Comparison of two Virtual Worlds based on their pedagogical affordances and constraints as interactive learning environments

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ABSTRACT

Within the improvement and expansion of web technologies, there has been an evolvement in the way of interaction, communication and collaboration within the web. As the last Webvolution[1] wave, connecting "within" the web has resulted in, in fact derived from, the development of virtual environments. During the last decade, to provide co-presence and co-create features, especially many tree-dimensional (3D) virtual environments (VEs) have been created. Interaction through virtual reality (VR) technologies has appealed people's interests and connected them. These VEs has many different interaction features, intended audience and purpose to serve. The purpose of this paper is to analyze the features of two of these VEs, NuVera Online and Cloud Party and discuss their pedagogical affordances in the learning process to may support and improve the design of interactive learning environments.

Author Keywords

Virtual world (VW), virtual environment (VE), tree-dimensional(3D), constructivist paradigm, affordance, fidelity, presence, inscription, discourse, experiential, resource tools, interactive learning, identity and representation, avatar.

INTRODUCTION

According to Kapp and O'Driscoll, information has a social life all its own and travels from place to place based on individuals' desire to interact with it[2]. This statement correlates with Mark Zukerberg's, CEO of Facebook, suggesting that communication should not be viewed as a way for people to get information, instead information is a mechanism to foster better communication between people[2]. So, as people's connection to web has evolved from "to","through" and "within", information has begun a "social production", indicated by Yochai Benkler, as a result of sharing, participating and collaborating among people.

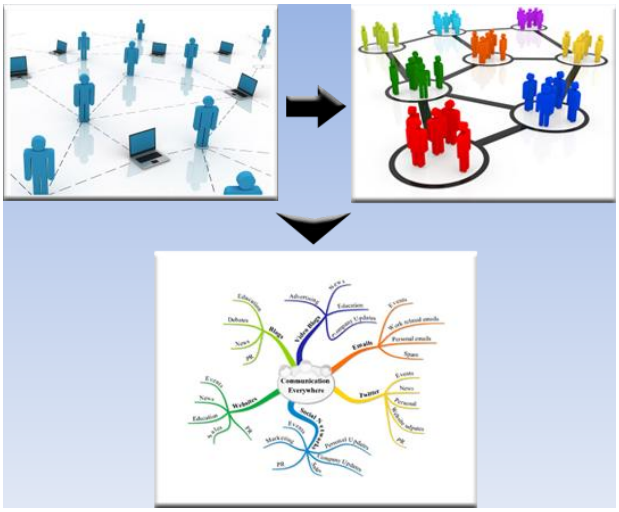

Figure 1 - Information Accessibility Transformation[3]

In parallel with the web evolvement, virtual world creation has advanced. According to a research conducted by KZERO (2008), from 2003-2008 approximately up to 100 virtual worlds has been released [4]. In addition to the number of VEs, the number of users registered to these VEs increased excessively. The research from KZERO states that at the end of 2011, there are 1,772m registered users.

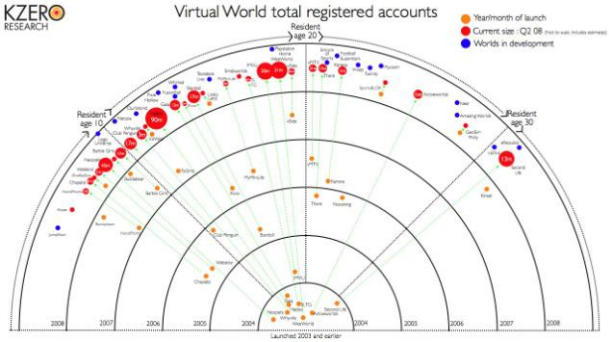

Figure 2 - Virtual Worlds Evolvement[4]

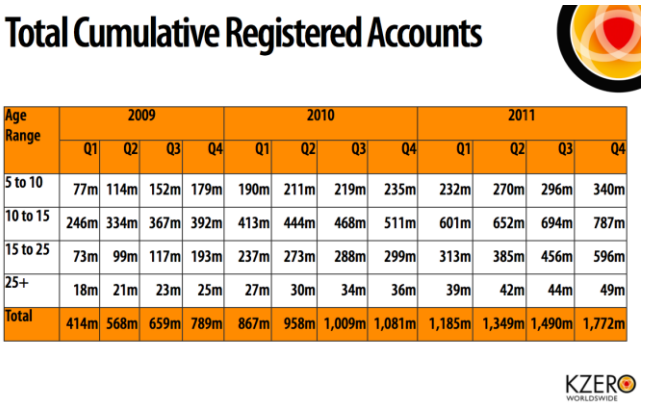

Figure 3 - Total Cumulative Registered Accounts to Virtual Worlds[4]

While characteristics of 3D environments emerge, delivery of this social production (information) is based on immediate networked virtual spaces, intuitive dynamic knowledge discovery, immersive 3D learning experience and interactive 3D social networking [6]. Throughout these baselines, VEs tries to ensure seven sensibilities for users.

