History of the (Virtual) Worlds

By Steve Downey

ABSTRACT

Virtual worlds represent a small but dynamic sector of the computer technology field with global applications ranging from art and entertainment to online instructional delivery and educational research. Despite their worldwide acceptance and usage, few educators, researchers, or everyday gamers fully understand the history and evolution of virtual worlds – their genres, platforms, features, and affordances. Many of the innovations we readily recognize today (e.g., user creation of in-world objects in worlds like Second Life) began as grassroots efforts by gaming and computer enthusiasts who were long on passion but short on documentation. The end result is a twisted and often thorny history for a technology that now actively engages hundreds of millions of users worldwide and millions of users within education alone. This article synthesizes histories and definitions from virtual world developers, industry leaders, academic researchers, trade journals, and texts in order to form a coherent historical narrative of events that contributed to the evolution and shaping of the virtual worlds as we currently know and use them in education and society in general.

Keywords: virtual worlds, history, computer technology, evolution

INTRODUCTION

Virtual worlds represent a small but dynamic platform within the field of computer technology. A quick search of academic journals and respected Internet sources will demonstrate that there is a growing literature base addressing the application of virtual world environments for a variety of purposes, including educational research, the delivery of instructional courses and programs, community development, entertainment, and more. Within education, renowned institutions around the world have long been affiliated with virtual worlds (e.g., University of Essex, University of Illinois, and Carnegie Mellon University). In more recent years, Harvard University, Indiana University, and University of Wisconsin have led the way in educational research related to virtual worlds. However, for all of the growth and inroads virtual worlds have made into education and society at large, there are very few educators, researchers, and everyday gamers who understand how virtual worlds, their genres, platforms, features, and affordances have evolved over the decades to their current state. As virtual world pioneer, Richard Bartle, wrote on the 30th anniversary of the virtual world MUD (October 20, 2008), "Some old-timers know the history of MMOs and whence they came, but most of today's developers haven't a clue" (para. 5).

For demonstration purposes, the following is a short quiz; try it and see how you do. The answer key is at the end of this article.

1. In what year was the first virtual world created?
2. What was the first virtual world to enable its users to create in-world objects?
3. What is the connection between Luke Skywalker and virtual world avatars?
4. True/False: The word *dungeon* in the term *Multi-User Dungeon* is a reference to the Dungeons & Dragons game from which early virtual worlds drew inspiration.
5. Rank the popularity of the following virtual worlds from most to least popular, based upon total user accounts at the height of their popularity: Club Penguin, EverQuest, Habbo, Second Life, and World of Warcraft.

If you didn't get all five correct, don't feel bad. It's surprising how much virtual world literature cites conflicting dates, events, and definitions as being correct. For example, not everyone agrees which virtual world was created first – see the section on First Generation Worlds for the varying views. To better understand this area of technology and how its evolution has established and supported a variety of teaching, learning,

and socialization affordances taken for granted nowadays, this article synthesizes histories and definitions from virtual world developers, industry leaders, academic researchers, trade journals, and texts in order to form a coherent historical narrative of events that contributed to the shaping of the field as we currently know it.

PROBLEM BACKGROUND

Brought to the attention of mainstream education and society in the mid-2000s through commercial successes such as World of Warcraft and Second Life, virtual worlds represent one of the fastest growing segments of the gaming industry during the first decade of this century (Dafferner, Chan, & Valette, 2010; International Business Times, 2010). The history of virtual worlds, however, stretches back more than 35 years and was slow to develop during its first few decades. Similarly, literature from the early days is comparatively sparse and much of the documentation from this period in virtual world history (e.g., magazine articles, user manuals, software code) is slowly disappearing (Koster, 2009).

Only during the last 10 years, driven by the rise in popularity of computer games, has there been a rapid increase in publications related to virtual world environments. This recent literature, however, is largely fragmented and widely dispersed across a variety of disciplines – for example, computer science, education, sociology, anthropology, and communication, (Downey, 2012). Although this can be good in that it demonstrates an examination of the field from different perspectives, it also produces a significant challenge to people entering the field as they typically gain only a partial understanding of the domain and its history.

A lack of a coherent history is not the only problem stemming from the fragmented literature. To date, no common agreement exists for defining or even naming these virtual spaces (Bell, 2008; Downey, 2010; Schroeder, 2008). They are interchangeably called massively multiplayer online games (MMOGs), massively multiplayer online role playing games (MMORPGs), multi-user virtual environments (MUVEs), persistent worlds, synthetic worlds, virtual environments, and virtual worlds (Bartle, 2003; Bell, 2008; Combs, 2004; Damer, 2006; Doppke, Heimberger, & Wolf, 1998; Spence, 2008). In some cases, these labels reflect meaningful, albeit subtle, differences in the various types of environments. For example, MMORPGs and MUVEs are meaningfully different in their purposes, social rules, and so on; however, they are both large-scale, multi-person, virtual spaces. Recognizing both the commonality and nuance differences between these different environments, the umbrella term of *virtual worlds* is used in this article to broadly refer to all of these environments and their shared history.

Purpose, Target, and Scope

To address some of the challenges brought about by fragmented literature bases and an unstable lexicon, this article seeks to synthesize and clarify key definitions and historical information in order to aid others in extending their understanding of virtual worlds. In fulfilling this purpose, the content in this article revolves around two primary research questions: (a) what are the major milestones in virtual worlds history and (b) how have virtual worlds evolved from one generation to the next to reach the highly social and collaborative spaces we know today?

