Changing Realities
User Creation, Communication, and Innovation in Digital Worlds[*]

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Abstract

By building upon advances in disparate technologies, digital worlds[1] enable easier and more powerful forms of creation and communication, allowing digital worlds to be more innovative places than the real world. The power to be more innovative makes it inevitable that digital worlds grow beyond their social and game roots. Furthermore, market and economic forces seen as detrimental by conventional massively multiplayer online role-playing games (MMORPGs) accelerate this transition. Ultimately, entertainment and economic incentives will integrate digital worlds into everyday life.

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[1] Digital worlds have also been referred to as online games, virtual worlds, The Metaverse, Cyberspace, Other Plane, and others. Specifically, digital worlds are places that use the real world as a metaphor; are created, evolved and owned by their residents; and, are for a mainstream audience rather than a techno-mage clubhouse.

Introduction[2]

The best way to predict the future is to invent it.
– Alan Kay

Digital worlds offer their residents the unique and powerful opportunity to create places. Whether the developers and publishers[3] wish this or not, it is the residents who truly mold the spaces in which they live. While it is true that digital worlds optimized for customization are able to more closely approach the ideal their residents are striving for, the design of even the most closed and themed worlds rarely survives first contact with their customers.[4] It is inevitable. Fortunately, this aspect can also be a great strength, so long as developers harness it rather than engaging in a long and ultimately futile battle against it. Residents will always take their worlds in unanticipated directions.[5] This is what places have always done throughout history. Just as real-world urban planners must accept change, digital world developers must as well.

Digital worlds will never again be simply games. Though many will desire a return to the age of innocence, digital worlds are engines of creation. Forms of communication and collaboration never before possible provide the freedom to experiment and lead to unprecedented rates of innovation. Digital worlds will move far beyond their role-playing game origins, expanding possibilities for both games and other uses, just as information technology has evolved from a tool applied to specific tasks to a ubiquitous part of business, communication, and play.[6]

Four Technologies

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[2] The themes for this article were first developed as a keynote address for the Accelerating Change 2004 conference.

[3] For the rest of this article, "developer" will be used as short hand to include world developers, publishers, and operators. To be technically correct, "developers" generally refers to those who designed and coded the original product, "publishers" market and sell it, and "operators" provide ongoing support and fixes to it once the world is launched. Corporations often fulfill more than one of these roles.

[4] Designs suffer from technical, gameplay, and economic flaws that often aren't discovered until the world goes live and that are compounded by out-of-band communication between players. See details of Star Wars: Galaxies launch problems http://www.pcgameworld.com/article.php/id/120/, City of Heroes nerfing discussions http://cohvault.ign.com/View.php?view=Editorials.Detail&id=9, and online guides http://www.gameguidesonline.com/guides/lineage2/lineage_2_adena_exploit_guide.asp

[5] Grimmelmann, James, "On the Second Life Tax Revolt," available online http://research.yale.edu/lawmeme/modules.php?name=News&file=article&sid=1222, December 21, 2003.

[6] Carr, Nicholas G., "Why IT Doesn't Matter Anymore," available online http://hbswk.hbs.edu/pubitem.jhtml?id=3520&t=technology, June 9, 2003.

We are more ready to try the untried when what we do is inconsequential. Hence the fact that many inventions had their birth as toys.
– Eric Hoffer

Four important technological advances form the foundation of digital worlds. These technologies are: massively multiplayer online gaming, the web, virtual reality, and decentralized avatar worlds. Together, these technologies demonstrate residents can make significant time and economic commitments to online spaces. They prove communities can build large and complex digital creations and demonstrate the power of shared spaces for creation. Finally, they demonstrate that digital worlds can take forms other than Dungeons and Dragons based role-playing games. While the histories of all four technologies have been well documented elsewhere, a brief review of each explains these critical ideas and insights.

Technology Number One: Massively Multiplayer Online Gaming

MUD1 launched in 1979 and created the first online world for people to explore together. Inspired by Dungeons and Dragons, *MUD1* established the role-playing norms online games have followed ever since.[7] *MUD1* spawned countless text-based online worlds[8] and defined online games for a generation of developers.[9] These developers added graphics to their worlds, beginning with *Meridian 59* in 1996.[10] *Meridian 59* was followed by two hugely successful games, *Ultima Online* and *EverQuest*. The MMORPG genre was born.[11] Driven by gameplay, social, and economic factors, millions of players moved into MMORPGs.[12]

True to their *MUD1* roots, MMORPGs retain many of the early features, including leveling, strongly themed worlds, social organizations, and player behaviors.[13] They proved large numbers of people will spend tremendous amounts of their lives in online worlds, and those people will extend and change their environment.[14]

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[7] Bartle, Richard, "Early MUD History," available online http://www.ludd.luth.se/mud/aber/mud-history.html, November 15, 1990.
[8] Keegan, Martin, "A Classification of MUDs," available online http://www.brandeis.edu/pubs/jove/HTML/v2/keegan.html, 1997.
[9] Koster, Raph, "Online World Timeline," available online http://www.legendmud.org/raph/gaming/mudtimeline.html, February 20, 2002.
[10] Ibid.
[11] Ibid.
[12] Nick Yee's Daedalus Project and Daedalus Gateway provides a wealth of data on player types and motivations http://www.nickyee.com/daedalus/gateway_intro.html.
[13] Bartle, Richard, "Paradigm propagation," available online http://terranova.blogs.com/terra_nova/2004/07/paradigm_propag.html, July 15, 2004.
[14] Ibid. See also Bartle's discussions of player types http://www.brandeis.edu/pubs/jove/HTML/v1/bartle.html and Castronova infra note 15.

