1. Technological Developments and Transitions in Virtual Worlds

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These days, there are a lot of places to go, people to see, and things to do online. Several million people all over the globe use personalized digital avatars to vicariously socialize, conduct business, attend school, pursue hobbies, and do just about anything else they like in Second Life, a virtual world located on a couple of thousand servers belonging to San Francisco firm Linden Lab (Hogge, 2006; Maney, 2007; Sipress, 2007). Several million more step into the breach as humans, gnomes, orcs, trolls, and a host of other species, girding themselves with everything from swords to magic wands in order to do battle with one another—and hordes of computer-controlled foes—in Azeroth, the fantasy-world setting of Blizzard Entertainment’s World of Warcraft (Levy, 2006; Hoeger, 2007; Woodman, 2007).

Although real life still remains the default plane of existence for most of us, the popularity of these and other online universes suggest that the physical sphere is no longer the only available venue for playing, fighting, and living in general. For some, this flesh-and-blood world may no longer even be their favored place of residence: Yee’s (2006a; 2006b) surveys of MMORPG (Massively Multiplayer Online Role-Playing Games) players from 2000 to 2003 found that 8 percent of respondents typically played for at least 40 hours a week, over 70 percent had on at least one occasion put in a ten-hour uninterrupted shift playing an MMORPG, and half considered themselves addicted to an MMORPG. In Castronova’s (2001) survey focusing on players of Everquest, a fantasy MMORPG with a fantasy theme like World of Warcraft, 22 percent of respondents indicated that they would spend all of their time in the game’s fictional world of Norrath if they were able to do so. Considering this fervent and widespread attachment to online worlds, along with increasing speculation that virtual environments may someday soon replace the World Wide Web as the primary means for seeking information,
socializing, and conducting business on the Internet (Kirkpatrick, 2007), it appears that living virtually is here to stay.

Things were not always this way, of course. But when did it all begin? At what point did the digital dual citizenship afforded by virtual worlds become an option? The remaining chapters in this volume will explore a number of personal, social, and societal dimensions of virtual worlds, MMORPGs, and the like, but first, this chapter takes a look back. To shed some light on the history and development of virtual worlds like Second Life and World of Warcraft, this chapter will briefly discuss an important family of forerunners to these 3-D online environments: text-based online games and environments. After briefly explicating some defining characteristics of today’s virtual worlds, this chapter will explore the inspiration and origins of earlier digital universes with a focus on the text-based predecessors to today’s graphical offerings. Finally, this chapter will compare the features, use, and experience of text-based online role-playing games with today’s 3-D virtual worlds—and what may lie ahead.

Online Colonization: The First “True” 3-D Virtual Worlds

So myriad are the origins and influences of virtual worlds that it is difficult to pin down a precise point in time when virtual worlds were born. Accounts vary, and identifying the point of nascent for virtual worlds is further complicated by some variation in acknowledgement of what features define a virtual world. Castronova (2001) identifies three criteria that define a virtual world, which he calls “interactivity,” “physicality,” and “persistence” (pp. 5–6), and conceptualizes these criteria thus: First, a virtual world must allow simultaneous interactivity with and between multiple users in remote locations, with the users’ actions impacting the environment and each other. For example, a console video game made to be played alone or with a friend in the same room does not constitute a virtual world, but an online game where players in multiple cities and countries can compete or cooperate simultaneously with each other might. Second, a virtual world’s interface must represent an on-screen environment that is “generally ruled by the natural laws of Earth and is characterized by scarcity of resources” (p. 6). Therefore, an online game without a graphical interface, or one that represents a player avatar’s physical movement in the game’s space inconsistently, or one where multiple players can possess the same item from an environment simultaneously, would not constitute a virtual world. Third, a virtual world must maintain its conditions persistently regardless of whether a player is connected or not. An online game that resets its environment to a consistent set of opening conditions whenever a player starts a new session is not a virtual world.

Other efforts to list the defining characteristics of virtual worlds are similar to Castronova’s (2001), though they may use different terms or subdivide one or more of Castronova’s three criteria (e.g., Book, 2006; Jakobsson, 2006). Although some maintain that a virtual world can use a text interface exclusively sans graphical representations (e.g., Barile, 2003), others concur that a 3-D graphical interface is a signifying feature of a true virtual world (e.g., Schroeder, Heather, & Lee, 1998; Castronova, 2001). Using these criteria, the first virtual world has typically been identified as Meridian 59, a fantasy game commercially released in 1996 (preceded by a 1995 early launch) by the 3DO Company (Castronova, 2001, 2002; Copier, 2005). Habitat, a 1985 Lucasfilm release, provided a similar environment to a virtual world, but its graphical interface was only two-dimensional (Robinett, 1994; Castronova, 2002). Despite its retrospective acknowledgment as the “first” virtual world, though, Meridian 59 did not have the commercial impact that some of its close followers did. While estimates place Meridian 59’s peak subscriber base at around 12,000, the 1997 Electronic Arts game Ultima Online would eventually surpass 200,000 subscribers and prove to be more commercially successful and influential among early virtual worlds (Castronova, 2001, 2002; Kent, 2003).

