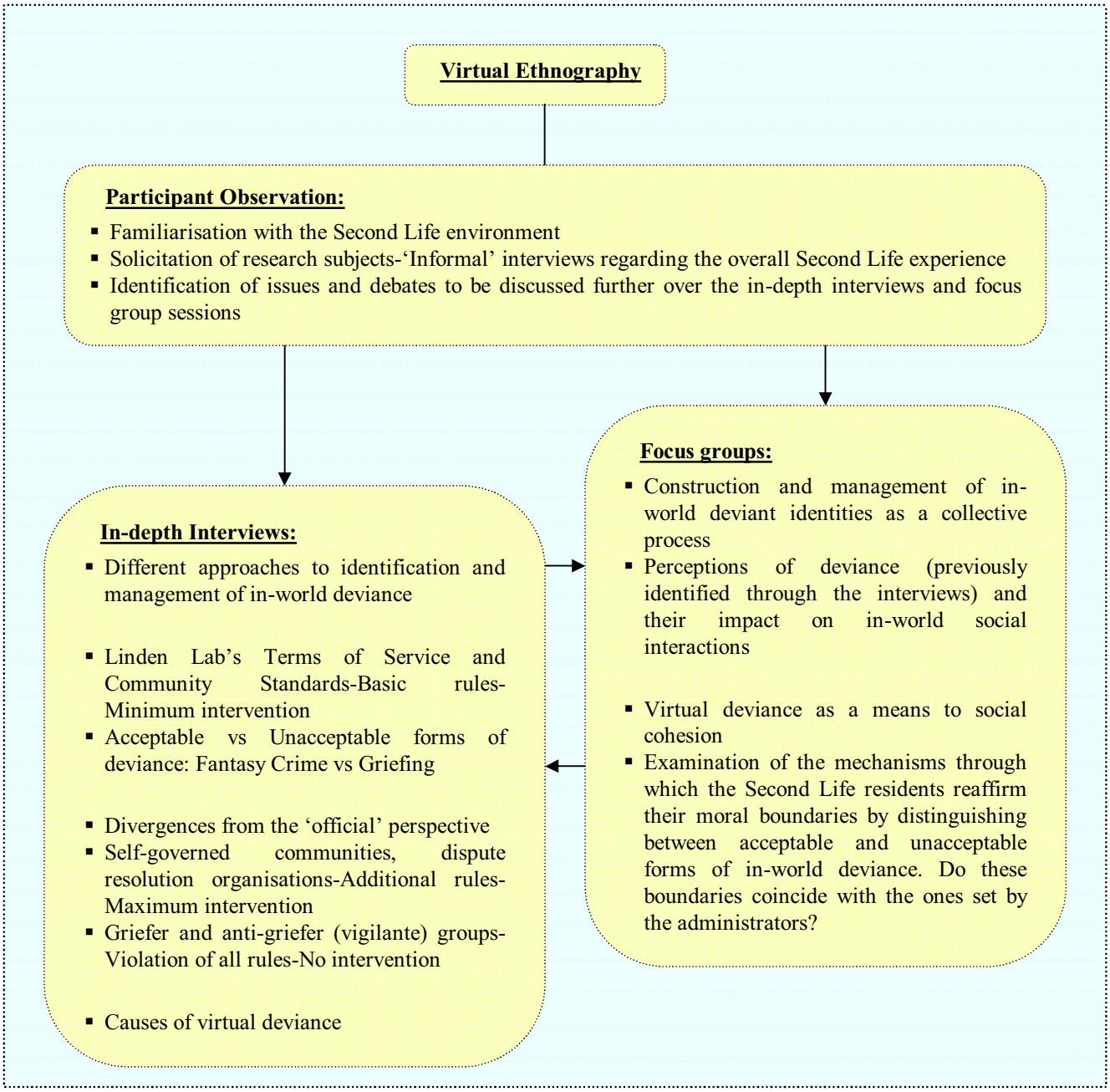

Diagram 1: Methodology Inputs and Outputs

d) owners of in-world sites of deviance (e.g. virtual prisons),

e) griefer and anti-griefer group representatives.

In that way, he will be able to look into the problem of deviance within Second Life from two different perspectives: on the one hand, the 'official' point of view will permit him to examine the criteria based on which Linden Lab "criminalises" certain kinds of in-world deviance via its Terms of Service and Community Standards, while, at the same time, intentionally neglects others. On the other hand, the alternative, 'unofficial' perspective will give the researcher a clearer understanding of the power relations (Foucault, 1991) developed within Second Life's neo-liberal society and of the processes through which residents choose to either follow, reinforce or violate the rules set by the administrators. By examining the variations in in-world perceptions of right and wrong, the researcher will be able to study the nature as well as the causes of virtual deviance and particularly, to look into the reasons why people are keen on misbehaving in such environments (Guest, 2007), but also, why some are keener than others.

However, though the preceding one-to-one interviews will offer an insight into different perceptions of virtual deviance, they will not indicate how these perceptions operate on a collective level, that is, how they affect the

social interactions taking place within Second Life. That is why focus group interviews need to be conducted as well. In particular, focus groups will allow the researcher to examine not only how residents make sense of Second Life's alternative 'reality', but also, how they identify and deal with deviant behaviours in the context of that reality. In other words, they will illuminate the process through which the Second Life residents reaffirm their moral boundaries and reinforce their unity by reacting only to particular types of in-world deviance (i.e. to griefing and not to fantasy crimes). The aim is to conduct 10 focus groups of 5 participants each. All participants in focus groups must have an active account in Second Life and have familiarised themselves with the virtual environment for at least two months. Although the plan is to examine a representative sample of Second Life users, focus groups will depend on the participation of volunteers, which means that participants will ultimately be self-selected (Ostrander and Stephens, 2007).

The aim of the current project is to examine the construction and management of deviant identities within the Second Life universe, that is, to study the virtual world in question in its own terms and not to draw a line between the research subjects' first and second life. That is why all interviews (in-depth and focus groups) will be conducted in-world. Before participating in the research, potential interviewees will be asked to electronically 'sign' a consent form clarifying their role as research subjects and setting out the project's objectives and ethical framework.

Doing a virtual ethnography requires that the researcher adopt an insider's point of view and take into account two important features of Second Life, that is, anonymity and deception. The fact that Second Life is a virtual -and not a material- world does not make the experiences lived within it less real. And that is because the people behind the avatars are real people (Lessig, 2006) and therefore, the virtual is real in essence (Shields, 2003). As McLuhan (2001[1964]) would argue, Second Life allows its residents to 'extend' their actual selves into the virtual world and to establish a 'dual presence' (Kendall, 2002; Aas, 2007). In fact, anonymity encourages users to project their deepest concerns and desires onto their virtual selves and to develop meaningful online relationships (Guest, 2007; McKenna, 2007). Virtual worlds like Second Life are primarily social rather than strictly cyber-spaces (Spence, 2008). In other words, the social interactions between those who inhabit them matter in themselves, irrespective of their physical-world ramifications.

Moreover, as far as the current project is concerned, in-world interviews are preferable to face-to-face ones because of the sensitive nature of the research topic. Some of the perpetrators may not feel comfortable with the idea of revealing their first-life identities. Consequently, it is much more likely for them to come forward and discuss their virtual existence within an anonymous, virtual rather than a physical environment. The researcher needs to respect the privacy of his interviewees. This means that he will not attempt to meet his research subjects in the actual world, unless they suggest such a meeting themselves or, at least, consent to it. However, even in that case, face-to-face interviews will be supplementary to the ones conducted in-world.

Furthermore, it is ethically imperative that any first-life information disclosed during online (and possibly, offline) interviews be considered accurate and treated with absolute confidentiality. The researcher's decision not to attempt to verify any of the information shared is not only morally correct, but also consonant with the project's objectives. As I have already mentioned, deception (usually in the form of role-play) is a key element of the Second Life experience. However, even in cases where the accuracy of the preceding information is questionable, this will not jeopardise the validity of the research. And that is because the virtual ethnographer does not need to adopt an omniscient point of view. On the contrary, as a Second Life resident himself, he will only need to know as much as any other resident. And as most residents do not meet their fellow residents offline, being ignorant of their first-life identities is absolutely expected and acceptable. In fact, what matters the most in such a case is not the accuracy of the shared information, but the act of sharing itself, which needs to be interpreted as a sign of intimacy (Boellstorff, 2008).