In reporting the major milestones of virtual worlds, the scope of this article is simply to identify what happened, when it happened, and how it affected later events in the evolution of virtual worlds. This article does not attempt to interpret these events through the lenses of different disciplines – for example, through anthropology: Boellstorff (2008), psychology: Turkle (2008), or others. It does, however, provide a linear timeline of the major events – many of which still influence the design, operation, and usage of virtual worlds today.

Given the summative nature of this article, the target audience for its contents is individuals who are new to virtual worlds. This article will aid them in gaining a chronological overview of the evolution of these worlds and a working definition of what currently constitutes a virtual world, from which they could continue their work within their own specialized disciplines and perspectives related to virtual worlds.

Methods

In completing this research, a historical research methodology was employed (Rowlinson, 2005; Johnson & Christensen, 2008). This approach utilizes four stages: (a) formulate problems to be addressed in the historical review, (b) collect

data and literature, (c) evaluate materials, and (d) synthesize data and report findings.

The formulating of problems for this review is straightforward. Virtual worlds have a fragmented history due to poor and disappearing documentation; they also have poorly defined terminology and are not well understood conceptually . To address these problems, materials were collected and analyzed with separate but related objectives in mind: (a) generate a formal working definition of what constitutes a virtual world and (b) delineate a timeline of major milestones in the evolution of virtual worlds.

For stage two, the collection of materials included both primary and secondary sources of information. Primary sources have direct involvement with the event being investigated, such as an original map or an interview with the person who experienced the event (Gall, Gall, & Borg, 2007; Rowlinson, 2005). In this article, these included information emanating directly from a world's developer, such as articles, blogs, presentations, and so on. Secondary sources are artifacts emanating from sources other than those having first-hand experience with the event. These sources include articles by academics and individuals not directly involved in the world's development (e.g., research journal articles), blogs of industry experts and academics (e.g., Terra Nova), news stories, game/world reviews, critiques, and others.

When evaluating materials, as was done in stage three, we considered Rowlinson's words: "Historians often use three heuristics in handling evidence to establish its authenticity or accuracy: corroborations, sourcing, and contextualization" (Rowlinson, 2005, p. 298). *Corroboration* involves cross-checking of statements, dates, and other information within a document (i.e., internal criticism) with other external sources and documents (Gall, Gall, & Borg, 2007; Johnson & Christensen, 2008). Sourcing relates to the authentication (or "external criticism") of documents and artifacts as a whole (Gall, Gall, & Borg, 2007; Johnson & Christensen, 2008). *Contextualization* is determining where and when an event took place. In this article, most of the evaluation work pertained to corroboration of developer claims (e.g., which virtual world came first). Contextualization was of lesser evaluative importance given the scope of this article; however, when possible, the author tried to acknowledge originating institutions where games/worlds were developed (e.g., Essex University for MUD1).

The final stage of data synthesis and reporting involved three major elements: selecting, organizing, and analyzing (Rowlinson, 2005). Selecting draws upon the evaluation process in stage three, above, to identify and select the most authentic and accurate information to include in the reporting (Johnson & Christensen, 2008). Organizing addresses how selected information is arranged to form a cohesive whole. Finally, analyzing relates to critiquing (and frequent re-evaluation) of findings as they related to one another to assess the overall accuracy and continuity of the information being reported.

Limitations

As with all studies, there are limitations associated with this research. In particular, three limitations affect the scope and potential quality of the findings presented in this article. First, only games/worlds that conformed to the formal definition presented in this article were selected in stage four for inclusion in the historical review. As a result, precursors and ancillary inspirations are omitted, for example, the original tabletop version of Dungeons & Dragons and novels such as Snow Crash (Stevenson, 1992). These exclusions were necessary to focus attention on the digital environments themselves, their traits, the terminology, and the conceptual heritage associated with these environments.

The second limitation is the lack of primary source documents and artifacts. Virtual worlds emerged as a grass-roots movement by enthusiasts, who often worked informally on a world in their free time. As a result, few of the early worlds were developed with any formal documentation and very little of that documentation still remains publicly accessible today. Similarly, virtual worlds of the current generation typically are developed by for-profit, corporations (e.g., Sony, Blizzard, Electronic Arts) and do not readily publicize many of the innovations associated with their worlds in order to retain a competitive advantage.

The final limitation is a product of the second. Due to the lack of primary source documents

and artifacts, information must be acquired from secondary sources (blogs, wikis, new reports, etc.) that may be biased, inaccurate, or purely personal opinion – even if they are statements from highly credible sources. Consequently, some findings may be omitted from the review because they couldn't be confirmed by additional sources.

VIRTUAL WORLDS THROUGH THE AGES: MAJOR MILESTONES

General agreement can be found in the literature that virtual worlds began during the 1970s (Bartle, 2004; Damer, 2008a; Kent, 2003; Koster, 2002; Mulligan, 2000); the exact date depends on whom you ask. The following narrative highlights prominent contributors to the three generations of virtual worlds and how their milestone contributions affected future worlds.

