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Internet and Games

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As an Internet and games researcher, I have long had a foot in these two scholarly communities which have grown up nearly simultaneously. Writing a chapter on the subject of the two therefore provides an interesting opportunity to trace their interweaving. Whether it is the actual playing of games online or, just as important, the ways the Internet has been a powerful medium in forming and sustaining game culture writ large, neither the history of the Internet nor the history of computer games can be told without reference to the other. They are deeply interwoven and have co-constructed each other along the way. In the following I will map out a bit of this history and then unpack several key areas of research in the field, including work on the social and psychological aspects of online play, as well as some persistent critical issues that continue to warrant our attention.

Brief History of Online Gaming

While this chapter will give an overview of some key research areas within the domain of the Internet and games, a short overview of critical development points is warranted to help give some context. It is important to remember that if we start our history of online gaming with the near past of, for example, massively multi-player online games (MMOG), we miss some earlier influential markers – points which suggest that for decades now the space of play has found a home within networked domains. Even in 1969 we can see computational technology linked with networking being used for games, as in a version of *Spacewar!* which ran on PLATO, originally a computer-based educational system developed in the 1970s. These very early systems, precursors to the Internet as we know it now, hosted a number of games that got played by research scientists, faculty, and students.[1]

While many of these early networked games were accessible only to people working with restricted-access computers and directly tied to university and research

networks, the bulletin board system (BBS) scene brought networked gaming to a larger population.[2] Homegrown BBSs dating back to the late 1970s hosted some of the first computer games. Using modems to connect users to each other, these systems form a fascinating early branch of online gaming history. By the mid 1980s a BBS protocol system called the Door allowed users to access a variety of games, directly linking actual play with being on the system. *Legend of the Red Dragon* (still being maintained), for example, was a popular early role-playing game (released in 1989) for BBS users which allowed them to collectively work on game goals. In addition BBSs were used to exchange game files or tips with other users, thus helping grow a more general game culture. With the development of larger commercial or state-sponsored systems (in the US CompuServe and in France Minitel stand out as notable examples) much of the networking functionality found in grassroots BBSs (including games) was brought to a larger public.

With the global development and expansion of the Internet across a growing number of university and research organizations there was also an emergence of new forms of computer gaming. In 1979 the first MUD (multi-user dungeon) was developed by Richard Bartle and Roy Trubshaw while they were at Essex University. Using text and basic telnet protocol, MUD systems allowed users to simultaneously enter online virtual worlds together. Early systems had a close kinship to *Dungeons and Dragons* (1974) game structures and were influenced by fantasy literature like *The Lord of the Rings* (1954), while later adaptations of the genre broadened out to provide worlds that were more building and chat focused (such as in the TinyMUD and MOO architectures). As a genre, MUDding plays a powerful historical role in the history of both our current 3D massively multiplayer online games and in non-game worlds for the ways it developed the notion of synchronous engagement and play in a virtual space.

Somewhat different from these (often fantasy) world environments was the development of the first-person shooter (FPS) genre and its networked play. *Doom* (1993) marks one of the earliest and most notable games of its type, allowing players on a network to simultaneously enter a space together to shoot monsters and opponents. While primarily played on LAN networks it is an important historical node for bringing together the genre of FPS with multi-user play. Built on an often strong team-based component these games have grown to be a popular genre, with titles like *Counter-Strike* (1999) sustaining not just a vibrant game community but also a professional gaming scene.

While MUDs originate in the pre-web period and FPS titles like *Doom* helped launch a new genre of networked gaming, simultaneous to their development was the porting to the Internet of more traditional titles. Versions of chess, accessed via telnet, or even *Scrabble* were for example quite popular in the earliest days of the Internet. And once graphical browsers for the web were created traditional board and card games also found a home on websites like Yahoo! Games or the Internet Gaming Zone (now MSN Games) where users could play things like bridge, hearts, *Monopoly*, and backgammon for free. So while computers and the Internet allowed for the creation and expansion of some new forms of gaming, they also helped sustain a much longer tradition of board and card games and titles that were familiar to many people who might not otherwise consider themselves "gamers."

This history is not a simple linear progression in which current forms have overtaken earlier ones. Even now one might still go online and play a game of chess using simple telnet and ASCII text, visit a MUD, or play the newest map of an FPS. The history of Internet gaming is one in which new genres and formats emerge but passionate player communities also remain around old favorites and indeed are sustained as networking and information tools become available. Websites and wikis have allowed communities of interest to form around objects that may have long passed out of popular fashion.