Finally, studying virtual worlds like Second Life in their own terms is preferable not only for privacy, but for convenience reasons as well. In particular, even if the research subjects consent to be interviewed face-to-face, distance, time and financial resources are additional impediments that need to be considered (especially in the case of focus group interviews). Second Life residents are scattered all over the world and thus, apart from the language limitations, which definitely pose a problem, it will be practically impossible for the researcher to coordinate a large number of face-to-face interviews without jeopardising his project's budget or time frame.

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Space representation, use, and management in metaverses

From urban places of the cities to virtual places in cyberspace: reproduction and / or appropriation of the practices of soccer sociability

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The article intends to present the forms of sociability found in soccer that were transposed to the cyberspace from the reproduction of real stadiums into virtual stadiums in *Second Life*. Researches are being made on how some social groups (players and fans) have found similar ways of identity expression (as social practice) and at the same time distinguished in their real life structure (due to the internet support) in the cyberspace. Attempts to understand the transpositions of the real sociability of soccer in cyberspace are being made by seeking to compare the spaces of the sociability practice of this sport in the cities with the virtual space, in order to understand the spatial appropriations that take place around this social reproduction amid cyberspace territories.

Introduction

With the development of computer mediated communication (CMC), there is an expansion of the forms of sociability that will take place through locations created in the virtual universe, sending the very idea of social practices that are presented in real urban areas. In this way, the notion of territory is expanded to the cyberspace adding a reproduction of social practices in different universes from the real cities.

This search for the sociability takes place from the social interactions based on the creation of social ties and exchange of social capital (Recuero, 2005), besides of allowing a historicity and also feelings of belonging to groups, which will be extremely important for the comprehension and authentication of their identities.

The world of soccer will evoke these dimensions as a sociability practice, becoming an urban and mass phenomenon in cities around the world. Toledo (2000) says that at the moment of entering a soccer stadium one of the first sensations that passes by the bodies and minds of the fans is the ecstasy and the fellowship that is provided by the game-show. Thus, this social fact of great significance in world culture (and mainly brazilian) will release a direct connection with the national identity (Gastaldo *et al*, 2006), creating myths (Rial, 2003) and becoming an extremely important social practice and influence, not only for culture but also for the economy and politics of a place.

However, according to Toledo (2000), the space, the place of soccer is going to surpass the boundaries of its headquarters (stadium), arriving to different environments as bars, houses and squares. It reaches the virtual universe, bringing new forms of social interaction with similar structures and yet quite distinct from those seen in the environment without the mediation of the internet. Besides, changes appear in the social spaces of soccer; it is started a movement of transposition of places and social practices from the cities to the cyberspace.

Ray Oldenburg (1999) will name these sociability spaces as "third places", classifying the daily live of the human being in three realms of experience. The “first place” would be the private and the domestic environment, which is characterized as an individualized residence, where the subject matter of risks and tensions would be covered (in some way, it would be opposite to socialization by isolating him from social contact with the rest of the community). The “second place” would be the working environment, because it wouldn’t fit in a residence and domestic space. The coexistence in this environment provides certain sociability, despite of being based for the productivity and focused in the promotion of each person. Then the “third place” came, neither being private nor dedicated to industrial production. It would be a place dedicated to sociability between individuals (Oldenburg, 1999, p. 14-17), such as the soccer stadiums (regarding to the interactions between fans, given that the players would found themselves in a second place position, due to consider soccer as a profession). This place is characterized for having a relaxed coexistence, with no competitions (no job stress), no hierarchies and no commercial interests.

Starting from the ideas developed by Fragoso (*online*, 2008) which states that the virtual environment interactions (in the case of his research, online multiplayer games) appear to be directly related to the role of third

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places. They promote the relaxation, the hanging loose, the sharing of experiences and social practices through a moderate climate, offering a comfortable and secure environment for their users. The interactions are constructed independently of an institutional order and are more fun, abolishing the differences of the social positions among their participants:

> Some characteristics of online games are exactly the same that Oldenburg (1999) uses to describe third places. That's the case of the potential for surprise and the novelty inherent to the absence of a rigid agenda and previously defined as also to the reunion of people with different backgrounds and varied interests (Fragoso, 2008).

Therefore, considering these virtual environments equivalent to the third places of Oldenburg, it has been chosen the virtual environment *Second Life*[2] (*SL*) as a key environment for the analysis of these real, social and spatial representations of soccer in cyberspace. It is characterized for having a digital technological mediation and the ability to enable interpersonal communication in the "many-much" way, called "multi-user online environments" by Fragoso, Rebs and Henn (2008). Various parts of the *SL* are real transpositions of places that already exist in the material world that are simply reproduced in the virtuality (whether in a symbolic way or even iconic) bringing a character of identity expression to the territories of sociability there created.

However, it is known that with CMC people acquired new forms of socialize, not needing a physical exposure nor even a "real" identification from the person, thus providing some assurance that besides staying at home (in a secure environment technically), a person may interact with a large number of online users.

Some authors, such as Santos, justify that mutation of places when say that "... the artifice tends to surpass and replace nature" as times goes by (Santos, 1997, p. 73). This means that with technological developments men will increasingly enjoy artificial environments rather than natural things, aiming to optimize life and the processes that are involved in it. In this way, it is believed that the arising of virtualized social places could be a spatial mutation Santos was referring to.

Therefore, it is aim to discuss the dynamics of the sociability that soccer provides in real cities that were transposed and re-appropriated into the online multi-user environment *SL*, characterizing these virtual places as representations of social environments observed in the urban cities, in order to understand the social relationships and their connection to the places in which they are developed.

Places as expression of territory and the dynamics of sociability

Clarifying what can be defined as a "place" turns into a problem from the different points of view perceived by different authors, especially when searching for reference in virtuality. Marc Augé (1994), for example, believes that "if a place can be defined as an expression of identity, relational and historic, a space that can not be defined neither as identity, as relational, nor as historic will define a non- place." For him places like virtuality, the assumed places produced in our minds, like the images on TV (all locations that can not be considerate as anthropological) would be the non-places. Therefore, soccer stadiums in the cities now have a sense of place, because they provide historicity, revealing social[3] interactions in its ambit, awaking identity in all ones that are part of the group. Sometimes, these places begin to have virtual space in the universe due to the support that multi-user online environments offer, allowing social interactions mediated by the internet. However, with the reproduction of places that hold historicity, which are relational and own identity in cyberspace, the nature of "non-place" seems to lose its meaning in virtual environments that will admit these features.

Despite of the non-materiality of these virtual places, we can understand these reproductions as being distinguished platforms of the real world that became visible in cyberspace. Lévy (1997, p. 17-18) says that" "the virtualization wouldn't be an action of removing reality, but a mutation of identity, a displacement of the ontological center of gravity of the considered object", which means that the virtual becomes "unterritorialized", even though needing a

[2] Nowadays, it is considered as being one of the largest emergent virtual communities of the XXI century. This social system is tridimensional virtual environment and completely interactive that simulates real life.

[3] The social interaction is comprehended as being the emission of a signal from one body to the other, in order to establish a communication entitled to reactions opposite to each activity established between the interacting agents (Turner, 1999, p. 62), offering an idea of an ensemble action, where both sides of the process will be affected, one by the other.

space-time to give reference to its meaning, because it becomes possible through physical means.

In this manner, the sociability keeps finding various third places, featuring a natural and social organization of human beings (Toledo, 2000). In the present essay, these places will be characterized exactly by coming from a construction of identity expression, historical, liable to occurring typical social practices in its ambit, which will characterize them as places-territory, as Martin deals:

> The relation built between history and space supplies a basis apparently material to identity: providing it a territory. The occupation (leading the labour of the sensibility over the deep-rooted physical manner) gives to "pays", cities, neighborhoods, a symbolic dimension (...) (Martin, 1994, p. 25)

However, it is important to define the concept of territory, which we are going to deal with and delimitate the aspects of the sociability in question. It has its origins in the Latin word "*territorium*", which has its meaning linked to the term "land" and denotes a piece of land that is owned by somebody. It should not be confused with "space" which is going to designate a more abstract question, without limits defined by the social actors (at this point, it is the opposite of the territory). Nevertheless, the size of the territory surpasses the geographical bounds, reaching a historicity that will provide identity and characterize social relations that will take place within (Albagli, in Braga, Morelli and Lages, 2004, p. 26).

Toledo (2000) will approach the appropriation issues of cities by the group of soccer fans who eventually expand its territory (the stadium) far beyond the boundaries delimitated at first, establishing social interactions in other parts of the city (as graffiti, flags hung out of windows of the houses, etc.). The same expansion phenomenon of surpassing geographic bounds is observed in cyberspace points that allow the expression of people in environments that seem to reproduce real spaces of cities, taking the identity of groups and their territoriality beyond the physical boundaries.