MMORPGs also established that strong secondary markets exist for the value created within these worlds, including virtual currencies, items and characters.[15] Recently, the global market for virtual game items was estimated at $880 million.[16] This market exists despite attempts by game developers to block it[17] via end-user licensing agreements (EULAs) that unequivocally prohibit transfers and sales.[18] Yet players, driven by a combination of time pressure, a desire to play with higher-level friends, and a need to conspicuously consume, provide a demand for these items.[19]

The strength of the digital item market demonstrates that people can become comfortable with the concept of wealth tied to intangible goods. It also raises the contentious question of ownership, which has been debated repeatedly.[20] Currently, MMORPGs generally do not allow ownership of digital property, because this provides another legal tool for blocking secondary markets.[21] This will have the effect of limiting the ultimate growth of the secondary markets, as property without ownership is not fungible.[22]

MMORPGs established the idea of virtual spaces worth living in and the economic power of digital goods, but game operators continue to work against these markets and fail to capitalize on their potential. Leaving aside the debates regarding merits of wealth generation and ownership, the market for digital goods is indisputably large and growing, and drives commoditization within these worlds. For MMORPGs, commoditization is problematic. Although some games are exploring alternate economic models,[23] MMORPGs generally have not integrated real-world digital item markets.

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[15] Castronova, Edward, "Virtual Worlds: A First-Hand Account of Market and Society on the Cyberian Frontier," available online http://papers.ssrn.com/sol3/papers.cfm?abstract_id=294828, December, 2001.
[16] Castronova, Edward, "Secondary markets: $880 million," available online http://terranova.blogs.com/terra_nova/2004/10/secondary_marke.html, October 30, 2004.
[17] Sony/Verant got this rolling in 2001 by banning eBay sales of EverQuest items http://www.avault.com/news/displaynews.asp?story=1192001-94048. Recently Blizzard announced a similar policy for Worlds of Warcraft, see infra note 21.
[18] "Terms of Use for Star Wars Galaxies: An Empire Divided," available online http://starwarsgalaxies.station.sony.com/content.jsp?page=Policies%20EULA, October 28, 2004.
[19] The largest of these is likely IGE http://www.ige.com, although the Google query "mmorpg sales" turns up an impressive list of both search results and sponsored links.
[20] Terra Nova http://terranova.blogs.com/terra_nova has numerous posts on this topic, including "Who Owns My Lightsaber" http://terranova.blogs.com/terra_nova/2003/10/who_owns_my_lig.html. See also Bartle, infra note 77 and Lastowka, infra note 79.
[21] Castronova, Edward, "Blizzard Goes to War," available online http://terranova.blogs.com/terra_nova/2004/12/blizzard_goes_t.html, December 12, 2004.
[22] De Soto, Hernando, *The Mystery of Capital*, Basic Books, 2000.
[23] See discussions on both Roma Victor http://www.roma-victor.com/ at http://terranova.blogs.com/terra_nova/2004/12/currency_and_th.html and Project

Technology Number Two: The Web

From their humble beginnings as ARPANET in 1969,[24] the internet and the web have grown to create connectivity unprecedented in human history.[25] Nearly a billion people all over the globe now have the ability to communicate in many different ways. This communication often takes the form of creation. Websites are the most obvious example,[26] but the last several years have seen an explosion of collaborative creation, with tremendous effort poured into wikis and blogs.[27]

What makes these creations special is, unlike much of the web, they are maintained. Decay and "web rot," despite low marginal costs, plague digital creations just like physical ones. However, community and collaboration have proven effective methods of preservation. Wikipedia[28] in particular is an impressive example of communal productivity.

Creation is strongly influenced by its medium, so web creations are generally based on text. News, humor and knowledge sites abound. Text web sites are easy to create, transmit, and display, but as a communication medium, the web has three significant disadvantages: it is generally asynchronous, it lacks place, and it is descriptive rather than experiential.

The real world allows communication to be synchronous and interactive. This is true even when the conversation is largely one-way (speeches) or non-local (telephone). Accomplished speakers react to their audience and adjust their presentation on the fly. Telephone conversations allow all the speakers to adjust the conversation and to react to each other. Telephone conversations do share the web's lack of place problem.

Entropria http://www.project-entropia.com/ at http://terranova.blogs.com/terra_nova/2004/12/treasure_island.html.
[24] "Internet History – ARPANET," available online http://livinginternet.com/i/ii_arpanet.htm.
[25] "Global Internet Statistics (by Language)," available online http://www.glreach.com/globstats/.
[26] "December 2004 Web Server Survey," available online http://news.netcraft.com/archives/2004/12/01/december_2004_web_server_survey.html, December, 2004.
[27] There are numerous sites that measure blog traffic and usage. Blogcount.com http://weblogs.about.com/gi/dynamic/offsite.htm?zi=1/XJ&sdn=weblogs&zu=http://www.dijest.com/bc/ acts as a useful aggregator.
[28] See both the Wikipedia main page http://en.wikipedia.org/wiki/Main_Page and its history page http://en.wikipedia.org/wiki/Wikipedia.

In the real world, place is part of the many non-verbal cues critical to human communication.[29] Relative location, movement, manipulation of objects, and body position are all lost when using text or voice mediums for communication. Without these cues, errors and misunderstandings are far more common.[30]

Related to the lack of place, web sites are generally not experiential. A text description of an airplane may allow the reader to imagine flying it, and pictures or movies may help the imagination, but the medium does not lend itself to actually flying the plane. Physicality and simulation are not built into websites.

Technology Number Three: Virtual Reality

Virtual reality has a long[31] and checkered history.[32] From early in the 1960's, researchers have looked for ways to allow interaction with virtual scenes. Generally, that research has focused on head-mounted displays[33] and haptic interfaces.[34] The goal for this combination is to allow natural viewing and manipulation of virtual spaces. Despite enormous technical and physiological challenges, virtual reality was making great strides in the late 1980's and lead to the realization that interaction with virtual models during construction would be a superior tool. This was especially true when multiple users were in a shared space. Three-dimensional spaces, with creation and interaction between multiple users, would completely change engineering and design.[35]

Unfortunately, attention remained focused on the interface (head-mounted displays and haptic interfaces) rather than on collaborative, creative spaces. Tremendous engineering and capital was expended on interface technology, with limited successes. At the same time, computer-aided design continued to improve, with very little focus on shared spaces.

Corporations built on their modeling and simulation capabilities have only recently been able to fully share modeling and simulation tools and data. Although collaborative

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[29] Cicca, A. H., Step, M., & Turkstra, L. "Show me what you mean: Nonverbal communication theory and application," The ASHA Leader, pp. 4-5, 34, December 16, 2003.