The three generations of virtual worlds defined in this article are based upon the changing nature and traits of worlds from one generation to the next (see Figure 1). First generation virtual worlds were primarily text-based, small in scale (250 users or less), and set in the realm of fantasy adventure (e.g., Dungeons & Dragons and Middle Earth). Second generation worlds witnessed the growing use of graphical worlds, larger scale systems (1,000 or more users), the introduction of social-oriented worlds, and the development of worlds in which users could create objects and shape their world in real time. Finally, the third (current) generation marks the age of massive systems (10,000+ simultaneous users), visually striking 3D worlds, and a growing array of genres and types of virtual worlds (e.g., MMOGs, MUVEs, MMOLEs; fantasy, science fiction, pseudo-reality) that target adults and children alike.

First Generation Virtual Worlds (1978 – 1984)

In reviewing numerous articles, dissertations, blogs, wikis, news stories, and other artifacts, no documentation was found that anyone intentionally set out to create the virtual world genre. This genre emerged through grass-root activities comprised of a series of one-step improvements, borrowed ideas, and ad hoc creations by computer enthusiasts who also were fantasy game hobbyists. Many of the early environments were just multiplayer versions of existing single player games. Given that many of these early worlds were developed either for fun and/or as personal challenges (Bartle, 2004), there is little documentation on these environments to ascertain which was truly the first virtual world. The literature points to multiple environments as being the "first" virtual world – Maze Wars (Damer, 2008a), MUD (Bartle, 2004, 2006; Kent, 2003; Ondrejka, 2008), Avatar (Call, 2010), and Habitat (Sharkey, 2009), among others. Each of these was innovative in its day and contributed to defining what we now think of as virtual worlds. As such, they all are discussed in the narrative that follows. However, MUD spawned a line of successors that can be traced to today's generation of virtual worlds (Bartle, 2006; Keegan, 2003; Mud Genealogy Project, 2005), thereby making it the digital equivalent of Ardi – the oldest known human fossil (Shreeve, 2009).

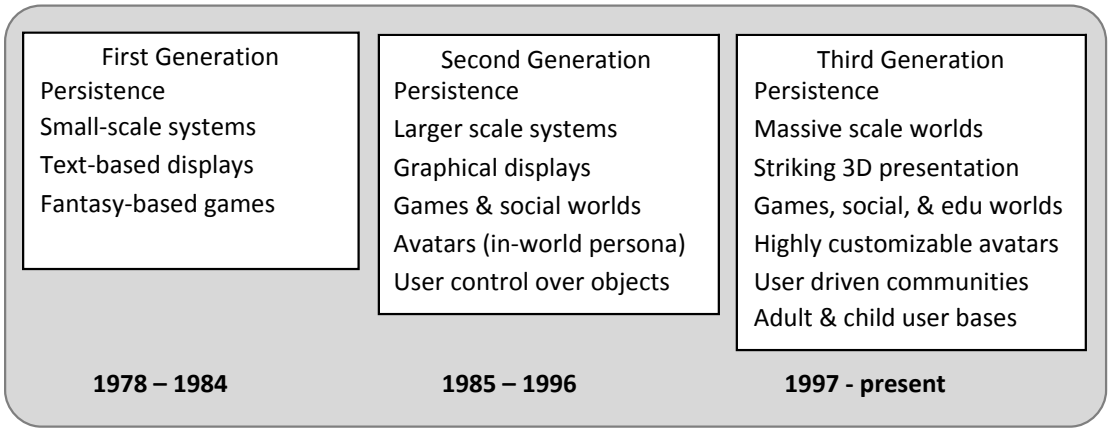

Figure 1. Generational Traits of Virtual Worlds. This figure presents a summary comparison of the prominent traits associated with each generation of virtual worlds.

Multi-User Dungeon or MUD was written by Roy Trubshaw in the fall of 1978 at the University of Essex (Bartle, 1990). Sometimes referred to as MUD1 to denote the first widespread release of the MUD system, MUD1 was actually the third iteration of the game that was started by Trubshaw and finished by Richard Bartle in 1979 (Bartle, 1990, 2004). Often mistakenly associated with the widely popular Dungeons & Dragons fantasy game, Bartle stated that the "D" in MUD does stand for "dungeon," but it does not relate to the game published by Gary Gygax and Dave Arneson in 1974 (Bartle, 2004). Trubshaw was inspired by ADVENT (aka Adventure, by Will Crowther and Don Woods) and ZORK (by Tim Anderson, Marc Blank, Bruce Daniels, and Dave Lebling at the Massachusetts Institute of Technology); he wanted to create a multiplayer version of those games (Bartle, 2004). The particular version of ZORK that Trubshaw played had been ported to Fortran and named "DUNGEN" [sic]. As a result, the acronym MUD (Multi-User Dungeon) readily presented itself and was adopted.

MUD1's contribution to virtual world history is nearly immeasurable. First and foremost, MUD1 demonstrated that users could share space, interact, and work toward a common goal, just as they had enthusiastically done in tabletop versions of games like Dungeons & Dragons. Numerous virtual worlds can trace their lineage back to MUD1 (Doppke, Heimberger, & Wolf, 1998; Keegan, 2003; Mud Genealogy Project, 2005). Examples of this can be seen in second generation worlds (described below), where MUD1 inspired TinyMUD, which lead to TinyMUCK, which lead to MOO, which lead to LambdaMOO, and so forth. As a result of this type of propagation, by 1992 there were more than 170 different multi-user games on Internet, using 19 different world-building languages (Rheingold, 1993). Witnessing this potential, computer programmers, university students, and hobbyists set about creating their own versions of a MUD, and the genre was born.