In each territory will occur dynamic processes of sociability, such as cooperation relations, conflict and competition developed by social groups, not only with the intention of maintaining order but also aiming to add reputation and *status* to its members, creating hierarchies and facilitating the exchange of a symbolic capital valuated by the group in their place of living (Recuero, 2006).

Therefore, it is observed that the dynamics of social groups will be directly connected to a spatial scale, especially when it comes to the construction of a "proper place", of a territory that will provide identity to these groups so they can be strengthened.

Georg Simmel (*apud* Gastaldo, 2004) defines sociability as a "ludic way of sociação", that is, characterized as a social phenomenon resulting from interactions between actors seeking to act in collective forms of behaviors in order to be accepted, recognized and inserted into a social group. These social groups will become apparent in a location, alluding to a cultural space, a space technically "inviolable" that will cause a repercussion in its social interactions and reinforce thegroup identity, expressing the territoriality (Albagli, in Braga, Morelli and Lages, 2004, p. 28).

Besides the knowledge of the territory, to be able to understand the organization, dynamics and values of a particular social group it is necessary a prior knowledge of these interactions that derive in symbolic changes. It is necessary a notion of sociability which is constantly developed and appropriated in the places where social practices occur. Caiafa speaks of the flows of movements that are synced and similar to dances that are being developed in each social space, changing its intensity, speed and fluidity according to the constitution and dynamics of each city. "We learn a collective rhythm. There is a possible fruition in joining this group wave: not being at home, it is necessary to reposition the body and this may be an interesting experience" (Caiafa, 2006, p. 3). This way, it is noticed that communication between the bodies in the urban social scene is naturalized and has it's comprehension as a essential factor so communication between subjects happen. Without this "understanding", the dynamic of interactions is impaired, affecting the flow of urban spaces. This will develop a series of "laws" in order to maintain order in chaotic spaces that the cities expose and control the order of the dynamic flow of users who pass by "non-places" and social places.

Fragoso (online, 2008) will say that sociability at the present time is extremely dependent on the mobility and fluency, showing that a significant number of people will deal in a daily basis with another ones from the sociability technologically mediated. In these virtual places where sociability happens, there are also cultural keys that are important for socialization of individuals that interact in multi-user online environments. It gets in contact with distinct cultures and the playful nature of these virtual spaces will add a more pleasant meaning, less demanding in the inter-personal relations, avoiding situations that could be unconciliative outside the virtual world (Fragoso, online, 2008).

Therefore, the knowledge of the dynamics of places (virtual or real) will be connected to its sociability, providing similarities and peculiarities in accordance to the support in which these interactions will occur. Arising from this, we trace a parallel in the differences and similarities of sociability observed in some places that are part of the real urban universe of cities and its visual reproduction from the sociability observed in the multi-user online environment Second Life. For this reason, in the real cities we chose territories such as soccer stadiums and their symbolic extensions with the intent to compare forms of social reproduction with the ones they suffer as they pass to the virtual places of cyberspace.

Social practices of soccer in the urban places of real cities

Soccer has well-defined territories in real urban cities. From this, it will awaken the feeling of belonging in the actors who will participate in the social practices that take place within, developing ideologies in the sense of composing a national identity that will unite people around common ideals (Rial, 2003). It characterizes a social event that possesses great capacity of mobility and social transformations. As first example, the cities that end up having the soccer stadium space amplified to the streets, drawing a festive and competitive nature among the fans.

Turner (1990) says that soccer is a ritual that will present a sequential configuration from its social practices that are pre-determined and already known by the people who share it. That ritualization that soccer emanates will be expanded to other borders, beyond the territory of the stadium (Gastaldo, 2004). Thus, the game enters into a crowded field filled up with meanings spread throughout the cities, holding a temporary character, as it has close connection with time.

There is a ritual in soccer games which is determined by television and that already is part of sociability (Rial, 2003). As properly pointed by Gastaldo "…it is inconceivable to think of the sport-spectacle universe without its mediatic (media-diffusion) appropriation" (Gastaldo, 2004, p. 3). There are the repetition of the best sequences of shots, the splendor of the group of fans, the moving narrative and the prioritization of the "live from" for each match (Rial, 2003). Watching soccer goes from a simple reproduction of a game to a ritual of junctions among friends, of sharing feelings and sensations of unity in the soccer "battle". Soccer approaches people and at the same time it keeps others away (like the rival team fans). It makes people share a common social[4] capital. The simple fact of someone dressed as the other brings a sense of sharing, it's not necessary the existence of a prior social[5] bond to the establishment of emotional interactions between individuals. The emphasis in the soccer ritual is so large that opens space for the development of planetary icons by the media, where "good" and "bad" actors become alive in the field, telling a symbolic story of wars, conquests and defeats (Rial, 2003).

In urban sociability there are headquarters, places that will carry an identity materializing the ritual by which the groups interact, so that exists a set of signs and objects that will bring them familiarity. These places will be characterized by being territories (adding identities, historicity and a set of symbolic interactions extremely significant for its members). In these headquarters "exist the possibility of individuals recognized each other in the sharing of values, world views, aspirations fairly consistent, materializing common collective projects" (Toledo,

[4] Here, social capital is understood as being a set of resources possessed by the social group (Putman, 2000). It is all the information considered important for a group.

[5] Social bonds are here understood as ways of establishing relationships. They are even denominated as relational bonds by Breiger (1974) and can be classified as strong or weak, according to its intensity as Granovetter says (1973).

2000, p. 143), as the desire of their team's victory. Consequently, there is a social and urban space in cities that will be the point of concretization of soccer ritual. This place is the territory that will have the "real" spectacle and it's exactly there the place where the fans will feel "at home" and will center their attentions.

The competition that is "unrolled" from the matches can generate physical violence, as it's seen in most of the soccer games. Despite the logic proper to that space (groups of soccer fans are divided in different tiers of seats in the stadium), constant conflicts will occur between fans from both teams, at times creating physical threats. After all "thinking soccer violence is also to think it within the logic of the disputes of political spaces of authentication in this universe" (Toledo, 2000, p. 135). It is important to emphasize that the sociability of the games has a competitive nature, different from other socialization places such as bars for example. These distributions made by fan groups in stadiums represent a series of symbologies that are known and understood by the individuals participating in the ritual.

When a fan dresses a team shirt, another fan using the shirt with the same symbol starts to be seen as a fellow (and sometimes even as a "brother"), it is ignored the social, economic and cultural differences, being sovereign the "religiosity", the ritualism of their soccer team. Therefore, only those who cheer for the same team are worthy of attention, support and share of social ties. The "feeling alike", participating of the same common capital causes the inexistence of hierarchical played roles, that is, the ritual of the fan groups makes its members to be homogenized, an illusive disintegration of the social classes visualization happens, mixing social fields from the nature of the disjunctions of modern competitions (Toledo, 2000). In the same way, there is a prioritization of a symbolic appropriation of the experiences, actions, identities and spaces of these fans, which will end up owning a typical city urban areas "lifestyle" (Toledo, 2000, p. 137). That means that soccer makes an individual to assume the identity of fan in different environments of cities, wandering with the shirt through the "non-places', through family and work environments, communicating, interacting with others given the symbolic nature of its cloth.

The act of hanging the banner over the window of the house and gluing stickers to circulating cars will be attached to the sense of identity expression characteristic of the fans' lifestyle. The cities are decorated with these symbols, these colors and bands of the teams, the streets have their course changed to facilitate the fans access to the stadium as for the safety of the population. The life of cities is modified by soccer (Toledo, 2000). There is an appropriation of urban spaces each time a new game is going to happen.

There is also the mediatic (media-diffusion) appropriation of sporting events that "even surpasses the "direct" existence of attending a soccer game at the very stadium, where many fans follow the game with their eyes over soccer field and a portable radio glued to the ear" (Gastaldo, 2004, p. 4). Even in the very atmosphere of the game, the media is present and defines points, clarifies doubts and determines situations. With the media, fans no longer needed to leave home to attend a soccer game, offering a new environment for this sport practice. Friends, neighbors and family start to gather around the TV to cheer, be emotionalized and enjoy the massive consumption of the sport (Gastaldo, 2004). The position of consumers of sports events provides a character of an imaginary participation from an illusive understanding of the game (Bourdieu *apud* Gastaldo, 2004), that is, the fan feels like an essential of the victory's conquest by his team.