[30] Grosvenor, Laura, "Hybrid Language: A Study of E-Mail and Miscommunication," available online http://tc.eserver.org/24406.html, 1998.

[31] Tate, Scott, "Virtual Reality: A Historical Perspective," available online http://ei.cs.vt.edu/~history/Tate.VR.html, September 28, 1996.

[32] Wikipedia entry "Virtual reality," available online http://en.wikipedia.org/wiki/Virtual_reality, December 16, 2004.

[33] Wikipedia entry, "Stereoscopy," available online http://en.wikipedia.org/wiki/Stereoscopy, December 20, 2004.

[34] Wikipedia entry, "Haptic," available online http://en.wikipedia.org/wiki/Haptic, December 16, 2004.

[35] Walker, John, "Through the Looking Glass," http://www.fourmilab.ch/autofile/www/chapter2_69.html, September 1, 1988.

creation is not yet in widespread use, organizations are recognizing the benefits of allowing both creators and managers to share, visualize, simulate and freely manipulate data.[36] For example, automobile companies easily explore new and creative ideas while using modeling and simulation data to determine the performance and costs of development.[37] Via collaborative creation, organizations are generating superior products.

Technology Number Four: Decentralized Avatar Worlds

The first graphical virtual environment was *Lucasfilm's Habitat*.[38] Released in 1986 on the Commodore 64, *Habitat* introduced the avatar as the graphical representative of the player.[39] They were able to interact with each other and to customize the over 20,000 places within *Habitat*'s world.[40] While *Habitat* itself drew from many sources, including early text games and science fiction, its decision to move away from the fantasy motif was an important one. Even more important, *Habitat* proved the impossibility of using detailed central planning to create truly immense and complicated places.

While *Habitat* was successful, the many digital worlds that followed were commercial failures.[41] Although many of these worlds are still in operation due to the passion of their residents, clearly social interaction is a necessary but not sufficient feature of digital worlds. Residents needed more things to do.

Active Worlds, introduced in 1995, attempted to address that by providing users with building tools, so users would be able to create the required content.[42] A large number of users participated and exhibited enormous creativity. Unfortunately, neither social nor economic forces existed to incent the creation and maintenance of large-scale and compelling content. Although there are still enthusiastic users, the population has waned.

Habitat through *Active Worlds* demonstrated that online worlds need not be based on Dungeons and Dragons, and users could be incredible sources of innovation and creativity. Users were able to create three-dimensional content and found great

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[36] "PLM Solutions boost efficiency at leading premium vehicle manufacturer," available online http://www-1.ibm.com/solutions/plm/doc/content/news/archive/912235113.html, July 25, 2003.

[37] "The Chrysler ME Four Twelve," available online http://www.allpar.com/cars/me412.html, September 7, 2004.

[38] Morningstar, Chip and Farmer, Randy, "The Lessons of Lucasfilm's Habitat," available online http://www.fudco.com/chip/lessons.html, May 1990.

[39] Ibid.

[40] Ibid.

[41] Farmer, Randy, "The Business of Social Avatar Virtual Worlds," available online http://www.fudco.com/habitat/archives/000020.html, July 15, 2004.

[42] "Mauz's Active Worlds Pages: History," available online http://mauz.info/awhistory.html, December 19, 2004.

enjoyment in doing so,[43] but the content was not sufficiently compelling to draw in new users. Insufficient motivations existed to generate sustaining behavior.

Building on the Four Technologies

These technologies provided a nearly complete foundation for digital worlds. A world built using them would still lack a cost effective method of creating enough content to entertain its residents and would miss the promise of collaborative creation. A further advance was needed in order to capitalize on the promise of these technologies.

Moving Beyond Atoms

If you want to make an apple pie from scratch, you must first create the universe.
– Carl Sagan

Since 2003, *Second Life* has generated behavioral and economic data from a digital world. Built upon the four technologies, *Second Life* has reached the next level via the critical additional feature of atomistic construction.

Atomistic Construction

Everything in the real world is built out of atoms. Unfortunately, atoms are not convenient tools for human construction. Nanotechnology, where products are literally built out of atoms, is expensive, difficult, and potentially risky.[44] Even construction at the macro level requires large expenditures of time, raw materials and energy to create just about anything. Large-scale creation requires mass production techniques that utilize economies of scale, which tend toward traffic and Wal-Mart.[45] In many ways, atoms suck. However, unlike the real world, digital worlds can use building blocks specifically designed to enable human-scale creation.

This is atomistic construction. Simple primitives are combined in various ways to build up interesting structures and behaviors. Primitives are the atoms of *Second Life* and they have been designed to allow for maximum creativity while still being simple enough for everyone to play with and use.[46] To understand how atoms work, consider building a piano first in *Ultima Online* and then in *Second Life*.

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[43] "AW Sites," available online http://www.tnlc.com/eep/aw/sites.html, December 8, 2004.

[44] IBM Research, "Nanotechnology," available online http://www.research.ibm.com/pics/nanotech/, September 9, 2004.

[45] Karjanen, David, "The Wal-Mart Way Seems to Be 'Only My Way,'" available online http://www.laane.org/pressroom/stories/walmart/040502pittsburgh.html, May 2, 2004.

[46] Ondrejka, Cory, "Aviators, Moguls, Fashionistas and Barons: Economics and Ownership in Second Life," available online http://papers.ssrn.com/sol3/papers.cfm?abstract_id=614663, November 7, 2004.

True Creation

In *Ultima Online*, a user can purchase a large number of objects, ranging from checkerboards to cloaks. With careful stacking and a lot of patience, it is possible to create something that looks like a piano. Of course, it is not really a piano and the user could not use it compose music, although it might serve as decoration.[47]

In *Second Life*, the resident would start building the piano in real time, simply creating primitives as needed. These primitives would be scaled, textured, colored and combined to create a piano. Sound could be added to the keys, so it could be played. A symphony could be composed on it. Rather than simply decoration, this *is* a piano.

Of course, since these are primitives, the piano could also fly or follow the resident around like a pet. Copies of the piano could be given away or sold with practically no marginal cost of reproduction. When the piano was no longer needed, it can be removed from the world and stored for later use.