For the purpose of presenting both sides of the "*which virtual world was first*" argument, next is a quick note about Maze War (or Maze as it is sometimes known). Maze War was released in 1974 and was innovative in multiple ways; however, even though it supported multiple players (up to 8) it is not a virtual world – it lacks persistence among other elements. Conversely, it was one of, if not the first, networked first-person shooter games (DigiBarn, 2004). Also, its use of graphics gave the illusion of a 3D space, something not seen in virtual worlds until Avatar in 1979. Even though it is not a virtual world based upon the definition used in this article, Maze War is still noteworthy because it utilized instant messaging, non-player bots, and levels of play—all of which are features commonplace in virtual worlds today.

Avatar (developed by Bruce Maggs, Andrew Shapira, and David Sides at the University of Illinois) was released for the PLATO system in 1979. According to Bartle (2004) and Goldberg (1996), it was the first fully functional graphical world. It should be noted, however, unlike Habitat (see second generation, below) Avatar's graphics only utilized a small portion of the user's screen; static text and a chat interface consumed the remainder. Although Avatar was remarkable in several ways (e.g., it introduced the practice of "spawning" to repopulate monster/bots), it is the ease of player communication and use of group-oriented content that significantly advanced the practice of in-world collaboration. In doing so, it prompted other developers to create more in-world interactions and social elements in their worlds.

Second Generation Virtual Worlds (1985 - 1996)

A relatively quiet period in terms of commercial successes, the second generation was critical to the rapid growth witnessed during the current third generation. During the second generation developers learned valuable lessons about players' styles and tolerances, refined underlying technologies, and developed new business models for today's marketplace. Noteworthy worlds during this generation include Habitat, TinyMUD, TinyMuck, and Meridian59 – all of which are discussed next.

Habitat was a remarkable world developed by Randy Farmer and Chip Morningstar at LucasArts. Released in 1985, it marked the start of the second generation. It was the first world to employ the use of an avatar to establish a user's in-world presence (Morningstar & Farmer, 1991). Unlike first generation worlds, Habitat scaled well, supporting more than 20,000 users (Morningstar & Farmer, 1991). It also offered

more in-world player interaction activities than the hack-n-slash dungeons of the first generation. Given its highly interpersonal nature (Farmer, 2003), Habitat arguably served as the first social-oriented virtual world (Damer, 2008a).

In 1989, *TinyMUD*, developed by Jim Aspnes at Carnegie Mellon University, was released. TinyMUD was innovative in that it focused less on combat and more on user cooperation and social interaction (Stewart, 2000). Its social focus and the fact that TinyMUD ran on widely popular Unix systems propelled the growth of TinyMUD, and MUDs in general, around the world. TinyMUD also spurred a series of innovations that Second Life users would find commonplace. For example, TinyMUD allowed users to create objects from within the virtual world (Doppke, Heimberger, & Wolf, 1998).

After playing TinyMUD, Stephen White (University of Waterloo) wrote his own variation, *TinyMUCK* (released in 1990), which further extended the functionality of TinyMUD and eventually created "MOO" (Bartle, 2004). MOO (MUD Object Oriented) provided a robust scripting language that allowed users to create in-world objects for social-oriented virtual worlds. Paul Curtis came along shortly thereafter and created LambdaMOO (Curtis, 1997), which gained popularity in the press and education.

As a result of these innovations, two distinct genres of virtual worlds emerged: game-oriented worlds and social-oriented worlds. Virtual worlds were no longer combat-driven realms in which players sought to get the upper hand on their peers. Thanks to customizable and cooperation-supporting venues such as Habitat, TinyMUD and LamdaMOO, virtual worlds began employing cooperative models of play versus purely player vs. player model (Jones, 2003).

Meridian59 (released in 1996) marked the end of the second generation and the beginning of the third. It was designed for slower 14.400 modems, but it began incorporating play styles and 3D perspective graphics found in today's worlds. It also was the first commercial game to use the new business model of directly employing the Internet, versus a proprietary network like CompuServe or AOL, to provide player access (Kent 2003). This model would become a common business practice for the highly profitable worlds of the third generation.

Third Generation Virtual Worlds (1997 – present)

The third generation of virtual worlds experienced an explosion of user growth and the entry of virtual worlds into mainstream society. No longer developed on shoestring budgets, third generation worlds have seen budgets from a few million dollars (Ondrejka, 2008) to hundreds of millions of dollars (Morris, 2012). They capitalize upon, and in some cases push the limits of, the increasing computational and graphic-rendering power of today's home computers in order to produce rich, vibrant visual worlds that draw users into the game and feed their desire to explore and play.

As much as Meridian59 was a stepping stone toward this success, Ultima Online (UO) was the first to begin realizing the enormous potential of virtual world games. Released in 1997 by Origin System Inc. (Electronic Arts), UO was designed from the beginning to be a richer and deeper world in terms of content than previous MUDs and worlds. In a recent interview (Olivetti, 2010), Richard Garriott, creator of the Ultima lines of games, explained that UO was intentionally designed to be different:

> [A] vast majority of MMOs are about running around, killing monsters and collecting treasure. They're not about interacting with the physical world in detail. Ultima Online was about this. Things such as placing cups and plates and silverware on tables, and being able to pick up rings off the ground were important to me. (para. 8)

The end result was that UO brought about a firestorm of changes in virtual world design. For example, different playing styles were accommodated (e.g., casual vs. hard core gamer) and first- person graphical views were used instead of the normal overhead view.

