

Running head: CONSTRUCTING THE USER IMPACT OF DESIGN ON USER
REPRESENTATION

Constructing the User: The Impact of the Design of Three-dimensional Virtual Worlds on
User Representation

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Abstract

This past decade has ushered in an era of new forms of communities. Three-dimensional virtual worlds are among the latest offerings of networked communities for spatially distant users to meet and interact. Unlike chat, newsgroups, and discussion forums, three-dimensional virtual worlds provide multiple means of self-representation within a virtual environment. However, like all computer-mediated environments, the design to varying degrees constructs the user. This investigation presents an exploratory case study of how Active Worlds constructs the user in the virtual environment. This case study relied heavily on participatory observations and interactions with other users in Active Worlds. During iterative cycles of observation and interaction, the three categories of presence, representation, and embodiment emerged. The findings reveal that value is placed on the development and autonomy of individual communities, however, a little value is placed on the user as an individual. While more research is necessary to explore fully the potential of 3D virtual worlds for specific purposes, this initial investigation revealed that values embedded in the design of an application impact how a user is constructed in a 3D environment.

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This past decade has yielded a proliferation of new and emerging technologies. Some interesting contenders among the various new offerings are three-dimensional virtual worlds. Three-dimensional virtual worlds can be roughly described as desktop virtual reality with three important features: representations of 3D space, avatars that serve as visual representations of users, and an interactive chat environment for users to communicate with one another. Three-dimensional virtual worlds typically provide a rich 3D setting or "world" in which users move around in three-dimensional space and interact with other users through their virtual presence (avatars). Studies of text-based or chat virtual communities have provided compelling views of how technology influences the representation and social construction of users in a computer-mediated environment (Bruckman, 1997; Riner 1996; Turkle, 1995). Like text-based chat communities, 3D virtual worlds provide users with a sense of presence. Participants can engage in conversation, build, and interact within an environment. However, unlike text-based chat environments, virtual worlds afford users a visual representation of place, space, and self that provides users with a sense of immersion and embodiment in the environment. While virtual worlds do provide a sense of embodiment, it is important to note that this embodiment may be encoded with values and beliefs not readily apparent to users. Researcher into race, ethnicity, culture, and gender in virtual communities argues that virtual communities are embedded with values and hidden assumptions that promote the interests of some users, while marginalizing other users (Bailey, 1996; Balsamo, 1994;

Branwyn, 1994; Cherny, 1995; Dibbell, 1994; Milthorp, 1996; Morningstar and Farmer, 1994; Pryor and Scott, 1993; Stone, 1995; Todd 1996; Turkle 1995).

Purpose of Study

The purpose of this qualitative study is to examine how the design of one 3D virtual world application impacts the construction of the user and the culture of a computer-mediated environment. Specifically this investigation presents an exploratory case study (Yin, 1994) of how the affordances and constraints of the three-dimensional virtual world application, Active Worlds, serve to constructs the user.

Data Analysis

The following categories: presence, representation, and embodiment were developed over time through participatory observations (Adler and Adler, 1994) and informal interactions (Fontana and Frey, 1994) within ActiveWorlds. These categories were liberally derived based on Huberman and Miles' variable-oriented and pattern clarification strategies for identifying themes (1994). It should be noted that this investigation is exploratory in nature. The purpose of this investigation is to attempt to identify various design features and look at how they serve to construct the user. In order to make sense of the vast, complex, dynamic, and interrelated features of a virtual world, categories were identified during preliminary investigations. These categories are not comprehensive in nature, but rather are meant to serve as a means of analysis of how the design of a 3D virtual world constructs the user.

It is acknowledged that technology and tools do not construct a user per se. Identity and sense of self are the composite of complex social, personal, and physical dynamics and based in real world experiences. This analysis focuses on design features

that construct and constrain presence, representation, and embodiment. It is acknowledged that by nature, the design of 3D virtual worlds is not static, but rather interactive and dynamic. It is at times antithetical to the design to isolate some features or to view them out of context. Many elements overlap; they can and should be discussed from multiple perspectives. However, the purpose of this investigation is not to critique or isolate features, but rather to look at how they function within the context of the overall design. Again, it is important to restate that this analysis is by no means comprehensive, but rather meant to serve as a window into how various features and dynamics interact.

Categories: Presence, Representation, and Embodiedment.

Presence. Presence in everyday life has a twofold meaning. It may define the actual physical state of presence, or it may be used to refer to the impression one makes in their society. Both definitions to some degree are valid when discussing 3D virtual worlds. In the subsequent analysis of Active Worlds, the discussion of *presence* will include such features as issues of access (both hardware and software) as well as access in terms of language.