By endowing every primitive in the world with physical and behavioral properties, primitives become the basic building blocks of everything from hats to houses, from cats to cars. Rather than the real world's hundred different atoms with limitations on how they can be combined,[48] *Second Life* is made up of several simple primitives types with the flexibility to generate a limitless set of possibilities.

Environment Matters

Critically, those primitives exist within a physically simulated world, providing generally predictable behaviors. Make a physical ball in the air, and it will fall. Make a square table with three legs, and it will fall over. A simulated world allows residents to leverage their intuitive understanding of the real world. While primitives and behaviors are flexible enough to create exceptions, the real world metaphor acts to orient new residents and to provide inspiration.[49]

Another important distinction is that primitives are actually manipulated and combined within *Second Life*, rather than relying on external programs and import paths. This means that the default creative methods are collaborative and synchronous, rather than individual and asynchronous. Collaboration can be as simple as asking someone for their help or opinion, or as complex as dozens of residents building a city from a set of master

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[47] "How to make the piano," available online
http://uo.stratics.com/homes/betterhomes/essay_piano.shtml, July 28, 2004.
[48] Senese, Fred, "The Periodic Table," available online
http://antoine.frostburg.edu/chem/senese/101/periodic/index.shtml, December 10, 2001.
[49] Ondrejka, Cory, "A Piece of Place: Modeling the Digital on the Real in Second Life," available online http://papers.ssrn.com/sol3/papers.cfm?abstract_id=555883, June 10, 2004.

blueprints. Feedback is instantaneous and communication a natural back and forth, rather than the sequential mode of a blog or email.

Second Life residents from all over the real world have created at every scale, from fashion all the way up to full-scale games, including a MMORPG built entirely within *Second Life*.[50] The creative power of the digital melting pot is astonishing to watch. This power also drives the economic forces with *Second Life*.

Creativity, Economics and Innovation

The creation of something new is not accomplished by the intellect but by the play instinct acting from inner necessity.
– Carl Jung

Just like the real world, artifacts created by the application of time, effort and innovation to raw materials are worth more than the sum of their parts. In *Second Life*, primitives alone have no cost other than the computing, memory and bandwidth resources they consume. For individual, temporary primitives, those costs are effectively zero. As more primitives are combined and they spend more time in the world, their impact on their local area of the world increases. In fact, for a resident to maintain permanent artifacts in world – their house for example – they need to decide to own virtual real estate within *Second Life*.[51] This ownership allocates computing resources and load balances the world.

The Exploration of Value

Just like the real world, the vast design space available to creators using primitives means there are limitless different ways of meeting similar needs. As a result, creators who apply more innovation, skill or time to their creations are able to create valuable artifacts. More valuable, how? Again like the real world, the consumers of the artifacts define value and it can be anything from efficiency and effectiveness to scarcity and beauty.

The flexibility and ease of collaborative creation leads to tremendous variety and experimentation. For example, in October of 2004, 15,000 distinct residents spent time in *Second Life*. Those residents exchanged over 50,000 items in 1 million player-to-player transactions with a total value of nearly US $1 million. Like the use of the real-world metaphor, trade and economic activity provide a second important context within digital worlds. Residents recognize that they could make money, so many choose to explore this opportunity. The power of the economy is unsurprising, as *Second Life*

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[50] See the Pixel Dolls Homepage http://www.nafii.com/kasi/PixelDolls/index.html, Unreal SL status report http://bedazzle.grfx.at/portal/modules.php?name=News&new_topic=3, and Alphaville Herald story about Dark Life http://www.alphavilleherald.com/archives/000561.html.
[51] Supra note 46.

leverages factors long associated with economic strength and growth: property rights,[52] the cost of learning,[53] and decentralization.[54]

Property and Learning

As discussed earlier, current research supports the concept that property rights are one of the key enablers of innovation and per capita economic growth. Without ownership, property is not fungible and retards economic growth. This was one of the key ideas behind *Second Life*'s decision to grant residents ownership of their creations. The growth of quality and quantity of user-created content in the year since that decision is a significant proof point. However, precision here is important because digital artifacts are intellectual property (IP) rather than property.

The IP domain governs digital artifacts. This is very important because although IP helps to steer innovation by creating excess value through temporary monopolies,[55] it is the cost of learning that drives the rate of innovation.[56] Strong copyright, like the approach currently being applied in the United States, hampers innovation[57] due to the increased learning costs. It also legislates areas of innovation rather than allowing less structured exploration, compounding the damage.[58]

Fortunately, digital worlds and atomistic construction have several advantages over the real world with regard to the cost of learning. First, atomistic construction allows anyone to attempt to reverse engineer or improve on the ideas of others rather than limiting those options to large corporations. Copyright still holds, providing creators with protections, but it increases the opportunity for useful knowledge and replacements to spread. Second, digital worlds have the opportunity to give their creators IP regimes that better support innovation by reducing learning costs. Creative Commons is an example of such an IP regime, and *Second Life* is currently exploring how to best use Creative Commons.[59]

Decentralization

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[52] Supra note 22.

[53] North, Douglas, "Economic Performance Through Time," available online http://members.shaw.ca/compilerpress1/Anno%20North%20Econ%20Perform%20thru%20Time.htm, June 1994.

[54] Malone, Thomas, *The Future of Work*, Harvard Business School Press, 2004.

[55] Netanel, Neil, "Copyright and a Democratic Civil Society," available online http://www.utexas.edu/law/faculty/nnetanel/yljarticle.htm, 1996.

[56] Supra note 52.

[57] Doctorow, Cory, "Microsoft Research DRM talk," available online http://www.craphound.com/msftdrm.txt, June 17, 2004.

[58] Lessig, Lawrence, Free Culture, The Penguin Press, 2004.

[59] "Creative Commons", available online http://creativecommons.org/, last visited on December 20, 2004.

Decentralization is the final important economic factor.[60] The steady reduction of communication and transportation costs in the real world has allowed many businesses to explore increasingly decentralized approaches. By placing more decisions in the hands of those who actually have the information needed to make the choice, organizations have the opportunity to achieve significant gains in efficiency.[61] Many open source and collaborative projects, such as Apache or Wikipedia, are using this approach.