Precursors: Early Influences and Inspirations

While painstaking distinctions and classifications may allow us to determine why Meridian 59 can be recognized as the first virtual world while Habitat cannot, the true history of virtual worlds stretches back far beyond the advent of the first game to meet the “true” definition of a virtual world. Just as two-dimensional Habitat preceded Meridian 59 and subsequent virtual worlds, Habitat was preceded by technological and conceptual predecessors. Of course, the advent of graphic persistent worlds is closely tied to the thirty-plus year history of arcade, computer, and console video games and the evolution of their graphics, play control, and other technological features (for history of video and computer games, see Wolf, 2002; Lowood, 2006). Similarly, advances in both the technological and economic structure of the Internet have also engendered the development of virtual worlds. A more complete understanding of virtual worlds’ roots and inspirations, however, begins with a decidedly more low-tech source: novels.

Many acknowledge Neal Stephenson’s (1993) science fiction novel Snow Crash as the work that popularized the term “avatar” to describe one’s virtual self-representation in virtual reality, though the term may have already been in use online when the book was published (Bailenson & Blascovich, 2004). Snow Crash also describes a fictional “metaverse,” a virtual world that users can traverse via avatars whose quality depends on the users’ financial status and technological savvy. Another science fiction novel, William Gibson’s
(1984) *Neuromancer*, coined the term “cyberspace” in describing another imagined virtual world and is credited with far-ranging impact on virtual environments in fact and fiction (Kamioka, 1998; Holland, 1999; Bailenson et al., 2003, Schroeder, 2006; Pontin, 2007). These and other authors imagined online networks where users could extend themselves into amazingly vivid and interactive virtual worlds, but there is another author often cited as an inspiration for virtual worlds—one who never even mentioned computing or online network in his bestselling novels.

J. R. R. Tolkien’s (e.g., 1975, 2004a, 2004b) beloved oeuvre epic struggle in Middle Earth, a quasi-medieval universe filled with elves, dragons, wizards, men, dwarves, trolls, goblins, and his well-known and short-statured hobbits. *The Lord of the Rings*, Tolkien’s best-known work, has sold over 100 million copies in more than 50 languages since its original publication as a 1954–1955 three-volume series (Carpenter, 1977; Sanderson, 2002). Decades after his death in 1973, new published work by Tolkien still continues to be printed via his son’s editing of archived material, including a new bestselling tale published in 2007 (Bethune, 2007). Although popular, such fairy-tale subject matter would seem anything but relevant to the advent of virtual universes. The characters in Tolkien’s works use magic and maces instead of moderns, and even rudimentary mechanical technology is typically reserved for his more abhorrent imagined creatures (Carpenter, 1977)—but the Oxford professor and fantasy author may have had as great an influence on today’s virtual worlds as any cyberpunk novelist or Internet visionary (Castronova, 2002; Thompson, 2003; Johnson, 2005; Williams, 2006). Although he never lived to see the virtual worlds of today, a case can be made that a lot of their development stems from attempts to recreate the world of Tolkien’s novels—offline and online.

Tolkien’s impact on virtual worlds is an indirect one. Although the author was not always glowing with regard to the massive U.S. fan base his work garnered in the 1960s—he famously referred to them as his “deplorable cultus” (Mooney, 2001, p. 38)—the scope of his influence on the fantasy genre transcended the book medium. Tolkien referred to the literary universe created by a storytellers as “a secondary world which your mind can enter” (Rogers, 1999, p. 139), and his work would soon inspire efforts to provide more ways to interact with imagined worlds. The seminal *Dungeons and Dragons* (*D&D*) fantasy role-playing game guides, first published in 1974, include a set of rules, descriptions, and the like outlining how a group of players could congregate and act out adventure scenarios using a combination of role-play and die rolls to determine outcomes (Apperley, 2006). Although the game guide did not explicitly acknowledge Tolkien’s work as an influence, the characters, settings, and themes of *D&D* are widely perceived as reminiscent of Tolkien’s universe (Castronova, 2002; Turnau, 2004). Thus, what is widely recognized as the first step from Tolkien’s

literary “secondary world” to “virtual worlds” was arguably taken on paper via the *D&D* guides.