EverQuest, released by Sony Online Entertainment in 1999, served as the de facto standard for graphical virtual worlds during the early 2000s. Within six months of its release, it overtook UO in total subscribers and maintained the leading market share in the United States until 2005 (Woodcock, 2008). In EverQuest, casual players no longer had to fight for their lives as they did in UO's player vs. player format. This made it even easier and more

enjoyable for newbies to join their friends online. Further, EverQuest was designed to encourage group play, prompting players to get their friends online and in-world. Witnessing the rapid success of both Ultima Online and EverQuest, more than 100 graphical virtual worlds were developed during 2000-2001 (Bartle, 2004). Each of them tried to capitalize upon the growing market defined by these worlds.

To date, the king of all virtual worlds (in terms of revenue generation) is Blizzard's World of Warcraft (WoW). Released on November 23, 2004, WoW sold 240,000 copies overnight – more than any other game in history (Van Autrijve, 2004). While at their heights, EverQuest and Ultima Online reached over 300,000 and 230,000 subscribed users, respectively (Bartle, 2004; Woodcock, 2008). WoW, in turn, reached more than 11 million subscribers around the world (Blizzard, 2008) and held more than a 50% market share among subscription-based MMOGs for more than four years (Woodcock, 2008).

Building on the lessons learned from Ultima Online and EverQuest before it, Blizzard designed World of Warcraft for multiple playing styles; then it went further. Blizzard designed content for multiple age groups, including pre-teens through retirees – market segments that previously received little attention. In addition, they made game play for each of these different age ranges and playing styles fun from the beginning. "World of Warcraft was one of the very first MMOs that you could hop right into and have fun – right away" writes Michael Zinke (2008, para. 6), lead contributor for Massively.com. He also to stated that, "In the original EverQuest, at launch, you spent long minutes waiting for your character's health to regenerate after every fight. Spellcasters had to meditate, essentially vulnerable to everything in the gameworld, for even longer minutes to get mana back" (para. 9). All of this downtime left the non-hardcore gamer bored and unengaged.

In addition, well-scripted scenarios also aided novice gamers in getting their avatars up and going. In doing so, players felt an immediate direction and purpose as well as experiencing early successes as they are learning to play. Open-ended end-game features and dungeons designed for both small and large groups also were contributing factors to its success. With open-ended end-game play, once your avatar reaches the highest level of experience within WoW, there are numerous options for continued play – achievements, guild building, player vs. player rankings, and so forth. In addition, small group and large group dungeons allow users to select content suited to their social preferences. Small group dungeons (5 or 10 person) are shorter in length and are easier to find willing participants to join the group. Large group dungeons (20 or 40 persons) are highly difficult and require a great deal of social organization and reliance upon others in order to successfully complete a dungeon. These features along with WoW's artistic presentation and articulate storylines have made World of Warcraft the leading example for how to design engaging, easy-to-play, content-rich worlds that are suitable for a variety of age ranges and playing styles.

Picking up where the MOOs of the second generation left off, Second Life differs from the previous milestone makers of Ultima Online, EverQuest, and World of Warcraft in that its content is user-created. Although it is not the largest social-oriented virtual world, Second Life (launched in 2003 by Linden Labs) is one of the most well known due to its popularity with the media and education.

Due to the ease of in-world object creation and a culture of sharing and collaboration (Luban, 2008), Second Life users have created a wide array of content from realistic replications of real-world buildings and towns to highly imaginative fantasies to scientifically based simulations. In addition, breaking established rules used by most virtual world games, Second Life not only allows but often encourages its users to sell and exchange items through forums and auction houses like eBay (Ondrejka, 2004). This approach has continued to feed the Second Life economy with more than $160 million in user-to-user transactions in the first quarter of 2010, a 30% increase of the previous year (Caoili, 2010). Given its open format for creating virtually anything a user wishes in-world, Second Life remains a highly popular venue for educators wishing to establish a virtual world presence for their institutions or who want to take their students on a virtual field trip to the ancient days of Rome or to role play the part of the characters in a literary epic.

THE DAWN OF A NEW AGE?

Recent changes in the virtual world field during the past five years have signaled the possible beginning of a new age. Changing trends in user profiles, business models, and the introduction of reality-augmented virtual world platforms (e.g., Activision/Blizzard's Skylanders and Disney's Infinity) may serve as precursors for new worlds and platforms yet to emerge.

The earliest of these signs was the emergence of the pre-teen demographic segment among virtual world players. *Habbo* is one of the oldest (launched in 2001 by Sulake Corp, Finland) and most successful of the worlds to target this rapidly emerging market segment. A pioneer in kid-oriented virtual worlds, Habbo boasts 15 million unique users from 150 different countries (Caoili, 2010). Habbo provides its users with furniture, pets, and other accessories to build their own spaces and customize their play; the rest users create. Lead designer, Sulka Haro states:

> One of the key things is that practically all the content on the servers is created by the players themselves, so it's not like we have to do that much to keep up with the times if you look at the content itself, because it's the players bringing the stuff in (Sheffield, 2009, para. 31).

Even more interesting is that Habbo, like many kid worlds, has a nearly 50/50 girl/boy demographic balance (Nutt, 2007); this is particularly noteworthy given that virtual worlds historically are male-dominated venues.