Representation. In a physical setting, when we refer to the term *representation* it usually is in terms of a referent or something standing in place for an antecedent. With 3D virtual worlds this is accomplished through several features. *Avatars* provide visual representation of a user. Issues of gender, culture, and ethnicity may or may not be expressed by means of this visual representation. Additionally, *identity* plays an important role in how the user is represented. These two features as well as *communication* and *construction* will be looked at in terms of how the design allows or

prevents representation as well as how various features function to serve or provide representation.

Embodiment. In many respects, it may seem incongruent to address issues of embodiment in a computer-generated environment. Usually when we refer to embodiment it is tied to the physical or experiential realm, however, there is some evidence (Jeffery & Marks, 1998) which indicates that users project some of the physical behaviors maintained in a physical setting into 3D simulated environments by way of their avatar.

In an article entitled “Constructing Social Spaces in Virtual Environments: A Study of Navigation and Interaction” (1998) researchers Phillip Jeffrey and Gloria Mark conducted a preliminary study into the similarities between behaviors displayed by users physical and virtual worlds. Their study focused on the “norm of social positioning” (personal space, group space, privacy, social navigation, crowding and territoriality) within OnLive and Active Worlds environments. Their investigation involved participatory observations. While social positioning are most likely contingent upon the cultural norms, there was evidence that users tend to replicate many of their real world behaviors of social positioning into the virtual world. Though this preliminary study by no means claims to determine precisely why this happens, there is evidence that might support users to at least some degree identify with their avatars.

Findings

Presence

Within Active Worlds, the user's presence is constructed by way of the hardware, software, level of "know-how," and language. Users must have access to a Pentium

computer, at least a 28.8 modem and have Internet access. In addition, the user must also possess the skills to be able to download an application and load it on a machine. This means the user must also have the language skills to read the instructions or have access to a translation. For the most part, accessing information requires the user to have competent reading skills or have access to some form of translation.

Users are to some degree constructed by affordances of language both in Active Worlds and by the access to information about using Active Worlds. Active Worlds is one of the few 3D virtual worlds to support multiple languages. It is interesting to note that although English is often observed in some of the more commonly populated areas it is by no means the only language used. In fact depending upon the time of day and location, English may not be the prominent language. In several worlds, English is rarely, if ever used. It is also important to note that while the browser supports several languages, most of the information contained in the integrated web browser pages is in English. Users still to some extent must have English language skills or have access to a translation. This may not be a problem for some users because Active Worlds has a large international population. However, users whose language skills are not sufficient in any of the dominant languages will be greatly disadvantaged.

Representation.

Within the 3D setting of Active Worlds, users are represented by a 3D avatar. Avatars serve as the visual representation of a user in the environment. Within an Active Worlds setting, there is little opportunity for creating custom avatars. With the exception of world owners, users are confined to using one of the prefabricated avatars provided in the various worlds. For visual representation, users must rely on avatars that may not

reflect their personal values, culture, ethnicity, or physical bodies. In addition, avatars are not transferable from world to world, so there is little opportunity for the user to construct a personal representation or a sense of identity based solely on appearances.

The type of visual representation the Active Worlds affords impacts the way a user is constructed in the 3D environment. Users are not typically identified by their visual representation, but through their unique identity. Within Active Worlds, each user has a self-selected unique identity that provides both privileges and accountability. Unique identities allow users to communicate through the chat tool and develop and maintain contact with other users through contact or buddy lists. A unique identity allows users to establish both reliability and consistency in both personal and social arenas. This is important for establishing a degree of trust among users.

Along with the privileges of a unique identity comes a degree of accountability. Within a system where users adopt alias identities, a unique identity prevents users from impersonating one another. These aspects provide for a degree of self-governance among users.

The accountability established by a unique identity can also impose inverse limits on well meaning users. Once a user is registered and other users add him/her to their contact list, any subsequent changes in their adopted alias will be reflected on the other users contact list. Initially this may not seem to impose limitations on how the users represents themselves; however, in an environment where users are free to re-construct themselves or develop alternate personae this can impose limits on self representation. For instance, one well known user, *UserJohnDoe*, with a fairly respectable reputation began logging on after midnight, discarding his usual moniker and adopting the name

NeedsSpanking. He was unaware that his name change was being reflected on all the contact lists of other users who had added him to their contact lists. While accountability has many advantages in establishing a sense of trust and reliability for users, it also imposes limits in areas not often expected.

Within the Active Worlds environment, great value is placed on communication because it is the primary means of establishing community. However, the design features that support community affords users a fair degree of self-governance. Identity privacy option allows users to designate individual levels of privacy and control over personal information. Users decide for themselves when and how much information is appropriate to disclose and to whom. Unique identities provide users with security and control over their online and real world identities. Privacy and identity also grants both individual users and communities a degree of personal and social autonomy. The addition of the *mute* command affords individual users a degree of social control and accountability without having to rely on world owners to maintain social order.