In the real world, decentralization can run into limits when the time comes to build things. Again, marginal costs and the need for specialized skills and materials limit the degree of decentralization.

Digital worlds with atomistic construction evade this limitation. Although personal skills will still vary, any resident with an idea or need has the tools to create it, and many do. During October 2004, residents in *Second Life* spent 18,000 user-hours per day in world and 30% of their time was spent actively creating. Thus, every day 5,400 user hours are spent creating, the equivalent of 2.7 user-years per day. That is the equivalent of a 1,000 person content development team. Even with Sturgeon's Law,[62] it is a team of 100, and this approach scales as the user base grows.

This decentralized creative team is closer to the community's needs and wants than any developer could ever be, allowing creation and innovation to be efficiently applied.[63] For the same reasons that Open Source users are often the best positioned to improve the products, *Second Life* residents are constantly improving their world, and they are not just doing it by making artifacts.

Education and Expression

Never doubt that a small group of thoughtful, committed citizens can change the world.
Indeed, it is the only thing that ever has.
– Margaret Mead

Atomistic creation is relatively easy, discoverable, and cheap, so digital world residents integrate creation into their regular lives. In the real world, consumers often make purchasing decisions around their desire to be self-expressive or to broadcast who they are to others. This certainly occurs in digital worlds as well. In fact, the comparatively high levels of wealth allow much more self-expressive consumption than in the real world. However, the ability to easily customize and create allows far more individuality to emerge. Consider the relative difficulties of customizing an automobile in the real

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[60] Supra note 54.

[61] Franke, Nikolaus, Von Hippel, Eric, "Satisfying Heterogeneous User Needs via Innovation Toolkits: The Case of Apache Security Software," available online http://papers.ssrn.com/sol3/papers.cfm?abstract_id=299419, May 31, 2002.

[62] "90% of everything is crap" http://www.jargon.net/jargonfile/s/SturgeonsLaw.html.

[63] Benkler, Yochai, "Coase's Penguin, or Linux and the Nature of the Firm," available online http://www.benkler.org/CoasesPenguin.html, December, 2002.

world versus the digital. While truly great customization will stand out and be most sought after in both, digital worlds allow for easy and reversible experimentation. Even if the design space is vast, explorations within it are safe.

Communicating Beyond Chat

Residents can also augment the narrow communication bandwidth of text chat. Why just talk about the presidential debate when you can build a mock up of it, stream the audio in live, and then sit around and discuss it?[64] Why just email family back home when you can sit down with them in a digital version of your tent in Iraq?[65] People's communication skills are built to use three dimensions. Digital worlds allow people to leverage those skills.

With innovation and creativity largely limited only by human ingenuity, a creative culture has emerged, where sharing knowledge and teaching has become a social norm. Want to learn how to add behavior to your motorcycle? Go to a scripting class, hosted and taught by fellow users. The collaborative and synchronous nature of atomistic construction is a natural fit for teaching in digital worlds, and many residents have discovered how much fun and informative it is to teach.

Learning and fun are clearly linked[66] and digital worlds show how much people can learn from creating. Importantly, this creation need not be the actual building of artifacts, but expands to building social networks, running groups, project management, event planning, and the myriad real-world activities that residents decide are needed in the digital world.[67] The powerful realization is that these skills are real and transfer back into the real world. Residents are not just building a world; they're building a better world and better people.

Worlds the Way They Want Them

Of course, what makes a better world from the perspective of the residents may not always agree with the perspective of the developers. Fortunately, the residents' skill and knowledge is often applied to communicating with the developers. Just like the real world, these attempts at information transfer can run the gamut from friendly chat to violent demonstration. Protests often copy real-world history, so many of the most effective use techniques that are developed from peaceful strikes and demonstrations.[68]

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[64] Au, W. James, "Bush Vs. Kerry, Live From Minna," available online http://secondlife.blogs.com/nwn/2004/10/bush_vs_kerry_l.html, October 13, 2004.
[65] Au, W. James, "The Second Life of Baghdad," available online http://secondlife.blogs.com/nwn/2004/06/the_second_life.html, June 21, 2004.
[66] Koster, Raph, *Theory of Fun for Game Design*, Paraglyph Press, 2004.
[67] Many of these are linked off the *Second Life* fansite page http://secondlife.com/fansites.php.
[68] Supra note 5.

These types of protests are not limited to digital worlds. MMORPGs have a long history of them as well.[69] The demonstrations in digital worlds just seem to be more creative – after all, only in a digital world could someone build a business around the sale of protest signs!

However, this does return to a basic concern of themed MMORPGs, namely that allowing user creation or ownership will lead to a loss of control.[70] While this concern is valid, remember that MMORPG designs never survive first contact with their customers unchanged. Patches,[71] and the nerfing[72] that often comes with them, are a major factor of ongoing MMORPG support as the developers adapt to player exploits and shortcuts and deal with the inevitable complaints and protests. Every MMORPG goes through this and it requires neither user creation nor ownership.

Protests cannot be effectively kept inside the games.[73] Developers can take draconian approaches, but that will simply move the protest onto forums, blogs, and the web. While this might have the advantage of raising general awareness of the game, it seems unlikely that this is the most desirable marketing strategy. Instead, operators should embrace protests as the useful signaling devices they are.

User-created content takes the idea of leveraging player opinions a step further by allowing them to effectively prototype new ideas and features. Developers can then measure which new concepts most improve the products and incorporate them into the game in future patches.[74]

The Siren's Song of Magic Circles

Every child is an artist. The problem is how to remain an artist once he grows up.
– Pablo Picasso

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[69] Star Wars Galaxies' is probably the most recent http://research.yale.edu/lawmeme/modules.php?name=News&file=article&sid=1600, but much older examples abound http://www.itu.dk/~tltaylor/papers/Taylor-LivingDigitally.pdf.

[70] Of note is that the protests of several years ago, which generally boiled down to "designer arrogance" have largely vanished. That concern was put through the wringer at GDC2002 http://www.skotos.net/articles/BTH_33.shtml.