The final threads in contemporary Internet gaming take several forms: MMOGs, web browser-based games, and networked console (and even phone) gaming. MMOGs have received a fair amount of press in the last several years as their player-base has broadened out. Owing a strong debt to both early MUDs but also 3D gaming technology, MMOGs – which date back to titles like *Meridian 59* (1996) and *Ultima Online* (1997) – now provide millions of players around the world with an opportunity to game together with other players, using avatars, in fantastical environments. Quite often MMOG players also use voice tools to chat and coordinate their adventures, a development that is relatively new to online gaming.

While traditional MMOGs are based on large-scale worlds and often have heavy time investments and computational requirements, there is a growing category of multiplayer games that are more amenable to casual players due to their accessible mechanisms and user interface, as well as potentially shorter, flexible play sessions. Generally speaking they are also not based on massive virtual world spaces, backstories, and lore but instead are structured around tighter and smaller scenarios. Titles such as *PuzzlePirates* or *KartRider*, while often not boasting as many simultaneous players as some of the larger standalone MMOGs, are nonetheless a popular genre and growing in stature. Popular websites like PopCap or Pogo host hundreds of games, often produced by small to mid-sized development companies. There are also a number of initiatives as developers work on tying the web to online games and virtual worlds (*Metaplace* and *Warbook* are notable in this regard). And though often less reported on in popular media, web browser-based gaming supports a huge number of players as well, often reaching a more diverse demographic than normally associated with gaming (IGDA 2006). Web-based games, while commonly seen as more "casual" due to their shorter per-game duration than many other forms, nonetheless support dedicated playing.

Finally, the newest development in online gaming is coming through the growth of console-based play. While there were some attempts that tried as early as 1998 to connect players to each other (the Sega Dreamcast and its popular title *Phantasy Star Online* being notable) we now see real development of networking gaming through these devices. With the widespread growth of broadband access in the home and the enthusiasm for networked games via titles like

World of Warcraft, many console game developers have expanded their offerings to not only include online multiplayer components, but allow players to share their game data online, comparing statistics and achievements and in general building the gamer community. Xbox Live now boasts 10 million users and both the PlayStation 3 and the Wii have networking capabilities built in. With this trend in functionality console players get opportunities to play with others from around the world, and build communities around games (the Xbox Live gamer tags and achievements are both interesting examples in this regard).

While thus far I have focused on briefly discussing games that could be played online, the Internet has also been a powerful factor in not only sustaining play but distributing games themselves. From the early BBS days sharing games was an important function networking provided. While the past decade has witnessed the rise of the high-profile commercial game developer with big budget titles and boxed products, we are in many ways returning to the early roots of game culture where titles get distributed and shared via online mechanisms. The Internet allows for a renaissance for smaller developers who use their websites to distribute titles and support fledging game communities around them.

Commercial distribution venues like Valve's Steam provide both mainstream and independent developers a platform for sharing games. Microsoft's game development tool, XNA, and its distribution methods are another branch facilitating these kinds of productions. In addition, all the major consoles now boast digital distribution mechanisms for their games and content via their XboxLive, PS Network, and WiiWare systems. Whether it is providing new titles for distribution and download or adding additional content to existing games players have already purchased, many companies are starting to take advantage of closely linking the Internet with their products.

Finally the Internet has for a very long time now been a prime distribution mechanism for fan communities to share old games and develop emulation systems for long-extinct gaming devices. Whether it was distributing old games via the Usenet system or harnessing the power of newer BitTorrent technology, players have long been using whatever communication tools available to keep their (often niche) game cultures alive. While the rest of this chapter will focus more on actual play and game culture on the Internet, we should keep in mind the ways it is also a powerful tool for distribution, a key component of gaming.

Player (and Character) Identity

Of the many genres of games played online there is a sub-set that has attracted a fair amount of scholarly attention over the years for the special ways games of this sort intersect with complex psychological processes. Online multiplayer games – from early MUDs to more contemporary MMOGs – immerse players in virtual worlds that they simultaneously inhabit with others. Using avatars, originally text-based but now typically graphical representations of one's self, players create identities and engage with others in communities online. Because of the particular mechanism of creating a character tied to a digital representation one issue that has arisen in scholarship concerns the nature of online identity and the line between our online and offline selves.

