

# Virtuality\*

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## Keywords

affordance, virtual world, video games, social media

## Abstract

This review examines studies of the affordances of digital technologies that produce virtuality. What we can call a “technological turn” in the literature considers technology a first-order analytical object rather than blackboxing it or subsuming it under social process. J.J. Gibson’s original concept of affordance is explained, as well as its evolution to a concept consonant with anthropology’s concerns. The review probes studies of political activism, work, and play. It comments on how virtuality affects anthropology as a discipline.

## VIRTUALITY: WHAT IS IT?

Huge swaths of human activity have migrated to digital venues where we work, play, study, love, rear children, form relationships, take care of ourselves, and, essentially, *exist* through digital technology. Virtuality is construed, in this review, as human activity mediated through multiple digital technologies, including Internet telephony and video, instant messaging, blogging, social media, games, online worlds, forums, chat channels, listservs, podcasts, logs, and databases. Multiple applications and devices form a complex ecology producing virtual experience (Bødker & Andersen 2005, Horst et al. 2010, Broadbent 2012, Ginsburg 2012, Horst & Miller 2012, Madianou & Miller 2012, Treré 2012, Tufekci & Wilson 2012, Kow & Young 2013). This lesson came home clearly to me in my research on the video game *World of Warcraft*. In playing the game, I soon learned that it did not inhabit fixed boundaries of the software application called *World of Warcraft*, but was continually produced in a dense online network of blogs, YouTube videos, gaming guides, player forums, Internet relay chat (IRC) channels, voice chat conversations, live-streamed games, databases, analytic software to assess game performance, player-created software extensions, specially designed gaming mice, and much more (Nardi 2010). Virtuality, then, is fundamentally interested in complex activity occurring within an intricate web of digital mediations.

This review considers the “technological turn” in studies of the virtual, focusing on work that takes the technology itself seriously—its function, form, evolution, and enabling and constraining properties. I investigate how scholars approach technologies as crafted objects whose properties must be reckoned with if we are to more deeply understand virtuality. “Virtual discontinuities,” that is, actions possible only virtually, are discussed, as are the concept of affordance and notions of “virtual” and “real.” To meet the demands of the allotted space, I restrict topical focus to (a) political activism, (b) work, and (c) play. These topics reveal virtuality as a series of mediations that impact activities in more and less potent ways. Assessing the technological turn and three topical areas means, of course, that much worthy research is excluded. I have, with a few exceptions, not considered work cited in Coleman’s (2010) *Annual Review of Anthropology (ARA)* review of digital media.

The technological turn renews the relevance of the four subfields of anthropology in recalling the intensity with which archaeologists scrutinize the artifacts they collect and interpret. Cultural anthropologists are most likely to consult the subfield of linguistics for inspiration, but artifacts, *qua* objects, are newly relevant in this digital age. Studies of the virtual demand attention to the designed artifact, what it can and cannot do and especially what it can be made to do within a particular human activity. For example, Snider (2014) studied the financial instruments that generated the 2008 subprime mortgage crisis, investigating the algorithms and surveillance technologies that bedeviled government regulators who failed to understand “the [technological] expansion of trading platforms, algorithmic high-speed trading, and its digitization” (p. 754). Ekbia & Kling’s (2005) study of Enron’s collapse showed how technology played a crucial role as Enron’s managers manipulated accounting practices hidden deep within the company’s computers. An immense deception was possible because Enron’s computer network allowed managers to conceal what they were doing by outright hiding transactions or causing transactions to appear benign. Without understanding the technical network, it is impossible to get to the bottom of Enron’s demise; we cannot tell a decisive part of the story—the one that uncovers how the technology massively scaled corruption within the virtual space of the machine. Kallinikos et al. (2015) note that “[c]urrent technologies of computing and communication hugely amplify and augment the capacity of individuals and groups to draw on information and technological capabilities to accomplish goals that would have otherwise been difficult or impossible.” Hilty (2008) observed that “technology is becoming increasingly obtuse, and as a result, it is practically impossible to assign responsibility and liability” (p. 47). Critical societal functions such as responsibility, liability, and governance

are deeply influenced by virtual capacities. It is incumbent on us to understand both risks and opportunities as we become increasingly entangled in the virtual. Kelty (2014) emphasized that we must even understand “how new technologies change the meaning of freedom itself” (p. 197).