[71] "Patching" refers to the process of releasing new versions of the product in order to fix bugs or provide additional features. See infra note 72.

[72] "Nerfing" occurs when the developers weaken some aspect of the game because it is unbalancing. Nerfing is always contentious and examples of the discussions that ensue can be found on the discussion boards of all MMORPGs.

[73] Supra note 69.

[74] Although it is important to remember that existing users rarely have the best interest of new users in mind. Fortunately, proper application of social and economic incentives can mitigate this risk.

While connections to the real world actually help digital worlds,[75] a tempting option from the standpoint of many MMORPG developers, designers and philosophers is to place MMORPGs within Magic Circles[76] in order to isolate them from the real world. Reasons vary, but generally arguments for isolation take two forms. The first is that real world laws and economic connections should not happen because digital items are neither property nor in real places.[77] The second is that the failure to preserve the Magic Circles will ultimately harm the digital worlds by destroying the Right to Play.[78]

Property in Digital Worlds

Given the solid scholarship around the property question, it is pretty clear that digital items are property.[79] Whether measured by utility, the added value of creation, or the investment of the creator, digital items pass the same historical tests property always has needed to. Despite this, the board game Monopoly is constantly used as an analogy to "prove" that the concept of digital property makes no sense.

The Monopoly example poses the thought experiment that while playing Monopoly a player decides to use US $10 to buy Park Place from another player. Does that player "own" Park Place? The person using this example then chuckles and says, "Of course not, that's silly!" and feels confident that they have proven their point. It is not that simple.

First, one must ask what ownership means. In particular, what does "owning" Park Place mean? In Monopoly, the player would have a card that allows them to collect play money from other players who land on it. If combined with Boardwalk, they would be able to build houses on the property. Ownership does not imply that they are going to walk out of the house with the Park Place card, since ownership of Park Place has no meaning beyond the current game of Monopoly. Ownership simply grants certain rights and privileges within the game, which is no different than if they had purchased it with Monopoly money. They could resell it to another player or mortgage it back to the bank for Monopoly money, establishing in both cases a conversion rate between US dollars and Monopoly money.

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[75] Ondrejka, Cory, "Living on the Edge: Digital Worlds Which Embrace the Real World," available online http://papers.ssrn.com/sol3/papers.cfm?abstract_id=555661, June 8, 2004.

[76] The concept of a Magic Circle applied to play was proposed by Johan Huizinga in "Homo Ludens."

[77] Bartle, Richard, "The Pitfalls of Virtual Property," available online http://www.themis-group.com/uploads/Pitfalls%20of%20Virtual%20Property.pdf, June 15, 2004.

[78] Castronova, Edward, "The Right to Play," available online at http://www.nyls.edu/docs/castronova.pdf, October 1, 2003.

[79] Lastowka, F. Gregory, Hunter, Dan, "The Laws of Virtual Worlds," available online http://papers.ssrn.com/sol3/papers.cfm?abstract_id=402860, May 29, 2003.

Nothing about ownership implies that game rules are changed, other than that the game rules might not have anticipated using real money. If the rules specifically prohibited that action, the other players would have to decide whether or not to follow them and whether or not to keep playing with the parties who used real money for the purchase. As the game continues, clearly the buyer owns Park Place within the scope of the game.

This concept of scoped ownership, where ownership only has meaning within certain constraints, is not unusual. In the real world, people buy poker chips that only have value within a given casino, digital music that only plays on certain brands of music player, or software licenses that only run for periods of time on certain operating systems. In all of these cases, they own what they paid for to the extent that they can use it within its designed context.

Scoped ownership interacts poorly with the desire to make digital items fungible. Scoping means that the value of the digital items becomes a function of stability and strength of the game world they exist within.[80] The solution is finding ways to expand the scope of game content where possible. After all, if the world closes but the content survives or is transferable, that content is much more valuable. Nobody worries if a web hosting company goes out of business because a website is completely portable. Digital worlds will have a much more difficult time adopting standards that allow their content to be transported between worlds and currently face business pressures not to allow this. However, if strong open source competitors appear, incentives to support standards will grow.[81]

Commoditization: Good or Evil?

Property and ownership discussions are further complicated by the fact that all property in digital worlds is actually intellectual property. As discussed earlier, precision is important since property and intellectual property operate under different rules. Digital items, as much as they may act like their real-world analogs, are still just bits and are protected by IP law, with all of IP law's quirks and disadvantages.[82] Concerns about the problems with IP law are often used as another reason to support Magic Circles. However, the IP law genie is already out of the bottle, since the very laws that many want to keep out of MMORPGs is a fundamental part of operators' strategies for blocking

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[80] See discussion of Earth and Beyond's closure http://terranova.blogs.com/terra_nova/2004/03/financial_cost_.html. Also, Yale's Professor Jack Balkin has raised the idea that bankruptcy courts could be forced to keep a game open if the assets were sufficient.
[81] This has been a recently discussed topic on Terra Nova http://terranova.blogs.com/terra_nova/2004/12/liberation_sour.html, http://terranova.blogs.com/terra_nova/2004/12/just_enough_con.html, and http://terranova.blogs.com/terra_nova/2004/12/you_cant_take_i.html.
[82] Great sources for information on the collision of IP and innovation are Laurence Lessig's http://lessig.org/ and Ernie Miller's http://www.corante.com/importance/ blogs.

digital item sales.[83] Ironically, by attempting to use copyright to block sales, operators are simultaneously admitting IP law into their worlds, while choosing a fundamentally weak argument. Returning to the Monopoly example, if a group of players decides that using real money is acceptable, Parker Brothers certainly has no power to stop you. IP law allows MMORPG operators to try a different approach if they choose.