The notion that one could go online and experiment with identity has been explored by a number of authors over the years who investigated multi-user games. Sherry Turkle's (1995) early influential work documented the way MUD players used those characters and systems as a way of often "working through" complex psychological issues.[3] In a MUD, they might explore a side of themselves that remained in the background or taboo offline. They might tackle emotionally weighty issues through their relationships and actions in the online world. The importance of this work, and that of other authors like Stone (1995) and Dibbell (1998) is that they sought to introduce into the conversation questions about how our understanding of ourselves is affected in online spaces and the potentials for experimentation. Given the popularity of games that allow for character creation in multiplayer environments the status of one's online identity remains regularly discussed by not only academics but players themselves.

Simultaneous to research on the more experimental side of identity in these spaces was work that sought to problematize the notion that one simply goes online and sheds offline traits, value sets, or frameworks. Work by scholars like Lori Kendall (2002), Beth Kolko (2000), and Lisa Nakamura (1995) have made important contributions by highlighting the ways things like race, gender, class, and powerful offline inequalities continued to exert themselves in important ways in these new spaces. These themes have also been picked up by some contemporary game studies scholars who continue to highlight the ways offline identity structures operate in online spaces, for example the way race, ethnicity, gender, embodiment, and sexuality continue to exert themselves within networked game worlds (Consalvo, 2003; Kennedy, 2005; Lahti, 2003; Leonard, 2006; Steinkuehler, 2005).

If we look at gender and online gaming, for example, we can see that while there has long been a stereotype that these technologies are not of interest to women and indeed an industry that has historically sidelined them as gamers, women have long been engaged players, often despite barriers to entry. While the game industry slowly seems to be taking notice, wanting to include women and girls more, often the framework for doing so relies on clichéd understandings of gender and leisure. There also remains at times the thorny issue of representation in games, and in particular the complicated relationship between aesthetics and play (Carr et al., 2006; Dovey & Kennedy, 2006; Krzywinksa, 2005). Finally, in some segments of game culture women often find they have to run a kind of gauntlet to participate, that the domain is not only governed by young men, but governed by ones invested in constructing and enforcing particular forms of masculinity. And while there is a growing body of literature on women and games, there has been very little exploring masculinity specifically and how it is constructed and enacted via computer gaming. As such there remain a number of areas within

game studies that still call for serious attention to the ways gender intersects this growing form of contemporary play. The work done by feminist game scholars who try to tell a complex story which weaves together the issue of offline identity, player experience, game culture, and the specificities of gameplay has been an important conceptual intervention in understanding the nuanced relationship between player and game.

Nuance is central in approaching the study of online gaming in particular. A study of a game world can have important differences from that of a non-game space in that there are key ludic elements at work in shaping not only what occurs, how but it is meaningfully interpreted and understood by players (and at times pushed back on and altered). One of the most important iterations on this issue of player and character identity in online games has been the ways game studies scholars have tried to pay particular attention to how the specificities of the game space – with mechanics and logics of its own – complicate the terrain. Game scholars interested in the issue of player experience and game culture must give additional consideration to grounding their analysis within the game sphere specifically and think about how the requirements and structures of the game challenge a notion that people simply go online and freely experiment and construct play experience.

Identity creation and performance in, for example, a role-play space may have different nuances and outcomes than what happens in a player-versus-player scenario or in a non-game virtual world (Tronstad, 2007). Questions of identity experimentation have taken a slightly different turn then in the work of scholars who have looked at the role-play aspects of many of these spaces. Work by people like Torill Mortensen (2003) and Marinka Copier (2007) have tried to situate the kinds of character development we see in these spaces within a framework where gameplay intersects with identity construction, social action, and collective meaning. This merging of what we might think of as a ludological approach with more traditional Internet studies helps us refine analysis around the specificities of game worlds in particular.

The focus on in-game behavior and practices can also be found in Richard Bartle's (1996) influential work on player types and their typical orientations to online multiplayer games. Though refined in his later book (2004), his basic typology of killer, achiever, socializer, and explorer continues to be a frame investigated by many others. The work is notable for the way it provides both a relational framework – both between the categories but also via a consideration of how such identities and activities are informed by their location within a game structure. Scholars like Nick Yee (2002) have sought to expand this line of inquiry through researching the relationship between online and offline identities in play spaces. He has, in particular, examined the complex motivations for play in online games and how playtime is influenced and informed by offline issues. His ambitious Daedalus Project, for example, on MMOGs, has collected over a period of six years data from 40,000 people who have visited his site and answered a number of questions about their experience of online play, including things like identity development and gender swapping.