- Sense of self via avatar
- Death of Distance via establishing same time, same virtual space
- Power of presence via embodied
- Sense of space via virtual space
- Power to co-create via display building
- Power to practice via exercises and activities
- Enrichment of experience via interaction immersion[7]

Because the VEs are aiming to simulate reality, people's daily life feelings should be provided by them. All of the seven sensibilities ensure that the user feels like that he/she belongs to there and really is a part of the system as in real life.

According to Dalgarno and Lee(2010), the representational fidelity and learner interaction result in construction of identity, sense of presence and co-presence and with these spatial knowledge representation, experiential learning, engagement, contextual learning and collaborative learning enabled[8].

While dealing with the senses of presence in VEs, some of the VEs have taken ensuring learning affordances as a goal. In fact, that these senses ease the way of learning process, it has turned all VEs into a possible interactive learning environments.

OVERVIEW

According to Dickey(2005), 3D VW applications typically most provide three main components: the illusion of 3D space, avatars that serve as the visual representation of users, and an interactive chat environment for users to communicate with one another[9]. There are many 3D VW applications including Second Life, There, Active Worlds, OpenSim, NuVera Online, Cloud Party.

Some of these VEs support constructivist perspective. In this method, knowledge is constructed, not transmitted, by establishing information contact with existing knowledge. So affording real-time communication, interaction with/collaborate in virtual environments and ability to externalize understanding are the key points in constructive paradigm implementation in VEs.

To asses VEs as educational assets with pedagogical affordances, constructivists VEs are eligible to discuss. So NuVera Online and Cloud Party 3D VEs have been chosen for comparison for this aim. This paper provides:

- An overview of **the interface** of the two applications,
- A review of **design affordances and constraints** of the types of tools necessary to support a contructivist learning perspective (i.e., inscription tools, experiential tools, discourse tools and resource tools),
- A conjectural analysis of the **educational implications** of each application,
- A **summary comparison of design features** of both applications.

NuVera Online[10]

NuVera Online is a 3D VW with motto "create, explore and socialize". With this statement we can conclude that this VE serves whatever we want from a constructive reality. It is operated by Nitrous Butterfly LLC. Because it is formerly developed by two people, the application mainly rely on user created content and user customizing housing. It can be considered as newbie as a VW because of that is no longer beta as of January 2012. Last decade's bright engine, Unity 3D, is used in the development. So, we can keep our expectations high for the future of NuVera Online.

Interface: NuVera Online runs as downloadable desktop application. When downloaded the application, if offers you two version as Client and Editor. In the editor version with a developer identity, you are able to create and modify the content.

Subscription method is used for additional website and 3D Client usage benefits. Even if you are not presence in the 3D, you are able to manage your account, avatar, purchases and events.

Its 3D client interface comprised of 3 main windows. The center and most visually prominent window is the 3D world itself. The upper window includes the main control interaction buttons with the environment. The last small-right corner window includes camera, subscription and area info quick buttons. There are some additional popup like windows according to the intention on clicking the main

control buttons. Like chat popup, friend list popup, avatar editing popup.

Figure 4- NuVera Online Interface Screenshot

Inscription Tools: NuVera Online enables construct and customize 3D VW in terms of furniture, atmosphere, skyboxes and media in your own place given at the beginning of login. Customized 3D objects and textures can be created at your private(or public) places via developer editor after subscription as developer. Pre defined object list is available. Moreover, modifications on these objects are enabled like scaling, rotating. When embedding one of the media options, it triggers an action to open the media. Interaction with objects based on right clicking and setting the actions. Some event triggered events can be created.

Figure 5- NuVera Online Inscription Tools Screenshot

Discourse Tools: In NuVera Online users has a unique identity. It helps establish both trust and accountability. Users can pick names and their names appears above his/her avatar's head. The communication within NuVera is limited to text-chat. Contact list and whispering to other users features exist.