In addition to early forerunners like Habbo, the entrance of international conglomerate and teen/pre-teen media heavyweight, Disney, into the virtual world scene caused shockwaves when it spent $350 million to acquire the kid-oriented world, Club Penguin (Barnes, 2010). In addition Disney has spent millions more creating new worlds targeting teens/pre-teens, such as ToonTown, Pirates of the Caribbean, and Pixie Hollow. Although not massive commercial successes, these worlds marked Disney's commitment to expanding the presence of virtual worlds to the teen/pre-teen demographic. In January of 2013, Disney announced a new gaming platform, Infinity (released in August, 2013), that integrates real world toys with virtual world style environments (Ha, 2013). Within the Infinity platform, kids and parents alike are given the ability to create their own virtual world spaces and incorporate their favorite Disney movie characters into these spaces – effectively creating a "virtual toy box" to create and share with their friends (Gaudiosi, 2013). Together with the Skylanders platform (pioneered in 2011 by Activision), these new environments are blurring the lines between real worlds and virtual worlds.

In addition to creation of new virtual world platforms, a new business model "Free-to-Play" (F2P) has emerged in recent years. This new model was devised in direct competition to the subscription-based model used so successfully by WoW, UO, and EQ. The end result has been the erosion of subscription rates of established games as users opt for smaller but less expensive virtual worlds. As a case in point, WoW's subscriptions have fallen from a high of 12 million in 2010 (Holisky, 2012; Kain, 2013) to 7.7 million in 2013 (Kain, 2013).

It remains to be seen if a new age in virtual worlds has truly emerged; if the history of virtual worlds has taught us anything, it is that change is constant and inevitable.

SUMMARY

While the popularity of virtual worlds in education and society has risen rapidly in recent years, the history of virtual worlds, themselves, can be traced to more than 35 years ago. Unfortunately their ill-defined history has left many educators, researchers, and everyday users partially informed and often confused about terminology and the evolution of these worlds.

The historical review in this article should help researchers and practitioners better delineate and understand the field, its history, and its potential future. In doing so, participants in virtual worlds — whether active gamers, content developers, researchers, students, and/or teachers — can gain a greater understanding of the chronological history and conceptual heritage of virtual worlds. With a colorful and diverse heritage, the history of virtual worlds will continue to grow as new worlds emerge and new applications of these worlds are devised.

GLOSSARIES

Terminology Associated with Genres

Virtual World	Generic, overarching term used to describe online environments (text or graphical) in which users collaborate communicate for the purpose of gaming and/or socializing.
MMO	Massively Multiplayers Online. A generic term like virtual worlds used to describe a spectrum of worlds.
MMOG	Massively Multiplayers Online Game. A subset of MMOs specifically oriented towards gaming.
MMORPG	Massively Multiplayers Online Role Playing Game. A subset of MMOGs specifically oriented towards role playing games such as World of Warcraft.
MUVE	Multi-User Virtual Environment. A term promoted by Harvard researcher Chris Dede to designate virtual worlds that are social oriented versus gaming oriented.

Names and Descriptions of Influential Worlds

First Generation Worlds (1978-1984)

Avatar	Introduced the practice of "spawning" (e.g., re-populating a world with monsters/characters) and facilitated players' communications to be more collaborative.
Maze Wars	Multiplayer environment incorporating wireframe graphics, giving the illusion of a 3D maze in which players interacted.
MUD (aka MUD1)	Multi-User Dungeon, arguably the first virtual world; initiated by Roy Trubshaw and finished by Richard Bartle in 1979.

Second Generation Worlds (1985-1996)

Habitat	Technology Experience
Meridian59	First commercial game to directly employing the Internet versus proprietary networks like CompuServe or AOL.
MOO	MUD Object Oriented provided a robust scripting language that allowed users to create in-world objects for social-oriented worlds.
TinyMUCK	First world to allow users to create objects from within the virtual world.
TinyMUD	One of the first worlds to focus on social interactions versus gaming and combat; in doing so, it promoted a new genre of virtual worlds.

EverQuest	Designed to encourage group play, EverQuest stood at the de facto standard in virtual worlds prior to the arrival of World of Warcraft.
Habbo	The most popular virtual world, in terms of user accounts created, although it hasn't become the cash cow that World of Warcraft was.
Second Life	Highly popular world, especially in the education arena, due to its extremely diverse content and ability for users to create and collaborate together on projects, activities, and lessons.
Ultima Online	Ushered in the third generation of worlds by introducing a wide array of changes in virtual world design, including variable playing styles (e.g., casual vs. hard-core gamer) and new graphical views versus the traditional overhead view.
World of Warcraft	Due to its eye-catching graphics and numerous gaming innovations, World of Warcraft captured 50% market share among subscription-based MMOGs for more than four years, making it the most commercially successful virtual world to date.

ANSWER KEY FOR QUIZ

1. In 1978, Roy Trubshaw created MUD, Multi-User Dungeon. MUD inspired a series of subsequent worlds traceable to today's highly diverse array of social and gaming virtual worlds.
2. TinyMUD, created in 1989 by Jim Aspnes, enabled users to create in-world objects.
3. George Lucas. In 1977, Luke Skywalker hit the movie screens in the original Star Wars film by George Lucas. In 1985, LucasArts released Habitat, which was the first world to employ the use of an avatar to represent a user in-world.
4. False. The "dungeon" in MUD was a reference to a FORTRAN version of the game ZORK entitled "DUNGEN" and not a reference to the popular tabletop game Dungeons & Dragons.
5. According to market research by K-Zero (2013) and press releases from game manufacturers, at the height of their popularity Habbo was the most popular, followed by Club Penguin, World of Warcraft, Second Life, and EverQuest respectively.