**Worlds of Wordcraft: MUDs and Other Text-Based Online Role-Playing Games**

By the time *D&D* was published, Internet technology had advanced enough to allow networked text interaction between remote users (Woolley, 1994). In 1977, the text-based computer game *Zork* allowed players to interact with 211 “objects” in a 191-room universe via text commands (e.g., “GO NORTH,” “OPEN THE WINDOW”) that elicited text responses (e.g., “You are facing the north side of a white house.” “With great effort, you open the window enough to allow entry”) (Lebling, Blank, & Anderson, 1979). Given these computing advances, it was not long before the *D&D* fantasy game’s mix of creative role-play and calculations from die rolls was transferred online. Between 1978 and 1980 (accounts vary), Roy Trubshaw and Richard Bartle developed *MUD* (Multi-User Dungeon, later also called *MUD1*) to distinguish it from a sequel), which accomplished just that (Kelly & Rheingold, 1993; Rheingold, 1994; Bruckman & Resnick, 1995; Bartle, 1996; Castronova, 2002; Mortensen, 2006). Like *Zork*, *MUD* was a text-based interactive game where players experienced and interacted with their environment via typed commands and computer responses, but *MUD’s* innovative feature was that it allowed multiple users to interact with the world and each other simultaneously via the Internet—and pit their avatars against each other in battle using a server-based incarnation of *D&D*’s die-rolling system.

Despite its lack of graphics, which were readily available in commercial console and computer video games by 1977 (Lowood, 2006), *MUD’s* real-time online environment struck a chord. *MUD* spawned an eponymous genre of followers, as well as an entire taxonomy of variants. Some similar games were called “MUDs,” while others with a particular emphasis on narrative role-play aspects or other game dimensions became known by terms like “MUSH” (Multi-User Shared Hallucination) or “MOO” (MUD, Object-Oriented) (McKenna & Bargh, 2000). Despite such fine distinctions in nomenclature, though, all such text-based games are often referred to generally as MUDs (Turkle, 1994), and this chapter will do the same for the sake of simplicity. By the early 1990s, there were hundreds of MUDs online, nearly all of them player-managed and offered free of charge (Rheingold, 1993; Curtis & Nichols, 1994; Kelly & Turkle, 1994).

Compared to the virtual worlds of today, it may be difficult to imagine how text-based MUDs and their ilk would provide a vivid sense of environment, but scholars investigating MUDs have described them with terms like “social virtual realities” (Curtis & Nichols, 1994, p. 193) and “text-based networked virtual worlds” (Schiano, 1999, p. 127). Instead of
high-fidelity graphics, it is the richness of the players’ prose that gives a MUD environment its quasi-virtual lucidity. Players may interact with a MUD environment and other players in it with terse commands like “LOOK,” “NORTH,” “OUT,” “ATTACK,” and so forth, but on many MUDs, most of the users’ keystrokes are dedicated to detailed character descriptions and narrative “poses” that describe their characters’ actions in colorful detail (Jacobson, 1996; Turkle, 1994, 1999). For example, Mortensen (2006) provides an example of a possible MUD character description (shown on-screen when another user chooses to use a command to look at the character): “Spiky hair surrounds a round, moonlike face. Two black eyes and a ruby red mouth stand out against the milky pale skin. The short and chubby body is draped in silky, black material” (p. 403). Similarly, Jacobson (1996) shares a typical pose from a role-played wedding scene:

Victor says, “Irene, through space and time I have found you. In reality, I know you only from a long series of electronic impulses passed from place to place and converging here in this time and this place. In the reality that is my heart, however, I have found a soul-mate, a friend, and a love that is far beyond my ken to explain. I have asked myself: How can such emotions be formed and sustained through this somewhat impersonal medium of electron flow? My answer? I have none. I only know what my heart tells me; and that is that I love you. So, tonight, I stand here with you in front of all these friends, to pledge my undying [sic] love for you, forever.” (p. 472)

Some poses might be accompanied by a command. For example, a medieval-themed MUD might feature a detailed pose describing a character’s sword attack on another character, followed by an “attack” command. At this point, the MUD would use data about the characters and one or more simulated die rolls to determine outcomes, such as whether the attack is a hit or a miss and how much the recipient is injured. In turn, the recipient would pose a response consistent with the MUDs combat simulation results, perhaps in conjunction with a retaliatory command. In addition to sharing character actions through poses and commands, players may also provide poses describing the general atmosphere or scene, talk to each other “out-of-character,” or even build new rooms, objects, and areas in the MUD if their account has been granted permission. (For a detailed discussion of MUD commands and role-play text with examples, see Kelly & Rheingold, 1993; Turkle, 1995; Jacobson, 1996).

The net result of all users’ role-play contributions is something of a collaborative epic novel or play produced session by session, with each player contributing part of the story but not controlling the entire narrative. Given that MUDs allow users such an opportunity to participate in telling favorite stories and acting out a character in a favorite imaginary place, it come as no surprise that beloved fantasy and sci-fi novels and films often provide the backdrop for MUDs; settings from favorite sagas like The Chronicles of Narnia, Star Wars, Star Trek, and, of course, The Lord of the Rings abound in the MUD universe.