A related question becomes whether or not digital item sales help or hurt MMORPGs, with strong opinions on every side of the argument.[84] Without entering into that debate, it is clear the traditional leveling treadmill inherited from *MUD1* both encourages external markets and is particularly vulnerable to commoditization. Users leapfrog their way past other players without acquiring the social connections and game knowledge that levels are intended to provide.[85] It is possible to create worlds resistant to this, but they require significant compromises and tradeoffs.[86] Even worse from the developer's perspective, leveling also exists to slow content consumption. By skipping large quantities of content, users force game creators into an arms race pitting their ability to build content against users' ability to consume it.[87] The cost of content creation is an increasing problem, compounding developers' fears of commoditization.[88] Of course, real-world buying and selling is not the only response to the treadmill, with exploits, cheats, endurance and twinking[89] all being used to accelerate the process of reaching higher levels.

Atomistic creation is helped by commoditization rather than harmed by it. By driving competition and rewarding innovation, economic connections provide a context for user creation. In fact, economic connections are a requirement for generating large-scale artistic and game content. While Open Source methodologies are extremely effective at solving modular problems that benefit from incremental additions, few games and entertainment experiences fit this model. Instead, they require long time commitments from large, heterogeneous teams. Economic motivations help to ensure success.

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[83] Supra note 21.

[84] Supra note 20 and 77 are good places to start, plus discussions on Terra Nova http://terranova.blogs.com/terra_nova/2004/06/virtual_propert.html.

[85] Cato, Greg, "MMOs: It's the Economy, Stupid," available online http://overanalyzed.com/portal.php?topic_id=19, December 15, 2004.

[86] Farmer, Randy, "KidTrade: A Design for an eBay-resistant Virtual Economy," available online http://www.fudco.com/habitat/archives/000023.html, October 20, 2004.

[87] Ondrejka, Cory, "Escaping the Gilded Cage: User Created Content and Building the Metaverse," available online http://papers.ssrn.com/sol3/papers.cfm?abstract_id=538362, May 18, 2004.

[88] "Online Worlds Roundtable #8, Part 1," available online http://rpgvault.ign.com/articles/455/455832p2.html, October 22, 2003.

[89] "Twinking" occurs when a high level character gives money or items to a lower level character, often within a group or guild. This social activity allows guilds to increase their overall strength and acts as a recruiting tool. Great discussion on Terra Nova about this topic, supra note 84.

Atomistic creation helps in another way. MMORPGs suffer from simple farming and other optimization strategies that lead to inflation, aka "mudflation." These approaches are ineffective in a user-created world. By placing the value on finished products rather than raw materials and by allowing creators to utilize the previously discussed advantages of digital items, atomistic construction rewards innovation and skill rather than mindless repetition.

"There is no spoon"

Although used in various ways, "there is no spoon"[90] is used to argue that 3D digital worlds are text with 3D interfaces grafted on, i.e. the Wikipedia with prettier graphics. It is tempting shorthand, made all the more powerful by its association with "The Matrix." It is also clearly wrong. Recall the piano created in *Second Life*. The piano had value and utility. It was also real in the useful ways that matter for a piano. While it may seem counterintuitive, digital worlds are very real places populated with real artifacts.

Digital world residents already describe themselves as living in them and millions of people spend much, even most, of their waking lives in them.[91] To them, digital worlds are real places by any useful definition and can only be understood within that framework. Dismissing the representation of digital worlds as unimportant or irrelevant misses out on basic aspects of what makes us human. People are highly evolved to operate within a spatial context. While most people can construct vivid approximations of places that are described to them, these representations vary greatly between listeners, even when great care is taken to convey information precisely. Similarly, mental pictures constructed from text are also quite error-prone.

Humans are evolved to operate in three-dimensional space via visual and aural data. We are generally quite good at it, using a vast array of subconscious systems to maintain a relatively accurate picture of what is around us. As seen early, place is a core component of how we communicate. From how conversations flow to what makes a downtown flourish, space and place are used to both convey and understand information. They are also places to play with and use artifacts.

Consider an airplane built using atomistic construction for use in a digital world. The builder had to understand the limitations of the world, what it would be used for, and made tradeoffs based on her skills and knowledge, just like a real-world builder would. The airplane could provide transportation, excitement, entertainment, or status. To the buyer, the airplane is real and therefore has value. The artifact need not exist outside of the digital world to be real. Claiming that it must makes as little sense as asserting that a real-world airplane needs to have some presence in the digital world. Much like ownership, the concept of real is scoped.

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[90] Chung, Carol T. "State of Play 2," available online
http://www.joshrubin.com/coolhunting/archives/2004/11/state_of_play_i_1.html,
November 4, 2004.
[91] Supra note 12.

Play in Commoditized Worlds

The final argument in favor of Magic Circles is the Right to Play.[92] The worry is that once economic forces and commoditization enter a digital world that it will no longer be a place where one can play. Leaving aside the many games that rely on economic aspects, the question really boils down to a fear that economic factors create lousy places to live. Competition and profit motive do not seem to coexist with fun.

In the real world, many of the negative effects are because of atoms. Building more, cheaper, and faster requires economies of scale and mass production, which are seemingly antithetical to fun and creativity. Digital worlds that use atomistic creation have no need of these approaches. After all, when using nonrivalrous raw materials and digital copying, any creator can choose to be anything from a boutique purveyor to a mass marketer. By being easy, accessible, and fun, atomistic creation blurs distinctions between work and creativity, between work and fun. A new gun built just because it was fun to blow stuff up might end up being sold, even though the creator was just having fun.

In fact, this collision between fun and economics is the critical enabling factor in building better worlds.

Better than Reality

Reality is that which, when you stop believing in it, doesn't go away.
– Philip K. Dick

What happens when the limits of the world are human creativity? What happens when the conventionally scarce resources, such as land or wealth, either no longer exist or are substantially reduced? *Second Life*'s experience is that residents really enjoy exploring their new freedoms and rapidly form communities and social norms related to building their world.[93] Much like open source projects, residents are generous with their time and energy, and are open about their desire to make the world a better place.

Residents are exploring the myriad ways to use digital worlds. They are building games, including MMORPGs.[94] They are building businesses, including those that may ultimately export creations back into the real world.[95] They are using digital worlds as

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[92] Supra note 71.

[93] Supra note 64, note how many of these are expanding the world of *Second Life*.

[94] Urizenus, "It's a Bug Hunt: Dark Life Opens for Beta," available online http://www.alphavilleherald.com/archives/000561.html, December 10, 2004.