Dr. Steve Downey is an Associate Professor in the Department of Curriculum, Leadership, and Technology at Valdosta State University (VSU).

REFERENCES

Barnes, B. (2010, May 12). Club Penguin misses goals, giving Disney a half-price deal. *The New York Times*. Retrieved from http://www.nytimes.com/2010/05/13/business/media/13penguin.html

Bartle, R. (1990, November 15). *Early MUD history.* Retrieved from http://www.mud.co.uk/richard/mudhist.htm

Bartle, R. (2003). *What are virtual worlds?* Retrieved from http://www.peachpit.com/articles/article.aspx?p=99703

Bartle, R. (2004). *Designing virtual worlds*. Berkeley, CA: New Riders.

Bartle, R. (2006). Plato. *(Ln(x))3 – The everyday blog of Richard Bartle*. Retrieved from http://www.youhaventlived.com/qblog/2006/QBlog010206A.html

Bartle, R. (2008, October 20). *(Ln(x))3 – Anecdote*. Retrieved from http://www.youhaventlived.com/qblog/2008/QBlog201008A.html

Bell, M. W. (2008). Toward a definition of "virtual worlds." *Journal of Virtual Worlds Research 1*(1). Retrieved from http://journals.tdl.org/jvwr/article/download/283/237

Blizzard (2008, December 23). World of Warcraft: Subscriber base reaches 11.5 million worldwide. [Press Release] Retrieved from http://us.blizzard.com/en-us/company/press/pressreleases.html?081121

Boellstorff, T. (2008). *Coming of age in Second Life: An anthropologist explores the virtually human*. Princeton, NJ: Princeton University Press.

Call, A. (2010). *A history of virtual worlds*. Retrieved from http://hst250.history.msu.edu/wiki-online/index.php/A_History_of_Virtual_Worlds

Caoili, E. (2010, April 29). *Second Life's user transactions hits record $57M in March*. Retrieved from http://www.gamasutra.com/view/news/28314/Second_Lifes_User_Transactions_Hits_Record_57M_In_March.php

Combs, N. (2004, June 7). *A virtual world by any other name?* Retrieved from: http://terranova.blogs.com/terra_nova/2004/06/a_virtual_world.html

Curtis, P. (1997). Not just a game: How LambdaMOO came to exist and what it did to get me back. In C. Haynes & J. R. Holmevik, (Eds.). *Highwired: On the design, use and theory of educational MOOs*. Ann Arbor, MI: University of Michigan Press.

Dafferner, A., Chan, J., & Valette, R. (March, 2010). *Social gaming: The fastest growing segment of the games market*. San Francisco, CA: GP Bullhound Ltd.

Damer, B. (2006, December 5). *The history of virtual worlds.* Retrieved from http://terranova.blogs.com/terra_nova/2006/12/the_history_of_.html

Damer, B. (2008a). *Virtual worlds timeline: The origins and evolution of social virtual worlds*. Retrieved from http://www.vwtimeline.com/

DigiBarn (2004). *DigiBarn's Maze War: 30 Year retrospective*. Retrieved from http://www.digibarn.com/history/04-VCF7-MazeWar/index.html

Doppke, J. C., Heimberger, D., & Wolf, A. L. (1998). Software process modeling and execution within virtual environments. *ACM Transactions on Software Engineering and Methodology, 7*(1), 1–40.

Downey, S. (2010). Virtual worlds—Taxonomy and demographics. In proceedings of *World Conference on e-Learning in Corporate, Government, Healthcare, and Higher Education 2010*, pp. 1676-1685. Chesapeake, VA: Association for Advancement of Computing in Education.

Downey, S. (2012). Virtual worlds – a taxonomy framework and working definition, *Journal of Educational Multimedia and Hypermedia 21*(1), 53-69.

Farmer, F. R. (2003). Social dimensions of Habitat's citizenry. Retrieved from http://www.crockford.com/ec/citizenry.html

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: An introduction* (8th Ed). Boston, MA: Pearson.

Gaudiosi, J. (2013, February 26). Disney exec John Lasseter goes to Infinity and beyond (Q&A). *Forbes*. Retrieved from http://www.forbes.com/sites/johngaudiosi/2013/02/26/disney-exec-john-lasseter-goes-to-infinity-and-beyond-qa/

Goldberg, M. (1996). The history of computer gaming – Part 5. Retrieved from http://classicgaming.gamespy.com/View.php?view=Articles.Detail&id=324

Ha, A. (2013, January 15). *Disney announces Infinity game Toy Box – with a range of characters and physical figurines – for console, mobile, and web.* Retrieved from http://techcrunch.com/2013/01/15/disney-infinity-launch/

Holisky, A. (2012, February 9). World of Warcraft subscriber numbers dip 100,000 to 10.2 million. *Wow Insider*. Retrieved from http://wow.joystiq.com/2012/02/09/world-of-warcraft-subscriber-numbers/

International Business Times (January 14, 2010). *Virtual worlds that make real cash for investors*. Retrieved from http://www.ibtimes.com/articles/20100114/virtual-worlds-make-real-cash-investors.htm

Johnson, R. B., & Christensen, L. B. (2008). *Educational research: Quantitative, qualitative, and mixed approaches*. Los Angeles: Sage.