Therefore, given the social practices enjoyed and released by the soccer phenomenon in real the cities, it was chosen the virtual environment Second Life as object of study, of which some opportune samples were withdrawn (through images and interviews[6] with its users) in order to characterize and illustrate such events with examples. This manner makes possible a better understanding and visualization of the phenomenon of transposition of places and sociability from the real universe to cyberspace.

[6] The names of the interviewed avatars were excluded, it is used another form of identification in order to guaranty them the anonymity. Nevertheless, all information and depositions here presented were properly authorized by each user that has participated of the interview.

The appropriation and reproduction of social practices of soccer in Second Life

The Second Life (*SL*) is characterized as a virtual environment in which avatars - visual representations of users or "inhabitants" – called residents – can interact in real time. It is a virtual system in which there is a reproduction of the real world, where there's people from the entire world (which are mounted on avatars) that will live their "second life" in the virtual universe. However, it has a unique feature compared to other similar systems: the whole *SL* world – attractions, objects, places - are created by the people and belong to them. In this manner, it is perceived that the people's conception of territoriality can be connected to what these individuals perceive and believe to be in the cyberspace, therefore allowing socialization by "virtual reality[7]". In the *SL* environment, it is possible, indeed, to make money (the virtual local currency is called Linden) and convert it into dollars, thus becoming a virtual space where individuals can also profit in real life.

Besides the countless seductiveness' which are reproduced in *SL* (such as zoos, stores, parties, concerts with rock bands and even virtual replicas of cities and monuments), there is the creation of soccer stadiums where its residents play "professionally[8]". The virtual "sport" is developed by the residents who are interested in the game, working like a game where several users from different parts of the world join teams (which are managed by other residents) and participate in tournaments organized by companies like ISN *Virtual Worlds*[9] and TIM[10]. The visibility of the event has gained recent emphasis in Brazil, considering that the country that still has the largest audience in *SL* virtual soccer is Italy. Indeed, journalistic coverage is made by blogs or even by the media present in the very *SL*[11].

To be able to participate in soccer teams, which in other words means to become a professional player in *SL*, it is required to get into the trials of one of the recognized teams by the virtual soccer federation. Thus, there are trainings and championships that offer reward to the champion team. Nowadays, Brazil does not have the same force in the virtual sport as in other countries, such as Italy that is characterized by being the pioneer country in soccer of *SL* and that has the largest representation in the virtual sport. Sociability in virtual places of cyberspace will take place in the same way as in real urban areas, in the sense of man-to-man interaction from the speaking and listening (by microphones), writing (keyboards) and the visual. In reality, the big difference is the mediation done by the internet. This, in its turn, seems to bring a more libertarian nature to the social interactions by allowing the non physical exposure of the individual (creating oneself as an avatar, in the case of *SL*). Besides, the security afforded by the anonymity increases these differences, facilitating the creation (or expression) of identities hidden because of prejudices in the real places of the cities (as it is observed in the avatars of *SL*, the majority has a physical according to the esthetic pattern established by the culture industry). However, the intention of sociability seems to be the same: to seek social capital and form bonds with people who have common ideals.

When playing virtual soccer, besides the interaction with real people in real time through the CMC, *SL* users can become professional players in the game, making dreams and wishes that were previously impossible to fulfill in the real universe (due to physical, technical or even financial disabilities) possible to be achieved through the second life proposal. However, it is observed a moment when the soccer fan of the life in cities passes from the nature of a simple fan to the professional player in *SL*, existing a possible transformation of the "third places" Oldenburg (1989) to "second" ones when considerating the nature of

[7] Fragoso (2002) says that this expression is used for "denominate a very wide set of applications and systems of digital base. The most rigorous definitions restrict the "virtual reality" field to digital, tridimensional, multi-sensory and immersive systems".

[8] It is said professionally due to the "second life" nature of *SL*. The residents have professions that offer wage.

[9] A company that provides Consultancy and Project Management for projects within on-line and stand-alone virtual worlds, in particular for *Linden Lab's 'SL Grid'* platform and *Second Life*.

[10] Company of the Group Telecom: it's a mobile phone operator.

[11] Data collected over an interview with the president of the Brazilian Confederation of Virtual Soccer – CBFV, HenriquexX Zilz of *SL* on 01/06/09 and also from the ISN Virtual World website - http://isnvirtualworlds.com/isn/index.php.

"second life" in the *SL*. Notwithstanding, even when playing in a professional manner (which will require discipline, behavior and time for the virtual profession), the social and amusing nature still seems to have "greater weight" in comparison with professional players of real places. In many cases, the *SL* residents achieve the fame in this world, becoming icons in the virtual world. This is the case of great players of teams that end up highlighted by the large number of goals and thus receive higher wages in virtual life. Residents seek status through their plays, presenting the fans the techniques developed in the systems to improve the performance of their avatars.

> [11:22] WT: that over there is the top striker of the national team
>
> [11:22] WT: this guy scores more goals than Ronaldinho
> [11:22] WT: everybody of the soccer world in here knows him [*sic*]_[12]

Thus, it is observed the existence of a capital turned to a self-promotion, the same to what is observed in soccer of real cities. In reality, the intention of the very virtual soccer game is to create an atmosphere of sensations, feelings and emotions similar to what happens in real life. A virtual soccer player in the *SL* and former president of the CBFV[13] said in an interview (provided on 01/06/2009) that the goal of virtual soccer is trying to be the closest possible to the soccer of the material universe. Then, while it seems very much like a videogame (as the Winning Eleven game of PlayStation), it mobilizes people in a serious way, it is necessary dedication to the team in the *SL*, especially to the professional players, because only with training and virtual money (from the sponsorship and wages of players and managers of the club) it is possible to mobilize great matches in *SL*.

> [10:15] TT: there was even hot dog vendor
>
> [10:15] T.T.: of course we didn't eat
>
> [10:16] TT: but create an atmosphere just like reality makes everything more interesting [*sic*]_[14]

It is noticed that virtual soccer has in its space the same ritual that real soccer presents. It gathers countless characteristics identities when the presence of game is on, like the media virtual of the world, vendors, fans and many curious people.

In times of games, fans (players, family members of players and club members) come out to the streets with their teams' shirts and buy banners. That makes the sociability through soccer to also be witnessed in the virtual universe. Residents identify themselves with the "team fellows", because they share a common social capital, facilitating their interactions.

> [9:50] TT: in reality I was quite unknown in the *SL*
>
> [9:50] TT: from the idea of bringing soccer to Brazil
>
> [9:50] T.T. is that I met friends
>
> [9:50] TT: and even Brazilians that already played in Italy
>
> [9:51] TT: and nowadays I access sl just because the friendships I made here
>
> [9:51] TT: but soccer is something that helped me socialize faster [*sic*]_[15]

The fact of being in a "virtual third-place" brings, by itself, a nature of development of characteristic sociability by its identity. People go to the virtual stadium for the same reason they go to the real stadium: some go to play, others to watch or even just to visit. However, the virtual fans are not going to be in a significant number as the fans of real teams do. The internet users/fans of "virtual" teams are not in a big number for various reasons (such as the disclosure of the games and even the aim of accessing the online multi-user environment) according to what a *SL* professional soccer player says in an interview:

> [12:10] 1L1S: there are fans but just a few

[12] Interview with a soccer player on 01/05/2009.

[13] "Confederação Brasileira de Futebol Virtual" – Brazilian Confederation of Virtual Soccer

[14] Interview on 01/05/2009.

[15] Interview on 12/05/2009.

> [12:10] 1L1S: the ones who come to watch the games are usually players from other teams in the championship to see how the opposite team works
>
> [12:10] 1L1S: the ones that cheer are generally friends of the players and managers
>
> [12:12] 1L1S: soccer here mobilizes players but not too many fans
>
> [12:13] 1L1S: It gathers people as a form of entertainment….I mean…you like soccer, you're a player at SL and stuff [*sic*]_[16]

Therefore, it seems that the social role that soccer plays in the real cities is also observed in virtual spaces. However, it is important to point out that there are differences between sociability seen on the cyberspace virtual places and sociability observed in urban places of cities. Despite admitting that " the discussion is part of the show and will always exist in all that involves soccer", the interviewee TT said that a control is done due to the existence of disputes between players or even by fans. There are rules in the games and people that don't follow them are "ejected "," blocked" from the access to the islands where the games take place. In this way, chiders, offenses or even people who bother the games end up being banned, causing this social control to exist. Residents must understand the rhythm that is developed in the social practice of soccer (as Caiphas, 2003, speech), in order to achieve an understanding of the interaction forms that are discussed.