Scholars of virtuality are turning their attention to the precise means by which interactions between technologies and social action produce activity. For example, Postill’s (2013) investigation of a Spanish protest movement directed attention to changes in technology and what they might mean for activism:

[Much] fieldwork on activism was [conducted] before the current global boom in the uptake of social media and smartphones. At the time, activists had access to indie/alternative media, listservs, email and websites, but mass “social Web” platforms such as Facebook, Twitter or YouTube were not yet in existence. This contrast raises the question of what difference, if any, the new media technologies have made to the recent waves of protest in 2011 and 2013. (p. 344)

Karpf (2012) pointed out that “the Internet of 2012 is different from the Internet of 2002” (p. 639). We cannot ask serious questions about virtuality if we do not understand exactly what it is that is different about the Internet of today from the Internet of a decade ago. Pink & Hjorth pointed to the importance of Uricchio’s argument that digital applications “share a fundamental realignment of subject–object relations thanks to their algorithmic processing layer” (Pink & Hjorth 2012, p. 147), which alters the “fixities of the world viewed . . . and determines what we see, and even how we see it” (Uricchio 2011, p. 33). Pfaffenberger (1988) famously said that technology is “a mystifying force of the first order . . . rivaled only by language in its potential . . . for suspending us in webs of significance. . .” (p. 250). It is exactly this mystifying force that current research aims to unpack through contemplation of the technology itself. The technological turn moves us beyond blackboxing technologies, regarding them as epiphenomenal, conceiving them as subordinate to the social, or construing them as infinitely malleable according to human purposes.

## DISCONTINUITIES

Bracketing out analysis of technical properties for the purpose of more thoughtfully reintegrating them back into social process represents something of a shift from earlier work such as that reviewed in Wilson & Peterson’s (2002) *ARA* article on online communities. The premise of the research they considered was that “[i]nter-networked computers are cultural products that exist in the social and political worlds within which they were developed, and are not exempt from the rules and norms of those worlds” (p. 462). Although this statement remains true in important ways, there is now less emphasis on social “rules and norms” to the exclusion, or devaluation, of the properties of crafted technical objects as focal points of inquiry, and newer literature examines the affordances of virtuality that give rise to heretofore unseen phenomena discontinuous with previous culture.

For instance, virtual worlds may be designed to virtually defy the laws of physics but seem perfectly natural to participants in worlds such as *Second Life* (Boellstorff 2008) or in games such as *Portal* where players navigate a physically impossible world (Linehan et al. 2014). We could always imagine such worlds, but now we act within them, developing and deploying new physical and cognitive skills to do so. For example, in a study of disability and the Internet, Ginsburg (2012) commented, “Amanda Baggs [a neurodiversity activist] is an avid participant in the virtual immersive community of *Second Life*, where Baggs has created an avatar who looks and acts like her—typing and rocking back and forth—but who can fly to different destinations and attend autism meetings with far less anxiety than in real life” (p. 111).

Virtuality permits forms of socializing not possible in the real world. A canonical example from the late 1960s, the era of the first virtual communities, is the community of phone phreaks, blind youth who found a way to meet and socialize virtually. Audiotaping tones played on an organ and then playing the recordings to a phone, they could imitate AT&T's frequencies and place free phone calls, including large conference calls, anywhere in North America. The phone phreaks gathered with distant friends, talking to others like themselves (Rosenbaum 1971). The impossibility of interaction with similar peers inside the small traversable geographies they inhabited in the real world was transcended through virtual interactions implemented with great imagination. Such positive outcomes are of course not guaranteed; virtual social life has also generated negative forms of interaction like grieving and flaming. These behaviors have no real-world analogs and have persisted since the beginnings of the Internet (Kiesler et al. 1984, Lea et al. 1992, O'Sullivan & Flanagan 2003, Suler 2004, Bakioglu 2009, Humphreys & de Zwart 2012, Sood et al. 2012, Kou & Nardi 2014). Even the very notion of media itself is changing; "media" has always implied persistence, but, at sites such as 4chan, virtual communities are organized around media that may last only as long as a few seconds (Bernstein et al. 2011).