Jones, G. (2003). *Massively Multiplayer online games: The past, the present, and the future – The pioneers: MUDs, MMORPGs, and Mayhem [week 2]*. Retrieved from http://archive.gamespy.com/amdmmog/week2/

Kain, E. (2013, July 26). World Of Warcraft sheds another 600,000 subscribers. *Forbes*. Retrieved from http://www.forbes.com/sites/erikkain/2013/07/26/world-of-warcraft-sheds-another-600000-subscribers/

Keegan, M. (2003). *A classification of MUDs*. Retrieved from http://mk.ucant.org/info/classification_muds.html

Kent, S. (2003). *Massively Multiplayer online games: The past, the present, and the future – Alternate reality: The history of massively multiplayer online games [week 1]*. Retrieved from http://archive.gamespy.com/amdmmog/week1/

Koster, R. (2002, February 20). *Online world timeline*. Retrieved from http://www.raphkoster.com/gaming/mudtimeline.shtml

Koster, R. (2009, January 5). *Losing MUD history.* Retrieved from http://www.raphkoster.com/2009/01/05/losing-mud-history/

KZero (September 12, 2009). *Growth forecasts for the virtual worlds sector.* Retrieved from http://www.kzero.co.uk/blog/?p=2845

Luban, P. (2008, December 24). *The megatrends of game design*. Retrieved from http://www.gamasutra.com/view/feature/3888/the_megatrends_of_game_design_.php

Morningstar, C., & Farmer, F. R. (1991). The lessons of Lucasfilm's Habitat. In M. Benedikt (Ed.). *Cyberspace: First Steps*. Cambridge, MA: MIT Press. Retrieved from http://www.fudco.com/chip/lessons.html

Morris, C. (2012, August 10). *Is the MMO dying?* Retrieved from http://games.yahoo.com/blogs/plugged-in/mmo-dying-223042438.html

Mud Genealogy Project (2005). *MUD family tree*. Retrieved from http://sourcery.dyndns.org/wiki.cgi?MudGenealogyProject

Mulligan, J. (2000). *History of online games*. Retrieved from http://tharsis-gate.org/articles/

imaginary/HISTOR~1.HTM

Nutt, C. (2007, September 6). AGDC: Haro on making Habbo a success. Retrieved from http://www.gamasutra.com/php-bin/news_index.php?story=15397

Olivetti, J. (May 18, 2010). *The Game archaeologist and the Ultima Prize: Richard Garriott*. Retrieved from http://www.massively.com/2010/05/18/the-game-archaeologist-and-the-ultima-prize-richard-garriott/

Ondrejka, C. (2004, September 23). Aviators, moguls, fashionistas and barons: Economics and ownership in Second Life. Retrieved from http://www.gamasutra.com/resource_guide/20040920/ondrejka_pfv.htm

Ondrejka, C. (2008). Education unleashed: Participatory culture, education, and innovation in Second Life. In K. Salen (Ed.). *The ecology of games: Connecting youth, games, and learning.* Cambridge, MA: The MIT Press.

Rheingold, H. (1993). *The virtual community homesteading on the electronic frontier.* Reading, MA: Addison-Wesley.

Rowlinson, M. (2005). Historical research methods. In R. A. Swanson & E. F. Holton III (Eds.). *Research in organizations: Foundations and methods of inquiry*. San Francisco: Berrett-Koehler.

Schroeder, R. (2008). Defining virtual worlds and virtual environments. *Journal of Virtual World Research 1*(1). Retrieved from http://journals.tdl.org/jvwr/article/view/294/248

Sharkey, S. (2009). *Creatures of Habitat: What modern day MMORPGs borrowed from Lucasfilm's ahead-of-its time adventure – and what they still could learn from it.* Retrieved from http://www.1up.com/do/feature?cId=3177225

Sheffield, B. (2009, July 27). *Habbo's Sulka Haro talks design, social dynamics*. Retrieved from http://www.gamasutra.com/php-bin/news_index.php?story=24185

Shreeve, J. (2009, October 1). Oldest skeleton of human ancestor found. *National Geographic News*. Retrieved from http://news.nationalgeographic.com/news/2009/10/091001-oldest-human-skeleton-ardi-missing-link-chimps-ardipithecus-ramidus.html

Spence, J. (2008). Demographics of virtual worlds. *Journal of Virtual Worlds Research, 1*(2). Retrieved from http://journals.tdl.org/jvwr/article/view/360/272

Stevenson, N. (1992). *Snow crash*. New York: Bantam Books.

Stewart, B. (2000). Summary MUD history. Retrieved from http://www.livinginternet.com/d/di_major.htm

Turkle, S. (2008). *The inner history of devices*. Cambridge, MA: MIT Press.

Van Autrijve (2004, December 1). *World of Warcraft is setting records*. Retrieved from http://pc.gamespy.com/pc/world-of-warcraft/569888p1.html

Woodcock, B. (2008). ION 2008 An analysis of MMOG subscription growth. Retrieved from http://www.mmogchart.com/ION%202008%20An%20Analysis%20of%20MMOG%20Subscription%20Growth.ppt

Zinke, M. (2008, March 28). *Special: Why World of Warcraft made it big*. Retrieved from http://www.gamasutra.com/php-bin/news_index.php?story=18038


ΠΡΑΓΜΑΤΕΙΑ
ΤΕΧΝΙΚΗ
ΣΥΣΤΑΣΕΙΣ