Studying Communities In and Around Games

The issues of socialization, communication, and distributed play go to the heart of Internet game culture. Online gaming allows people to either play with strangers from around the world or create shared situations with their already existing family and friends. It is important to consider the two prongs of how the social can be formulated here. The first is in looking at the actual play situations themselves, mediated through the Internet. The second area however is the way the Internet facilitates the ongoing production of game culture writ large.

Playing with others

From FPS clans to MMOG guilds to groups of people who play Yahoo! bridge together every week, online games have been hugely influential in allowing people to come together online and interact in and around play spaces. This aspect of online gaming is one of the oldest and it crosses genres. Sometimes the nature of playing together is cooperative – as in the *World of Warcraft* guild that attempts for numerous weeks to finally take down a powerful monster in the game or the *Battlefield 1942* team that refines tactics and teamwork. At other times play is primarily competitive or oppositional – seeking out the top spot on a high-score list, moving up the rankings ladder in one's favorite game, or competing in a player-versus-player match. And because network technology is a powerful way of bringing together distributed populations, we also have an instantiation of playing together that is about sharing and communication, such as when people visit each other's *Animal Crossing* towns via the Internet or swap items for their game worlds (as with *The Sims*).

Playing together online dovetails with many of the experiences tracked in Internet studies over the last several decades. Game groups are communities of practice who build systems of membership and norms. Their members are often passionately engaged not only with the game, but with their community and the relationships with each other (Jakobsson & Taylor, 2003). Many report that they stay with a title long after the game itself has interested them simply because of the people there. The social side of games, and a player's experience of one over the years as they progress, reveals a nuanced lifespan of a game with varying activities and networks that range from casual group interactions and solo play to large-scale coordinating raiding (Chen, 2009; Jakobsson, 2006; Simon, 2007; Thomas & Seely Brown, 2007). And as technologies are developed and extended into gaming spaces we see additional patterns of socialization and bonding emerge, for example with guilds that use voice communication (Williams, Caplan, & Xiong, 2007). Playing together online has proven to be one of the most powerful developments not only in game culture, but in the ways mainstream society is reinserting play through games into everyday life and increasingly legitimizing the notion that we may spend leisure time in these spaces.

Creating game culture

Beyond synchronous playing together however is the powerful way the Internet has been used to create and sustain game culture more generally. Player communities are brought together via websites to talk about games, and sometimes even thorny issues like cheating (Consalvo, 2007). Forums are widely used by groups of players in guilds, clans, and teams to organize their activities and create a community of players. Websites which host databases or wikis are regularly used for the production of collective knowledge about particular titles which are regularly used by players to facilitate their play. Video sites allow people to distribute walkthroughs and footage of skill demonstrations, and to produce machinima (Lowood, 2006). And most recently podcasts have allowed huge numbers of people to become amateur broadcasters, putting together shows covering their favorite games or topics of interest.

The network aspect has allowed for a kind of complex globalization of game culture, one which taps into issues of cultural importation and, often uneasily, socialization. In addition to the games that support players from different parts of the world on the same server (*Lineage 2* is a prime example of how the Japanese and American player-base is supported on shared worlds, although at times ambivalently), the Internet has been a powerful mechanism for people who are interested in titles that may otherwise be inaccessible to them due to sales restrictions or language and cultural barriers. Collective work to provide tools for breaking region coding, translation for titles, and websites that (often illegally) sell titles across national and regional borders have helped created a more global game culture (Sun, Lin, & Ho, 2003). Though regionalism still holds powerful sway (game companies themselves often actively segment markets for example and indeed communities can face globalization of their player-base in often fractious ways) game culture as mediated through the Internet is nonetheless fairly massive, distributed, and global.