Soccer in *SL* will also bring a sense of nationality, awakening collective identities according to Rial (2003) words about soccer in the real cities. However, the virtual game is not going to release a very strong mobilization, not being able to acquire a social character of equal strength as seen in soccer of real-material life in comparison to life in the *SL* because of it is treated as a simple way of entertainment (as the president of the Brazilian Virtual Soccer Confederation - HenriquexX Zilz said in an interview). It is going to be characterized more as a computer game, where people from all over the world gather to compete in the game, than as an event of great proportions, to what concerns the *SL* world. That means that the virtual soccer does not have the same power of social and economic transformations in the "second life" as the strength that it presents in real life.

The competitive nature of the virtual soccer is the same one observed in real life. It is known that the cooperation will be characterized as being the process that will organize society and it may begin from individual interests that will be understood by the group, which will produce collective actions in order to maintain the social structure (Recuero 2006 p. 93). Thus, cooperation among the participants of the game is evident, especially because of the sharing of a common social capital. It is from cooperation that they have the development of the sense of belonging and collective identity.

However, the conflict exists and "can generate hostility, wastage and breakdown of social structure. Often, it is associated to violence and aggression" (Recuero, 2006), in the case of soccer because of his jesting and competitive nature. Still, as already seen in the *SL*, there are forms of control that will prevent violence from unruly avatars.

Competition can generate conflict or even cooperation (Burt, 1992, *apud* Recuero 2006, p. 94) in a way that fortifies or wastes the social structure, generating disruptions of social relations (Recuero, 2006). It can work as a form of acquiring some social status or reputation within the social group, where the one that wins, that acquires more social capital in the dispute (that is, the winning team, the fans of the winning team or the very player who makes the goals) is automatically valued by the social group to which it belongs. After that, those members that are gaining reputation from the acquired social capital will add people in their group (such as admirers and fans) (Recuero, 2006).

It is also important to understand that besides the aggregations that will occur in a social group, there are also going to exist ruptures, that is, by a conflict (such as fights between members of a team, arguments with the coaches, fights among fans) group members fail to participate because they don't accept the ideals proposed by their superiors or even the ideals of their teams.

About the masculinity nature of the soccer in virtual universe, there is still a predominance of males in the games. Although they are mixed, no differences between strengths, skills or another category that end ups to be limitative between sexes

[16] Interview on 12/15/2008.

difference in real life, the player 1L1S asserts that the majority is still men, even in the virtual universe of *SL*. Thus, we can verify that the sociability aspects will occur in a extremely similar manner between the soccer social life in real cities and the virtual soccer life on the *SL* islands.

Regarding the places, the games and teams territories, it is noticed that in *SL* the stadiums are reproduced with a direct reference to the stadiums already existent in real life (as much the space structural form of organization as how they become virtual "replicas" of stadiums already existent in cities). These stadiums will play a role as symbolic extensions and of meanings of real urban territories. However, there are "original" stadiums created by the avatars without a direct connection with the representation of another place that already exists. These stadiums are characterized for having an identity, a historicity and will comprehend interactions in its field, therefore characterizing themselves for being places. The same goes for the identities and names of the teams in *SL*.

For the reason of generating public, of awakening virtual icons and even dealing with the collective imaginary of people, soccer in *SL* is also going to invest in the business of sports articles, because there is a demand for soccer shirts that are collected by the active internet users in *SL* and mobilizes money, likewise in life outside the cyberspace.

> [16:56] DS: But I'm keen on the shirt of Argentina
>
> [16:56] DS: here I am with all the shirts of the national team
>
> [16:56] D.S: I am a soccer fan
>
> [16:57] DS: thus I buy all the ones that are for selling here, 'cause here is cheaper than in real life[17]
>
> [16:57] DS: the staff is keen on my look kkkkk [*sic*][18]

Therefore, we verify that there are social relations in the *SL* soccer world that directly resembles with the same kind of sociability found in the soccer universe of real urban cities, being distinguished mainly by the limit that its territory has due to the structure in which it is supported (one virtual and the other one real).

Concluding remarks

All these myths, these interactions, meanings and symbology that characterize soccer will act as forms of sociability where there will exist an opportunity to put into action the competitive form of sociability through a game. It unites people around the bar, unites families and friends around the TV and even transforms cities into real spaces of "sportive warfare". The sport moves so much with the social imaginary that, besides the media, advertising takes advantage by launching a series of sports articles related to each team, each "religion" each fan chooses to follow.

The virtual soccer in *SL* seems to search the same social practices as the real cities soccer, arousing the same feelings and symbolism in its users such as those experienced by real soccer. Despite the physical limitations that CMC offers (like anonymity, safety, and no physical exposure) the dynamics of competitive, cooperation, conflicts and the acquisition of reputation by individuals involved in this sport practice has proved to be similar.

It was also observed that in most part of the times, cyberspace virtual places reproduced real stadiums of the cities, carrying within identities and issues of cultural personality. Thus, places become symbolic representations of real environments in which Internet users will try to find people who share a common capital (whether about tastes, geographic issues, identity expressions, information, etc.)..

The very reproduction of social practice now can be seen in cyberspace environments seeking to converge people in order to establish mutual interactions (as soccer). Besides the stadiums being mined of great power of identity expression, they are initially used to gather Internet users. After that, groups are formed (fan groups or teams) as in real cities, now acting, at least technically, in a safer environment than in material cities.

Nevertheless, it is important to remember that CMC brings an appropriation of sociability practices, because even seeking to reproduce territories, real places; communication will always be mediated by

[17] "Real Life": meaning life outside the cyberspace, a material life.

[18] Interview on the 10/05/2007.

Internet, fact that will bring a distinguishing character in the social interaction. Despite the diversified facilitations that cyberspace virtual places seem to offer in contrast to real places in cities (particularly regarding prejudice, rules, freedom and security), it is believed that the cyberspace universe does not fully become decomposed from real life. There are constant references to territories, identities and places as platforms for development of social practices existent in the material city, which refers to a thought that the universe cyberspace does not act as a replacer for social practices, but as a manner of amplifying these sociability forms that will take place in these spaces.

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Final summary and thoughts

Overall perspective

By Leonel Morgado

The SLACTIONS 2009 conference took place remarkably well, with unforeseen events of various sorts, but looking back I believe that the format demonstrated its feasibility, but in operational terms and in scientific content.

Operationally, several key issues were faced beforehand. For starters, the time zone different was immense, which is a nightmare in logistics: the conference started simultaneously at all chapters, meaning that it was starting at 7 AM in California, representing 10 PM in Hong Kong. It would last until 1 PM in California, and 4 AM in Hong Kong. Even later (or earlier, depending on your perspective) in New Zealand, from where one of the participants did his presentation. There could be no lunch breaks or dinner breaks: in Portugal and the UK, the conference would last from 3 PM to 9 PM, so dinner could be afterwards; but in Austin, going from 9 AM to 3 PM, and in Brazil, going from 11 AM to 5 PM, lunch would take place during the conference – meaning that local participants had to choose between a sandwich or a short lunch break forgoing some presentations. In Israel, with the schedule meaning the conference ran from 5 PM to 11 PM, the same could be said of dinner, not lunch. This meant that the two 20-minute coffee breaks introduced in the schedule were useful – even if taxing for late-night participants – because local participants could use them to get sandwiches or miss just a couple of presentations.

Further, having several local chapters meant that logistics and unforeseen circumstances would be more likely to occur – and so they did: a typhoon alert prevented Hong Kong organizers from attending the final rehearsal of the format (but fortunately, did not impact the conference); construction works cut São Paulo's optical fibre link on the first day, meaning that participants from that location had to resort to lower bandwidth connection options during the first day – but still they managed to participate; lastly, the head of logistics for the Portuguese chapter, my co-organizer Nelson Zagalo, caught the flu on the day before the conference.

This proved also to be a strength of the format: Nelson was only present at the opening of the conference – avoiding physical contact while trying to make sure all matters were taken care of (great response by Ana Oliveira, our co-organizer locally) - but still managed to follow the conference for the full two days, while recovering at home. A presenter from Brazil simply moved from the university grounds to his home, to enjoy a better Internet connection; in Portugal specifically, which I followed more closely, several people that were not able to attend physically due to pressing matters at the opening of the academic year were still able to attend - and present – online. But, at the end of the day, we could still enjoy relaxing moments with local participants at dinner, and as in most conferences, meet and get to know interesting people and their work. Then, as photos, movies, and reports from local chapters start to be online (search for slactions2009 at Flickr.com, YouTube.com, and the Web in general), we could delight in the richness of approaches and events taking place across the chapters, adapted to local realities as only a local event could.