[95] Au, W. James, "Dream of Fields," available online http://secondlife.blogs.com/nwn/2004/11/dream_of_fields.html, November 30, 2004.

laboratories[96] and for education.[97] They are building websites to meet unmet needs[98] and to explore ways of connecting the real and the digital.[99]

What makes this exploration so powerful is that it is happening within both a social and market framework, as well as taking place without the need to ask for permission or developer support. Residents recruit skills and talents from within the world and allow the marketplace to test the validity of their ideas. Much like the early days of the web, nobody really knows what ideas or approaches will be the best, but the digital world design space is certainly being mapped out more quickly and effectively by its residents than any large company could.

Digital worlds enable powerful interpersonal connectivity blending social, entertainment, and commercial motivations in novel ways. When a corporate imaging firm moved into *Second Life*, rather than following the current trends towards in-game advertising,[100] they recognized the resource of the thousands of people designing clothing in the world. In fact, they took advantage of the connectivity to hold classes where real-world fashion designers interacted with the digital designers, teaching, talking, and comparing ideas. Not only was this a lot of fun for everyone involved, but designers on both sides came away with new ideas and skills. They have also built tutorials for the community.[101]

Next Steps

Prediction is very difficult, especially of the future.
– Niels Bohr

Many of the next steps for digital worlds are clear. They will increase their connectivity with the real world, while simultaneously allowing their residents greater ability to live within them. As more and more non-game applications begin to coexist with MMORPGs, incentives will appear for greater communications and interoperability between worlds. Worlds will leverage existing standards to allow their residents to maximize their creativity and available markets.

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[96] Au, W. James, "A Lever to Move the Mind," available online http://secondlife.blogs.com/nwn/2004/09/in_the_minds_ey.html, September 9, 2004.
[97] Au, W. James, "The School of Second Life, Part One: Matt Farber," available online http://secondlife.blogs.com/nwn/2004/05/the_school_of_s.html, May 10, 2004.
[98] SLExchange Homepage, http://slexchange.com/, last visited on December 20, 2004.
[99] Gaming Open Market Homepage, http://www.gamingopenmarket.com/, last visited on December 20, 2004.
[100] Book, Betsy, "These bodies are FREE, so get one NOW!: Advertising and Branding in Social Virtual Worlds," available online http://papers.ssrn.com/sol3/papers.cfm?abstract_id=536422, April 30, 2004. Also, see Terra Nova discussion http://terranova.blogs.com/terra_nova/2004/07/oh_great.html.
[101] space think dream tutorials page, http://www.spacethinkdream.com/v_tutorials.php, last visited on December 20, 2004.

Existing media forms will be improved as they migrate into digital worlds. All media forms, from books to games, are better when they are social. Whether it is telling a story or MST3K-ing a movie together,[102] it is more fun to experience and create media in groups. For many groups in *Second Life*, the first creation is a stage.

Digital worlds are raising more questions than answers. It is already possible to go digital cool hunting,[103] so fashion will flow from digital worlds to the real world. What will be next? As modeling and simulation technology improves, more and more real-world items will be successfully designed in collaborative spaces that can be leveraged both by corporations and *ad hoc* groups.

And those groups will be created by residents from all over the world. Digital worlds allow anyone with a broadband connection to be an employee, a student, or an entrepreneur. For millions of people, the fun of digital worlds will act as a bridge to knowledge and wealth.[104]

Markets and wealth within digital worlds also enable activism. Within digital worlds, motivated individuals and communities are able to raise awareness and funds for real-world causes and organizations.[105] As digital communities grow, they will leverage their wealth and connectivity to seriously change the real world.

Digital worlds have long been described in speculative terms, often providing key plot elements for compelling science fiction.[106] At the dawn of the 21st century, digital worlds are no longer relegated to a distant future. As a result of transferring the power to change their worlds from developers to residents, digital worlds take radically different approaches to world building, gameplay and design. They leverage powerful economic and social forces and enjoy significant advantages relative to the real world.

The question is not whether digital worlds will change the real world. The question is whether the real world is ready.

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[102] "MST3K" is riffing on an old movie in a funny way. Specifically, the style of the TV program "Mystery Science Theater 3000," http://www.mst3kinfo.com.
[103] "Cool hunting" is the act of observing fringe groups in order to better guess at future trends, particularly in fashion.
[104] Will this just lead to exploitation of the 3rd world? A speculative fiction story on this topic is Cory Doctorow's "Anda's Game," http://www.salon.com/tech/feature/2004/11/15/andas_game/index_np.html, although nonrivalrous digital goods are not under the same economic pressures as real world items.
[105] VERTU homepage, http://www.vertuous.org/, last visited on December 20, 2004. Also, see Terra Nova discussion about Tsunami Relief, http://terranova.blogs.com/terra_nova/2005/01/wave_of_giving_.html#more.
[106] Vinge, Vernor, "True Names", Binary Star #5, Dell Publishing Company, 1981, Gibson, William, *Neuromancer*, Ace, 1984 and Stephenson, Neal, *Snow Crash*, Bantam Books, 1992 being the obvious examples. Oh, and those *Matrix* movies.

Further Reading

For more information on law, economics, and digital worlds, the references provide a good starting point. In addition, the following websites and mailing lists are excellent sources of data and debate.

http://terranova.blogs.com/terra_nova/ Terra Nova is home to many great thinkers and writers at the intersection of research and digital worlds. It also maintains a great set of links to useful digital world web sites. This article could not have been written without the writings, debate, and arguments of my fellow Terra Novans.

http://www.themis-group.com/whitepapers.phtml/ The Themis Group has several excellent whitepapers on online games and related issues. Thanks also for the shepherding, editing, and feedback of The Themis Group's Alex Macris and Nova Barlow.

https://www.kanga.nu/lists/listinfo/mud-dev/ MUD-Dev has everything you ever wanted to know about digital worlds, although historical discussions are often hard to find.

http://ssrn.com/ The Social Science Research Network is home to many papers about digital worlds, their residents, and their economies.

http://gamsutra.com/ Gamasutra is a repository for all things game related. An increasing number of articles deal with digital worlds and online games.