Digital Play Industry and The Co-Construction of Games

Though their history is rooted in the homebrew, research, and fan communities, games have become a significant commercial industry and online gaming traverses a number of sectors that range from global production houses to policy and legal decisions by governments. Games are a growing and influential part of a larger media economy and as such they are also involved in broader conversations happening in that sphere around participation, reuse, audience influence, and cross-media engagement (Deuze, 2007; Jenkins, 2006). Questions about the status of games as media co-constructed objects (built from the passionate engagement of both formal designers and players) must engage with work that explores a structural analyses of gaming *vis-à-vis* its location in larger transnational industries that regularly intersect with governmental bodies (Ernkvist & Ström, 2008; Jin & Chee, 2008: Kline, Dyer-Witheford, & De Peuter, 2003). Considerations of the structure of the game industry, its processes and imaginations about its players, and in turn players' relationship to their games and altering them provide valuable ground to explore (Kerr, 2006; O'Donnell, 2008).

Player-designers

As can be seen in several of these critical issues raised above, one of the things that becomes apparent is the complex relationship between the imagined user for whom systems are designed and how systems actually get used in practice. Player communities often create new rules and norms around how they interact with game systems and indeed sometimes developers provide tools to help them then translate those practices and desires into technologies that feed back into the game (as with modding, the practice of player-modification of games). What this produces is a more complex picture of games – one in which gamers don't simply take products at face value and play them as intended off the shelf, they produce an emergent culture in and around them. While there are a few examples of developers integrating active players into their development process (Banks, 2002), the implications of this trend – be it in developing tools and methods for ongoing iterative development or participatory design, or in providing communities ways of managing themselves and influencing developers meaningfully – have yet to be explored fully in design practice.

Through their practices players transform the spaces they inhabit, often having productive impacts on how professional game designers make the spaces. Modding in computer games has, for example, proven to be a powerful method for players' productive engagement in reconfiguring games to cycle back into official releases of a title (Postigo, 2003, 2007; Sotamaa, 2007). But in addition to creating software, the practices of communities – in forming norms for their server, rules for how to play that may not be in the manual, practices for socializing new players into how things are done, and regulations for community behavior – also point to the productive power of users (Steinkuehler, 2006; Taylor, 2006, 2007). These emergent practices of playing together shape what games are and how current and future designers create titles.

Managing emergence

Game culture has long been contested territory. Whether it be governments wanting to regulate how much their citizenries play, companies seeking to carve out territories that are controlled through region encoding, or developers holding a tight rein on how actual play unfolds in their game worlds, the issue of governance and the regulation of gamers and their play is key (Grimmelman, 2006; Humphreys, 2005; Pargman, 2000; Smith, 2007; Taylor, 2006c). In-game protests by MMOG players are not infrequent, though regularly shut down by

game managers and deemed illegitimate activity. Community managers for various games participate not only in fostering the community but also in regulating conversation and gameplay. As many games become small micro-societies companies are often confronted with having to tackle complex social issues and regulatory decisions. And in addition to the management work happening within games, ongoing activities of adept players to circumvent formal systems of control are widely prevalent. Rogue servers, cracked and bootleg copies of software (distributed over the Internet or via physical copies), and third-party applications that assist gameplay in ways deemed illegitimate by game companies all highlight the tension that can exist between what some players feel they should be allowed to do and what game developers claim governance over.

Very closely tied to the issues of regulation and governance is an ongoing debate about the legal status of game artifacts and the player activity around them (Hunter & Lastowka, 2004). With the growth of the modding community, machinima, and the amount of time and investment many players put into their game characters, the issue of whose game it is and, most importantly, what the legitimate boundaries are for use, re-use, and modification become ever more pressing. While on the one hand game developers are actively enlisting their player-base to refine and improve their games (with everything from beta-testing to modding user-interfaces) they are also always drawing a line in the sand in which they claim seemingly immovable intellectual property (IP) and ownership rights. This approach, one we see in the culture broadly, where IP rights have been well extended and vigorously defended, can at times seem out of step with the passionate enlistment of the labor of many players. Given the way ongoing game development and refinement can look more like a circuit between developers, designers, and players (versus a one-way distribution path), notions of co-creation present themselves in constant dialogue to an often regressive formulation of ownership and governance.