From the scientific perspective, the conference was also a success. This was a lingering doubt when the idea for this conference first occurred. It would be the first conference under the SLACTIONS brand, albeit in Portugal benefiting from the contacts of two previous national events, the cef^SL workshop and conference organized in the two previous years by the University of Aveiro – but no real international background. Organizing a traditional, physical conference could end up resulting in a handful of low-quality submissions from people expecting an easy road to acceptance – a worrisome perspective.

This ended up demonstrating another advantage from the format: a global conference with local chapters meant that potential authors could benefit from knowing they'd have the chance to meet people physically, but not spend significant amounts since participation could be online of only involve national/regional travel. Thus, this enlarged the potential pool of contributing authors.

Still, if the original assumption of the relevance of the theme was wrong, this would not materialize in significant or varied papers. This was the final piece of uncertainty at the time of organization.

The organizers were happy to witness that SLACTIONS received a significant number of quality papers. The ones accepted for the conference encompassed several thematic areas, and their quality is attested by the fact that 13 of them were selected post-conference for publication at two journals – Journal of Virtual Worlds Research and the International Journal of Technology-Enhanced Learning, and 6 more invited to submit expanded versions to two other journals – Computer & Graphics and the Journal of Theoretical and Applied Electronic Commerce Research. This result supports the notion of the current relevance of SLACTIONS initiative to provide a forum that enables researchers working with metaverse platforms to present and discuss a variety of approaches and acquire a richer overview of what is possible – a key factor in understanding novel technology.

California-Berkeley chapter

By Sneha Veeragoudar Harrell

SLACTIONS 2009 posed an wonderful opportunity to participate in a unique, visionary international conference on virtual worlds. It unfolded as a both a global and local experience, both of which offered presentations/workshops by leading researchers in a wide range of disciplines. I applaud the global lead organizers for their unyielding efforts in organizing chapters across large time differences, technical challenges associated with convening presenters virtually, and the lengthy process of organizing a conference that runs from eliciting proposals to releasing the final proceedings. It was also a lovely surprise to have the live concert stream from Spain after the closing remarks.

The California chapter of the conference was fortunate to have multiple venues interested in hosting the event. We thank the Lawrence Berkeley Laboratories and the Tech Museum for their generosity. We decided to choose only one location to maintain consistency for attendees and the Tech Museum was chosen to be the host venue. Their staff and catering services were professional and timely, it was truly a pleasure to work with them.

Locally, we had great success with two important events. The first was a workshop on Scratch for Second Life led by Eric Rosenbaum (MIT, Media Lab) and the second was a screening of the film Second Skin, directed by Juan Carlos Pineiro Escoriaza. We were also fortunate to secure sponsorship and gift bags for attendees from TERC (www.terc.edu), a non-profit organization dedicated to technology education research since 1965.

In closing, I applaud the efforts of all members of the organizing committee and thank everyone who participated and helped make SLACTIONS 2009 a great event. I look forward to SLACTIONS 2010!

Collaborators in California

SLACTIONS California Chapter Conference Co-Organizers	Sneha Veeragoudar Harrell and Dor Abrahamson
Venue Contact:	Robert Ketner

Texas-Austin chapter

Coordinator and chair: Ana Boa-Ventura, Texas Advanced Computing Center

Research conference in the Second Life® world? Life, imagination, & work using metaverse platforms Austin, Sep. 24-26, 2009

PROGRAM

Thursday Sept 24

MORNING

9:00 – 9:10 AM	Introduction
9:10 – 10:30 AM	Presentations in Second Life in real time (with voice). *
10:30 – 10:45 AM	Break
10:45 – end **	Continuation of presentations in Second Life in real time (with voice). *

* Total presentations: over 12, of 20 min each. They will be seen / heard by Austin participants in real time at the TACC auditorium, as they occur in SL. We will have a 'camera director' in Austin controlling the SL in-world camera and also a 'pivot' to whom participants direct questions, as a Q+A follows each presentation. Presentations' titles, times and authors can be seen at http://www.slactions.org/slactions.php?s=ProgrammeSlactions (Austin time zone column)

** End of morning session: at participants' will (since this is a global event, presentations continue until 3PM CST). You may break for lunch at your leisure. We do start the afternoon session with **on-site speakers** at 2PM local time.

AFTERNOON

We will have experts' lectures in Austin both on-site and by videoconference and AccessGrid.
All presentation times include Q+A.

2:00 – 2:45 PM	The IBM SL Grid Craig Becker (live in Austin)
2:45 – 3:15 PM	Virtual environments: new possibilities at the peta-scale for Digital Arts - a conversat Mark Skwarek (webcast) & Ana Boa-Ventura (live in Austin)
3:15 – 3:30 PM	Break
3:30 – 4:45 PM	Hacking Opensim: A walk through Austin, Texas - sim'd Jeremiah Spence (live in Austin)
4:15 – 5:00 PM	Demo of mWorlds - Novel Human Interaction with Virtual Worlds Mary Pietrowicz (AccessGrid) & Robert E. McGrath (AccessGrid)
5:10 PM	Coffee & Cake at the Commons Center (walking distance from TACC) and Screening of 'Second Skin' (Film Director: Juan Carlos Piñeiro Escoriaza)

Friday, Sept 26th

MORNING

Time	Presentation
9:00 – 9:10 AM	Introduction
9:10 – 10:30 AM	Presentations in Second Life in real time (with voice)."
10:30 – 10:45 AM	Break
10:45 – end of morning**	Continuation of presentations in Second Life in real time (with voice)."*

* - (approximate total: 10) from experts all over the world - 20 min each - in real time in Second will be screened at the auditorium in Austin. We will have a camera director controlling the SL camera and a pivot in the room. Austin participants can ask questions - a Q+A follows each presentation.
Presentations titles, times and authors can be seen at http://www.slactions.org/slactions.php?s=ProgrammeSlactions (scroll down for Sept. 25th)

** End of morning session: at participants' will (since presenters are at different time zones : Isra Hong Kong…). We do start the afternoon session with on site speakers at 2PM local time

AFTERNOON

2:00PM – 5:00PM	Workshop: "Explorations with machinima and augmented reality in Second Life' Facilitator: Ana Boa-Ventura

Workshop will include:

- 90 minutes of a directed tutorial on machinima.
- Exploratory / creative (applied) work in Second life by the participants
- Creating a local community, interested in pursuing work in this area :
  - decide there and then on social network platform to use
  - we brainstorm on ways to connect with other pertinent local communities (SXSW. AMODA, and film communities, among others).

LIST OF PRESENTATIONS & SPEAKERS in AUSTIN

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Craig Becker

The IBM SL Grid
Thursday 9/24 2:00 – 2:30

IBM SL Grid is, to this day and by far, the largest and most prominent experience in running a corporate event in SL behind corporate firewalls.
Craig Becker spent several months working with Linden Lab to implement sixteen regions in Second Life behind IBM's corporate firewall. The purpose was to create a location for participa IBM's first conference in the virtual world. Attendees would still have access to IBM and other islands within the public Second Life environment. Becker, who is a Global Architect and 3D Internet specialist, along with and a team of volunteer designers and builders, built the facilities include a reception plaza, three theaters, a support library, and green data center.

Bio:
Craig Becker is a Master Inventor at the IBM Austin Lab, Software Group Emerging Internet Technologies. He is a Global Architect and 3D Internet specialist at IBM Corp

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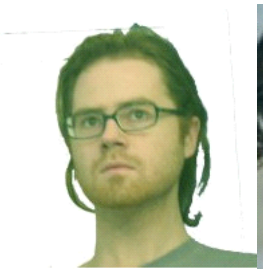
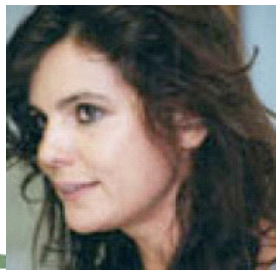
Mark Skwarek & Ana Boa-Ventura

Virtual environments - new possibilities at the peta-scale for Digital Arts: a conversation
Thursday 9/24 2:45 – 3:15

Ana and Mark have never met in person but they have interacted often. In one instance Mark v frenetically typing, sitting on the floor of a museum in Hong Kong, responding to a request for i by Ana. Their communication is emblematic of what collaboration across disciplines, practices, countries, and time zones is today. In a very informal setting, both will discuss possibilities (an hindrances?) of supercomputing in the digital arts. The chat will focus around Children of Arca work by Mark Skwarek, Joseph Hocking, Arthur Peters, and Damon Baker that Ana unequivoc considers 'groundbreaking' when re-thinking digital arts at the peta-scale. Come hear (and see why…

Bios:
Mark Skwarek is a new media artist working with 3-D graphics and video game technology to create non-goal oriented experiential works. Mark's current body of work tries to give context t societies present condition in the U.S. by drawing from related social and political issues in rea time. Mark has recently shown in CyberArts 09, the Sunshine International Art Museum in Beij

Beijing and the Krannert Art Museum at the University of Illinois. Mark is also an adjunct profes at NYU Polytech University and City Tech University CUN.