Experiential Tools: The avatar appearance can be changed. In addition, private worlds can be made public. By this way user created content feature is enabled. Camera positions and perspectives can be set through controls. Every object in the environment has a pre-defined interaction functions. For example, it is not possible to pick up an object. There are some daily quizzes making terminals called "Trivia Terminal". These terminals asks user a set of questions and according to the number of correct answers, the user is given awards and some cash in the terms of environment currency called "NN". This feature increases the engagement learning benefit. If the user is not a subscribed member, then flying option is disabled, so navigation by walking is restricted. With camera option, user can take and save photos.

Resource Tools: Learning resources are embedded media items like YouTube page, streaming radio and web page. And of course, text based textures as information signs and billboards. Triggers may be placed to the environment to start the interactivity with media object.

Educational Implications: NuVera Online affords many of the pedagogical affordances for creating constructivist-based interactive learning environment. Moreover, "externalize understanding" throughout building objects is served. However, there are some constraints. Inscription tools allow building only in private worlds and creating custom objects is only for developer subscribed users. Experiential tools not so much allow for kinesthetic experiences. Moreover, physical properties of environments, like gravity, wind speed cannot be controlled. Communication being restricted to text based can stuck the users into language usage effectively. However, information sharing via media items can be used very effectively in learning processes. For example, a classroom simulation on text-based can be simulated very easily and effectively by this way.

Cloud Part[11]

Cloud Pary is a 3D VE running on Firefox and Chrome browsers. It is operated by Cloud Party, Inc. and has open beta since June 2012. It is designed primary as a Facebook game. It is similarly can be considered as newbie in VW market.

*Interface:*Cloud Party has three main parts on the interface. Most of them includes 3D world itself, small chat box on the left bottom and just a small icon on the right top to open menu control. There is an tutorial menu leading the user for the first run. These simple and easy to use interfaces relax the user and keep concentration high on the context. The main menu is like a screen of smart phone with applications like contacts, navigation, camera, activity and of course Facebook application. Sub menu windows are opening as popup windows on the left side of application screen like building and avatar customization.

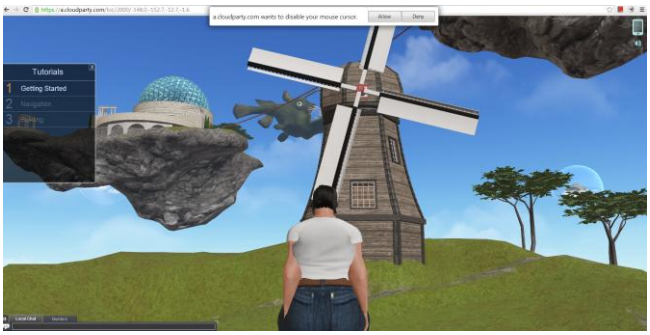

Figure 6- Cloud Party Interface Screenshot

Inscription Tools: Cloud Party enables creating uploading and modifying 3D objects. Building is enabled according to the world permissions similar to NuVera Online. The creation element list option is much more than NuVera Online. On the create model menu, user can create and design costume, texture, particle, script and sky too. This ensures the freedom of control and contextualization. Interactions with objects are predefined, like sitting, or can be triggered by scripts.

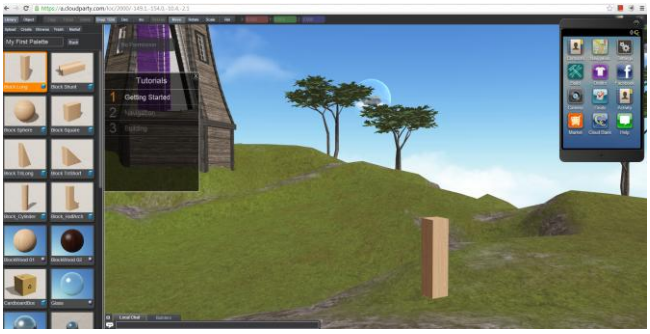

Figure 7 - Cloud Party Inscription Tools Screenshot

Discourse Tools: Communication within Cloud Party is text-based. There is a contact list. Users have the ability of changing avatar representations. Because worlds are centrally hosted, users have the availability of using unique identities with names appear over their head. Interaction with other users is via text-based chat.

Experiential Tools: Custom-made avatars are enabled and it enables to be recognized easily. For a navigation method, flying is free. Binding Facebook account let the user share content and increase socialization. As a physical interference, the user is capable of changing environment object occlusion, color shadows and soft particle presences.