The type of skills and abilities requisite for communication also constructs the user. Text-base dialogue, like that typically found in chat applications, requires the use to be able to weed through multiple-threaded conversations. Bandwidth, distance between users, and typing skills often cause some messages to be delayed, so resulting conversations often overlap and move simultaneously in different directions. Additionally, the lack of visual, verbal, and nonverbal cues typically used to signal turn taking are not always easily replicated in synchronous text-based dialogue. However, unlike face-to-face communication, with a text-based chat, users often have the option of scrolling back and forth through the text of the dialogue.

Though multiply threaded conversations may initially be difficult to follow, most users soon develop skills and strategies for following various threads. In addition, unlike the custom of face-to-face interactions, in a text-based chat, it is possible to conduct multiple conversations simultaneously.

In the Active Worlds environment, users do not have the option to create a visual representation (avatar) of their own making, however, they can build and create homes, structures, and environments that are often reflective of their personal interests and culture. Within several of the Active Worlds public worlds, users display a great deal of personal expression. The ability to import images, animate, and designate interactive sensors to trigger actions provides users with a wide range of interactive tools to customize their constructs. Additionally, the ability to specify a web page to load in the integrated web browser allows more options as users are able to integrate text and web support to enhance their environment.

Building within an Active Worlds environment is accessible. Users need not have any background knowledge in 3D design and modeling, or knowledge in how to create and map textures for 3D objects. The building interface is straightforward and easy to master within minutes. Additionally, throughout the Active Worlds settings there are resources for not only learning how to build, but also for examining the types of objects and textures are available, animating textures, importing objects, and setting triggers and actions. The focus within the Active Worlds environment is on the building of a community by allowing users to create their own environment.

The relative ease of building also allows users to gain a sense of ownership within the worlds. Many users invest a great deal of time and energy in building, which is

apparent in the types of constructs they create. For some users, building is an emotional investment they make in the community. In the physical world we are often limited by income, and locale as to the type of house or structure we live in. Within the Active Worlds environment, users do not have the same real world limitations. Land is free, as are building supplies. Building in some sense becomes a type of representation not only in Active Worlds, but also a reflection of their real world interests as well a tool for their imagination.

Within the Active Worlds environment, great value placed on communication and community. Active Worlds is the most fully functional user extensible 3D virtual world available. The user extensible features allow users the opportunity to not only build and contribute, but also helps to establish a sense of ownership within the community.

Embodiment

There are limited affordances for physical embodiment in Active Worlds. Users have limited control over their avatars and have limited options for expressing much range of non-verbal communication. Other than through navigation and a few simple pre-programmed emotions and actions, users have no control over gestures. There are also limitations imposed by the viewer perspectives. While users can control the rotation of the camera (avatar) view along both the X and Y-axis, only rotation along the Y-axis is apparent to other users. Users are prevented from displaying much non-verbal communication and they must rely on text to convey emotions. This reliance on text might lead one to assume that the user is limited to text in constructing a sense of embodiment; however, the limited evidence provided by Jeffery and Mark's (1998) behavioral study indicates that the ability to command and control gestures and to move

body parts may not be as necessary for creating a sense of embodiment as one might assume. Embodiment in Active Worlds is limited to the realm of navigation and proximity. The ability to *see* other users and to move around them is in part sufficient to construct at least a limited sense of embodiment for users. However, depending upon the purpose for which Active Worlds is being used, it may be important to question how the limits of embodiment imposed on the user might limit the types of experiential knowledge that may be gleaned from these environments.

Discussion:

Active Worlds constructs the user as a social being, however, with notable limits on representation. While users are able to self-select their identity, they are limited in the way they are visually represented in the environment. Research of text-based virtual communities notes the importance of affordances for self representation in a virtual environment (Cherny, 1995; Dibbell, 1994; Morningstar and Farmer, 1994; Stone, 1995, Turkle 1995). While Active World users may self select, gender, race, age, and able-bodiedness are to varying degrees constrained. Users do not have the freedom to self select how their presence is represented.

In the Active Worlds application, value is placed on the user as a part of the community. Although users are constructed as part of a community, they also have a great deal of control over their privacy. If they choose not to speak, no one may know they are present. While Active Worlds does stress the importance of community, it does not require the allegiance to one central governing body, but rather encourages users to develop their own communities. Throughout the Active Worlds universe, both in the public-building worlds and in individually owned worlds, are examples of small

communities of users who have collaborated on creating and adapting an environment to reflect their own cultural and personal values and priorities. While Active Worlds is a medium for social interaction, the user to a small degree sets the limits and parameters.

While users have a degree of personal autonomy, limits of representation and embodiment constrain individual representation and personal control within those communities. Active Worlds is a medium for social interaction and value is situated in establishing individual communities, but at some cost to the user as a individual.

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