Ana Boa-Ventura is a digital humanities researcher and a HASTAC scholar working in social media mining. Ana came to the US to pursue a PhD at UT Austin on a Fulbright scholarship. S was an early adopter of SL (born in 2004...). In digital humanities, she is intrigued by the poter of peta-scale computing in digital arts today. She has managed and collaborated in several international programs involving IT in Brazil, Canada, Mexico, Portugal, Spain, US, and Venez and is intrigued by the impact of social media in intercultural communication in online commun

****

Jeremiah Spence

Hacking Opensim: A walk through Austin, Texas - sim'd
Thursday 9/24 3:30 – 4:00

Demonstration of the VWRC SIM creating a 3d version downtown Austin within a virtual world environment. This is a proof-of-concept to push the limits of open sim virtual world to integrate satellite orthophotography, LIDAR ground radar data, and streaming real-time information geo-coded to represent “real-world” information within the virtual world equivalent.

Bio:
Jeremiah Spence is the founder and editor of the peer-reviewed, online, academic publicatior Journal of Virtual Worlds Research, and has given presentations related to virtual worlds resea in Brazil, Israel, Europe, the United States and Canada. Jeremiah is pursuing his doctorate at Austin with specific research activities on the themes of Information and Communication Technologies (ICTs) and virtual worlds research.

Mary Pietrowicz & Robert E. McGrath

Demo of mWorlds - Novel Human Interaction with Virtual Worlds
Thursday 9/24 – 4:15 – 4:30

Virtual worlds, such as Second Life, show some of the rich possibilities afforded by networked virtual worlds. However, current environments are very limited in the kind and degree of user interactions available: they are usually restricted to keyboard and mouse interfaces. Using our system [...] a highly

trained, professional violinist (or other instrumentalist) is able to interact, navigate project herself into a shared, virtual environment using her performative gestures, the resultant audio signals, alone.

[from: Guy Garnett, Robert E. McGrath, Mary Pietrowicz, "mWorlds: novel human interaction with virtual worlds", Mardi Gras Conference 2009: Virtual Worlds: New Realms for Culture, Creativity, Commerce, Computation and Communication, February 19-21, 2009]

Caption: Performing using mWorlds. Piece “eDream and be merry” between the Krannert Center a NCSA during the official launching of eDream. From left: Ben Smith playing violin on Stage 5 at Krannert Center; John Toenjes, music director for dance at Illinois, on drums, and Mary Pietrowicz flute, performing at NCSA’s Advanced Visualization Laboratory.

Bios:

Robert E. McGrath has developed advanced distributed systems for more than twenty years. In his fifteen years at NCSA, he has collaborated in many projects a worked with many user communities, public (including NASA) and private. He currently provides expertise in advanced cyberinfrastructure for a variety of I-CHA projects. Dr. McGrath participates in the Cultural Computing thrust of the Institute Advanced Computing Applications and Technologies (IACAT) and the Cultural Computing Initative. Dr. McGrath co-authored the book Web Server Technology (Morgan Kauffman 1996). McGrath has a BA in Anthropology, an MS in Psycholo and a PhD in Computer Science.

Mary Pietrowicz is a research programmer at the Institute for Advanced Computi Applications and Technologies (IACAT) and the National Center for Supercomputi Applications (NCSA) at the University of Illinois. She also studies music compositi Her current research interests include exploring human-computer interaction, mac audition, and performance environments in the context of virtual worlds. Most rece she has been exploring the use of machine learning techniques for the recognitior physical and sound gestures, and event systems, for relating events and actions i real and virtual worlds.

Rio Grande do Sul, Brazil, chapter

Chairs:

Eliane Schlemmer
Suely Fragoso

Supporting team:

Daiana Trein
Éderson Locatelli
Rebeca Recuero

Blog post on September 25th, 2009:

http://gpedunisinos.wordpress.com/2009/09/25/slactions-na-unisinos-2/

SLACTIONS na UNISINOS

A UNISINOS foi ontem (24 de setembro) sede de um dos capítulos físicos do SLACTIONS 2009. Uma conferência internacional realizada online no metaverso Second

Life.

Hoje o evento continua pelo Second Life, participe!

São Paulo, Brazil, chapter

By Maria da Graça Moreira da Silva, Donizetti Louro, Monica Mandaji, Renata Aquino Ribeiro, & Renata Kelly da Silva

The local chapter of SLACTIONS 2009 in São Paulo was quite rich and agitated since it involved professors and students of the Catholic University of São Paulo, bringing together undergraduate and postgraduate courses in the areas of Computer Science, Education: Curriculum, Technologies of Intelligence and Digital Design. Therefore, the event encouraged all participants to study and research metaverse platforms with different approaches such as those of design, interaction, audio, immersion and education, emphasizing interdisciplinary themes. Listening to presenters from other countries enhanced the possibilities of dialogue and debate in several moments.

The local schedule (composed of presentations and a workshop) during the hours before the official opening of the event was also important for the involvement and the contextualization of the participants towards the theme and the introduction to Second Life for those who hadn`t seen it. It is important to point out that the event had the participation of professionals from various areas and companies both at PUC-SP and offsite, virtually in Second Life. In PUC-SP there were, besides participants at the scene, professors from other institutions who participated in the workshop as well as collaborated on the discussion about the possibilities of metaverse platforms for education. Among those, representatives of Colégio Bandeirantes, Fundação Padre Anchieta, SENAC, and schools and colleges of technology in the state of São Paulo. Slideshows portraying participants can be seen at http://webcurriculo.wordpress.com/

One of the features of SLACTIONS 2009 in São Paulo, therefore, was to unite different educational institutions toward a single goal which was to explore even more metaverse platforms for the benefit of education.

There were technical issues which prevented a better participation at the event, such as a delay in the presenters' audio, unstable connection due to a link surcharge and slowness in data transfer.

PUC-SP received a greater number of participants than those originally expected and registered online, about 100 participants entered the event onsite due to the interest of undergraduate students on the spot.

The conference as a whole presented themes with high academic quality and great relevance to emergent debates, both in the university environment and the corporate one. We have been receiving e-mails from interested parts even after the event, representing people and institutions interested in a better knowledge of Second Life activities.

Chapter Organization

Professora Dr.ª Maria da Graça Moreira da Silva
Professor Donizetti Louro

Local Workshop

Monica Mandaji (PhD student – Education: Curriculum PUC-SP)
Renata Aquino Ribeiro (PhD student – Education: Curriculum PUC-SP)
Renata Kelly da Silva (Master in Education: Curriculum PUC-SP)

Coordination of the Local Workshop:

Prof.ª Dr.ª Maria da Graça Moreira da Silva (professor at the department of Computer Science and Post-Graduate Program of Education: Curriculum PUC-SP)

Local speakers

Prof. Fábio Fernandes (professor at the Department of Computer Science at PUC-SP)
Jean Liberato (developer and owner of SL GURU)

Event opening

Prof. Donizetti Louro, (professor at the department of Computer Science at PUC-SP)
Prof.ª Dr.ª Maria da Graça Moreira da Silva, (professor of the department of Computer Science and Post-Graduate Program in Education: Curriculum at PUC-SP)
Professor Maurício Pontuschka (Head of the Department of Computer Science)
Professor Fernando Giorno (Vice-president of the Centre of Math Science and Technology)
Professor Luiz Carlos Campos (Director of the Centre of Math Science and Technology)

The local programme with events organized locally (in Portuguese):
http://webcurriculo.files.wordpress.com/2009/09/slactions_press_2309_2335.pdf

Portuguese chapter at Braga

Local chairs:

Nelson Zagalo, University of Minho
Leonel Morgado, University of Trás-os-Montes e Alto Douro
Benjamim Fonseca, University of Trás-os-Montes e Alto Douro
Hugo Paredes, University of Trás-os-Montes e Alto Douro
Paulo Martins, University of Trás-os-Montes e Alto Douro

Local organization:

Ana Oliveira, University of Minho
Andreas Vilela, University of Trás-os-Montes e Alto Douro
Marta Noronha, University of Minho
Nelson Ramos, University of Minho
Tiago Ribeiro, University of Trás-os-Montes e Alto Douro

Video broadcasting server:

William Jeniaux, University of Trás-os-Montes e Alto Douro, Portugal (Erasmus grant) & Haute École de la province de Liège, Belgium

Blog post, September 24th, 2009:

http://virtual-illusion.blogspot.com/2009/09/slactions-primeiro-dia.html

SLACTIONS, primeiro dia

Acabou o primeiro dia da conferência internacional SLACTIONS 2009 e posso dizer que correu muito bem. A abertura realizada pelo anfitrião no Babbage Amphiteatre, Andabata Mandelbrot, parecia tirada de um filme sobre as missões Apolo, em que vemos o posto de comando na Terra a comunicar com os viajantes do espaço, neste caso do ciberespaço, dando as as boas-vindas e esperando pelo feedback de todos.
Os quatro continentes estiveram ligados em simultaneamente das 15h00 às 21h00 horas portuguesas, de Hong-Kong a Berkeley, passando por Braga, Manchester, São Paulo, São Leopoldo e Tel Aviv. Os conferencistas puderam apresentar as suas comunicações com voz, slides e avatar em 15 minutos com direito a 5 minutos de perguntas. Para se poder ter uma melhor noção do dia de hoje aconselha-se uma visita ao blog do evento.
Amanhã teremos o segundo dia, para ver o programa vejam o site do evento.

Posted by Nelson Zagalo at 22:08

Manchester, UK chapter

Venue

Manchester Business School
The University of Manchester
Booth Street West
Manchester
M15 6PB, UNITED KINGDOM

Coordinators

Kathy Keeling
Kathy.keeling@manchester.ac.uk

Debbie Keeling
Debbie.keeling@mbs.ac.uk

Hong Kong chapter

By David Herold, Vincent Ng, Paul Penfold, Peter Duffy, Mei Li, Newman Lau, Gigi Ay, Bill Yu, & Jovi Liu

The SLACTIONS 2009 conference was a very mixed experience for us in Hong Kong. We were impressed with the venue and pleasantly surprised with the relative absence of technical problems in conducting such an international event in Second Life. The time difference and time tabling of the conference presented us with a great challenge, though. The international sessions of the conference took place between 10PM and 4AM local time, which meant that there was no outside interest in the conference, and even the presenters decided not to stay around for too long after their own presentations.

Locally, we used the occasion of the conference to launch our Second Life campus officially within the university. In an Opening Ceremony attended by a large number of university dignitaries and the press, the President of the Hong Kong Polytechnic University and the Vice President for Academic Development cut the ribbon for our campus both offline, as well as in Second Life. We organized a number of workshops and seminars locally, around the international conference and the Opening, which were well visited, and brought us a lot of attention and publicity.

Collaborators in Hong Kong:

Core SL Project team leaders:	David HEROLD, Vincent NG
Conference Coordinators:	Paul PENFOLD, Vincent NG
Core SL Project team:	Paul PENFOLD, Peter DUFFY, Mei LI, Newman LAU
Project/Conference Manager:	Gigi AY
Project/Conference Staff:	Bill YU, Jovi LIU

South China Morning Post
scmp.com

First virtual campus in Asia opens at PolyU

Liz Heron

Updated on Sep 26, 2009

Students can "fly" to live tutorials and field trips held in cyberspace on Asia's first virtual campus at Polytechnic University.

The virtual campus, which uses the latest generation of Second Life technology to create learning opportunities in live, interactive virtual reality, opened yesterday to all students and academics.

The HK$1.6 million virtual campus was launched by PolyU's president, Professor Timothy Tong Wai-cheung, at the opening of the world's first global research conference about Second Life applications, held at the university.

SLActions 2009 began in Hong Kong and is continuing non-stop for 48 hours at universities in the United States, Brazil, Portugal, Britain and Israel, with speakers timetabled in their local time zones.

Tong pressed a button on a remote control to "cut a ribbon" in an image of the virtual campus displayed on a projector screen, while other colleagues cut a real ribbon before conference participants to open the novel learning environment.

Vice-president Professor Suleyman Demokan said: "Today's youngsters really are digital natives. The traditional one-way teaching in the classroom no longer interests this generation of students. They are eager for more sensory inputs and expect to be engaged through multiple channels in their exposure to knowledge."

Initiatives such as Second Life could engage students in new and exciting ways, Demokan said.

"They can walk or fly around different localities, explore virtual cities, design virtual buildings, work as managers in a virtual hotel or as nurses in a virtual hospital," he said. "Students not only enjoy this kind of learning, but they can take charge of their study and work in an environment that mirrors their future work closely."

Tutorials, projects, work placements and field trips will be conducted from the virtual campus, which has already been used to teach more than 800 students in the departments of computing and applied social science, and the schools of design and hotel and tourism management.

The virtual campus has a central "island" modelled on PolyU's real-life, dense, red-brick campus in Hung Hom, but students can also fly to two other islands housing a virtual version of its teaching hotel, which is currently under construction, and four imaginary hotels.

Project director Dr David Herold said he taught four tutorials a week on the virtual campus to students taking urban studies courses, introduction to modern society and introduction to media.

He said other applications in the pipeline included paramedic training using a simulated accident scene, and nursing training involving robot avatars programmed to behave like psychiatric patients.

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Press Releases

PolyU opens Virtual Campus in Second Life — 2009-09-25

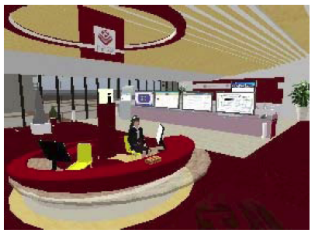
The virtual campus of The Hong Kong Polytechnic University (PolyU) in Second Life was opened today (25 September) by Professor Timothy W. Tong, PolyU President, and Professor Suleyman Demokan, PolyU Vice President (Academic Development).

Addressing the ceremony, Prof. Tong said, "PolyU is known for its innovation in teaching, research and applied learning. I am glad to know that we are the first educational institution in Asia with a virtual campus in Second Life. This digital platform readily provides both academics and students with exciting opportunities to enrich their teaching and learning experience."

PolyU has taken the lead in Hong Kong to develop an entire virtual campus in Second Life. The campus contains a range of facilities such as a library, a teaching hotel, an exhibition centre, a medical centre and other areas for educational use. A team of colleagues from the Departments of Applied Social Sciences, Computing, School of Hotel and Tourism Management, School of Design, Educational Development Centre and the Pao Yue-kong Library have worked together over the past two years to develop an extensive facility in Second Life. More than 10 subjects have been taught to over 800 students through virtual tutorials, lectures, field trips as well as virtual assignments and placements.

In addition, SLActions 2009, the world's first 48-hour non-stop research conference in Second Life, is being held from 24-26 September. The conference spans across different time zones around the globe, starting with Hong Kong, moving to California and Texas, US, south to Brazil, then across the Atlantic to Portugal and the UK, concluding in Israel. PolyU plays host to the Hong Kong Chapter of SLActions 2009. Synchronized with the conference, the University also hosts a series of local events such as workshops and seminars to encourage academics to make use of the virtual environment in their teaching and research.

SLActions 2009 is a unique and one-of-a-kind event, conducted both in the virtual world of Second Life and on-site in a number of countries throughout the world. Various themes will be explored at the conference, from educational research, gender studies, media distribution, virtual branding, advertising and fundraising, to emerging technology applications. As a hybrid online and physical conference, all paper presentations and plenary sessions by guest speakers will be held in the virtual world, and projected locally for participants attending physically. Participants can interact with the one another via a local avatar and microphone.



For more details and programme of SLActions 2009 Hong Kong Chapter, please refer to website at URL: http://coresl.edc.polyu.edu.hk/SLActions/HKChapter.html

*****

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Nelson Zagalo, Universidade do Minho, Portugal

Ana Boa-Ventura, University of Texas - Austin, USA

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Dor Abrahamson, University of California Berkeley, USA

Eliane Schlemmer Unisinos, Universidade do Vale do Rio dos Sinos, Brazil

Hanan Gazit, The MOFET Institute & MetaverSense Ltd., Israel

Kathleen Keeling, Manchester Business School, University of Manchester, UK

Donizetti Louro, Pontificia Universidade Católica de São Paulo, Brazil

Nelson Zagalo, Universidade do Minho, Portugal

Paul Penfold, Hong Kong Polytechnic University, Hong Kong

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