One emerging issue that intersects not only the governance and IP issue, but questions about the relationship between online and offline, in-game and out-game, is around real-money trade (RMT), that is, when players use their offline currency to purchase things for their in-game play. Hotly debated by both scholars and players, RMT provides a fascinating test case to explore larger conceptual and definitional issues (Dibbell, 2006). Sometimes RMT takes the form of authorized goods that players can buy from the game developer themselves, but just as regularly it comes in the form of illegal purchasing from game-currency sellers or power-leveling services of in-game goods, money, and services. While some game companies have been instituting formal mechanisms for players to pay "real world" cash for in-game artifacts or mechanisms, there remain a number of developers and designers who feel such practices undermine the meritocracy of the game or, in the case of unauthorized selling, compromise the inherent IP rights of the authors. As gaming takes on an increasingly distributed and networked character via the Internet such issues, which go to the heart of what it means to be engaged in play online and the relationship between domains, are sure to be ones we debate for years to come.

Conclusion

While we are now several decades into Internet research and well approaching a decade for game studies there remain some key areas that continue to pose challenges for those interested in the social and political aspects of online gaming. For the most part these issues hit massively multiplayer gaming most directly, though some other genres are also touched by them. One larger conceptual debate that intersects most of the areas described above – be it research done on player experience and characters, game culture, emergent play, and regulatory/governance issues – is the status of what is termed the "magic circle." Coined by Johan Huizinga (1955), the magic circle notion invokes the idea that game space is bracketed off and separated from our normal everyday life norms and practices – that it operates with special rules distinct from how we usually govern our behavior and that when we step into it, we agree to these rules and adopt this new ludic stance.

Within game studies there is ongoing debate around the notion of the magic circle along several axis: the benefits and costs of this conceptual framework, any normative assumptions that are used when it is invoked, and finally whether or not it has meaningful empirical basis. Some authors have expressed concern about when the boundaries of the "virtual" game space become porous to the "real" or when the rules of the game world are overtaken by those of offline life (Castronova, 2005, 2007). As we have seen in both game and Internet studies however, actual actors regularly cross and blur these lines, prompting such a position to be more normative than empirical in its framing. By contrast there is a growing body of work that is simultaneously problematizing this approach by introducing empirical work on the everyday experiences of play and the role of contingency in games (Malaby, 2006, 2007; Taylor, 2006a, 2006b). Indeed if we look to both work in traditional Internet studies and a range of research within game studies, the issue of the boundary line (offline/online, in-game/out-game) has historically been quite thorny and continues to be widely debated by researchers, developers, and players.

Another area in the developing landscape of the Internet and games worth our sharp focus revolves around globalization. Given that the rhetoric of the Internet is powerfully woven through with this notion more can certainly be done to investigate how it is operating in game culture. While there are many examples of game titles crossing national boundaries, very little has been done in documenting the complicated ways this occurs – both within the development process but also in relation to the labor of gamers who circulate products and information. There has also been very little research done exploring whether or not game culture is one in which globalization is increasing or actually contracting, for example via the use of regional encoding and enforcement schemes, breaking massively multiplayer game worlds into regionally based servers, and other forms of localization. Finally, while there have been some studies looking at cross-cultural comparisons of play in computer games (Chen, Duh et al., 2006), much more could be done to tease

out the relation between "the global" and "the local" in terms of practices (in both play and design). While there are important specificities in game forms and play practices worldwide, games simultaneously often inhabit a global economy and game culture writ large, and much more could be done to understand how network technology is shaping this part of the domain.

Traveling hand-in-hand, the growth of the Internet and the development of networked play present us with fascinating new areas of leisure, work, and exploration – both as scholars and gamers. Internet and game studies have fruitful points of dialogue with each other, though the specific ludic qualities of online play at times require an additional layer of analysis that contextualizes the particular structure of engagement. Whether it be in an interpersonal microanalysis of role-playing characters in a MMOG or large-scale structural studies of networked distribution mechanisms in the game industry, the range of activities taking place in online games lends itself to valuable work that helps us discuss everything from the nature of identity or the work/play boundary, to systems of authority and control. As such, online games are not simply a niche culture, but increasingly a vibrant site for understanding broader critical social processes.

Notes

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1 For an excellent timeline history of online worlds, many of which were computer games, see Raph Koster's (2002) Online Worlds Timeline at http://www.raphkoster.com/gaming/mudtimeline.shtml.

2 Though not commonly thought of within the scope of the Internet, it is important to remember that early BBSs, with their links into FidoNet, provided some of the first paths into email and newsgroups for non-university/research-based computer users. The larger commercial and public systems mentioned also provided an important bridge technology for non-university-based users.

3 Indeed Turkle picks up this notion of the computer as not only a computational device but one we enlist in our psychological processes in her book *The Second Self* (1984).

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