Resource Tools: There is no embedded web browser. With texture based signs and billboards added scripts, teleporting kind of actions are enabled.

*Educational Implications:*As a difference from NuVera Online, free customized building option is an advantage in the learning process. Embedded Facebook integration increases immersion but, less media item usage constraints users in terms of interactivity.

SUMMARY COMPARISON

Inscription Tools: Building in both VW is enabled but in Cloud Party it is much more flexible. User created content is encouraged without need for subscription.

Discourse Tools: In both environment communication is text-based. Uniqueness of identity is ensured in both of them. This feature quicken the learning process.

Experiential Tools: Exploration and interaction methods with objects are similar in both universe. Physical intervention is much more on Cloud Party, and flying navigation eases the exploration process.

Resource Tools: Because embedded media item options are more than Cloud party, NuVera Online is much more suitable for a learning environment.

Educational Implications: NuVera Online and Cloud Party allow user to build, interact and collaborate, both of them has features of enabling constructivist learning.

VEs		Nuvera Online	Cloud Party
Inscription Tools	Library of objects	X	X
	Modeller	X	X
	Interactivity	X	X
Discourse Tools	Text-chat	X	X
	Audio-chat		
	Unique identities	X	X
	Contact lists	X	X
	Whisper	X	
	Telegrams		
Experiential Tools	Avatar library	X	X
	Custom-made avatars	X	X
	Movement through 3D	X	X
	Gravity	X	X
	Collision	X	X
	User specified gravity and collision		
	Object manipulation	X	X
Resources Tools	Integrated Web browser		
	Seamless integration of Web browser	X	

Table 1 - VE Comparison

DISCUSSION AND CONCLUSION

Strategy Analytics has a pay-for report looking at projected virtual world takeup over the next ten years. This study, titled "Market Forecasts for Virtual World Experiences," predicts that 22 percent of global broadband users will register for one or more virtual worlds over the next 10 years[12]. Over this fact, GameDaily(2008) claims that this will expand the virtual world market to one billion registrants, with roughly an eight billion dollar services opportunity[13]. When we think about these numbers, if VEs are able to provide some of the affordances mentioned above, it certainly will serve as an effective tool for pedagogical field.

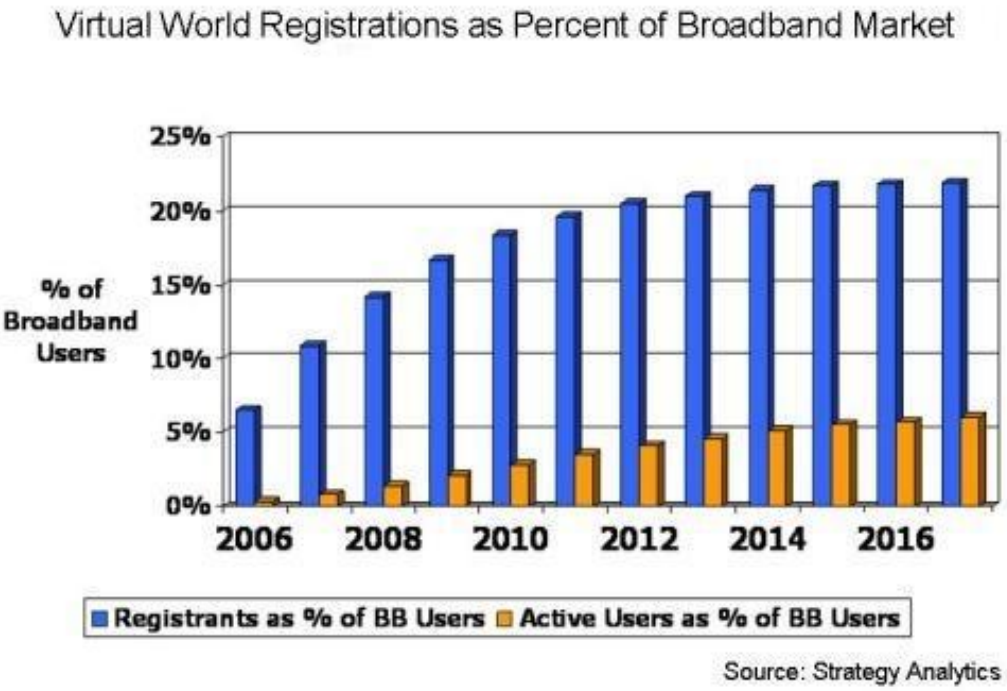

Figure 8- Virtual World Registration as Percentage of Broadband Market[12]

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