Do MUDs meet the aforementioned criteria of a virtual world? Not quite, by most standards. Like virtual worlds, MUDs are interactive by way of both their in-character and out-of-character poses and their command systems. Like virtual worlds, MUDs are persistently online as users come and go, and they are bound to some extent by physical laws governing possibilities and probabilities pertaining to travel, combat, and the like. Their text-only interfaces, however, prevent them from being classified as true virtual worlds in many current typologies (e.g., Schroeder, Heather, & Lee, 1998; Castronova, 2001; Book, 2006; Jakobsson, 2006). Like the two-dimensional Habitat online game (Robinett, 1994; Castronova, 2002), the MUD genre is therefore all too often relegated to footnote status as a predecessor in the virtual world saga, perhaps an example of what Winston (1998) might call a partial prototype akin to 1920s mechanical televisions and various other “not quite” advances.

The More Things Change: The Legacy of Text-Based Online Role-Playing Games Today

The high-quality graphics, massive environments, and millions-strong subscriber bases that typify virtual worlds like Second Life and World of Warcraft certainly oustrip the no-frills command MUD interfaces. If MUDs are an also-ran in the history of virtual worlds, though, then it stands to reason that they should have gone extinct in the decade or so since the arrival of virtual worlds (Castronova, 2001, 2002; Copier, 2005). Not so. While millions may do their vicarious socializing and swordsmanship in ritzier (and usually pricier) virtual worlds, a computer owner with an Internet connection is still only a free software download and a connection address away from narrative adventure in scores of MUDs available today. Web sites such as Mud Magic (http://www.mudmagic.com/), The Mud Connector (http://www.mudconnect.com/), and Top Mud Sites (http://www.mudconnect.com/) list scores of active MUDs of all types and provide them details, ratings, rankings, and connection information. Whether or not MUDs can be properly classified as virtual worlds per se, they still endure as a venue for virtual adventure.

Why do MUDs remain despite their seeming technological inferiority? Simple explanations such as price (typically, none) and loyalty come to mind, but there are also potential explanations in findings from empirical research on technological variables and the media experience. For example, a substantial body of research explores the antecedents and consequences of feelings of presence—the feeling of “being there” when using media
their fundamental principles will continue to include surprisingly consistent threads. An entry in the 2007 virtual world slate offers an apt indicator of this conceptual and thematic stability: the high-profile virtual world Lord of the Rings Online: Shadows of Angmar, released by Turbine (Chick, 2007). As this chapter has shown, it can be argued that Tolkien and similar authors played a heavy role in inspiring role-playing guides, MUDs, and virtual worlds to create ways to take users to their literary worlds. Now, you may be able to take your avatar to a nightclub, classroom, or virtual store in Second Life, but there are still well-populated corners of cyberspace where you can battle witches and trolls. The technology of virtual worlds may change, but it seems that at least some of the destinations our imaginations seek often remain the same. What new ways will we create to take us there (albeit virtually) next, and where else will we choose to go? It will be exciting to find out.

Note

1. Even the term "virtual worlds" is not universally accepted, though the phrase has gained some a degree of approval and adoption as a general term for a broad range of interactive, avatar-based online game and community environments (Malaby, 2006). Castronova (2001) also notes that "virtual world" presents a shorter phrase and acronym (VW) than alternative terms such as "massively multiplayer online role-playing game" (MMORPG), "massively multiplayer persistent universe," and "persistent online world."

References


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2. The Sociotechnical Infrastructures of Virtual Worlds

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Introduction

This chapter examines the evolution of virtual world infrastructures. Virtual worlds are immersive online environments in which people interact for non-goal-oriented entertainment purposes. More recently, virtual worlds are becoming arenas for formal and informal education, as well as for diverse commercial transactions. Virtual worlds have real consequences. They are now important sites for investigating attentional and financial resources.

Since the evolution of game play can signal important cultural changes in human communities, it can be useful to study how online worlds function. First, this chapter will provide a brief history of virtual worlds juxtaposed against the background of online game development. Then it will describe a new virtual world known as Second Life, which will serve as a case study for applying theories of infrastructure. For example, Second Life can be understood as an infrastructure that supports second-order large technical systems created by residents.

As a boundary object between the real world and the virtual world, Second Life's infrastructural code provides certain constraints and affordances that affect the experience of residents within its world and beyond. At the same time, this analysis reveals how user agency and contingency play an important role in shaping the infrastructure of Second Life. In addition, this agency and contingency can be described further in terms of the capital that is created within Second Life. Finally, the dual role of user/designers in virtual worlds offers important lessons for developing next-generation cyberinfrastructure.