The rise of data analytics (big data) generates new forms of research possible because of virtual activity resident in social media, games, virtual worlds, recommender sites, and many other online venues. A paradigm centered around quantitative sampling of the virtual has bred an increasingly dominant program of research that often disdains or ignores the painstaking work of ethnography. Big data advocates' enthusiasm, and success in research funding, rests on the contention that technologically driven modes of quantitative data collection and analysis are superior to the clumsy, inefficient work of face-to-face participant observation or intensive person-to-person interaction in online communities—work that relies on what is taken to be egregiously small sample sizes with findings "based on the researcher's impressions after having spent 12 months living with a small subset of one of the populations" (Castronova 2006, p. 184; see also Bloomfield 2009). The technical capacity for harvesting and algorithmically analyzing voluminous, numeric data from virtual venues such as Facebook and Twitter, coupled with cultural values elevating quantification and scale, has dramatically altered the research landscape. These alterations threaten anthropology (see Boellstorff et al. 2012, boyd & Crawford 2012, Ang et al. 2013, Ekbia et al. 2014, Tufekci 2014). Technologies have "made a difference," as Postill said, one that we are grappling with as a field.

## AFFORDANCE

Since digital technology began to penetrate everyday life in the late 1970s, it has been apparent that we need a concept to capture technology's capacities relative to persons. That concept is affordance. The idea emerged in psychology independent of considerations of technology (Gibson 1979), then evolved in studies of human-computer interaction in the 1980s (Norman 2002), followed by organizational studies (Faraj & Azad 2012, Vaast & Kaganer 2013), and is increasingly used in anthropology. J.J. Gibson, a perceptual psychologist, coined the term affordance, asserting that animals directly pick up information about the environment from the ambient optic array. That information is about affordances, i.e., what the environment "offers the animal, what it provides or furnishes, either for good or ill" (Gibson 1979, p. 127). Animals directly perceive affordances as possibilities for action in the environment, which are determined, on the one hand, by the properties of the environment and, on the other hand, by the action capabilities of the animal.

This relational concept was intended to be applicable to all animals, but it usually does not extend elegantly to human activity. Although some of Gibson's examples involve artifacts (e.g., knives, mailboxes, staircases), the affordances are conceived in simple categories such as physical manipulation (piercing, inserting) or locomotion (climbing). Concerns of cognition, culture,

learning, and the intentional design of tools do not mesh with Gibson's theory, nor do changes to the animal subsequent to tool use, such as learning or enhanced strength. Kaptelinin & Nardi (2012) suggested retaining the Gibsonian idea of action possibilities but situating affordance within a theoretical space of mediation and cultural process.<sup>1</sup> In this view, affordances are a technology's action possibilities that mediate cultural activity, potentially changing the person and the culture. For example, Tacchi's (2012) analysis of the discourse of international development notes that affordances can have political consequences: "[D]evelopment agencies and policies . . . assign . . . affordances for digital technologies that converge with the focus on economic growth as the key indicator of poverty reduction as development" (p. 236). The assignment of affordances indicates that as part of a cultural process, we may emphasize some affordances over others to serve agendas.

## VIRTUAL AND REAL

Some researchers examine virtuality "on its own terms," with little reference to the real world, e.g., Boellstorff's (2008) study of Second Life or Cherny's (1994) early study of gender in a text-based virtual world. In other research, precise articulations between virtual and real are apparent in phenomena such as video gamers sitting next to each other and playing together in Internet cafes (Lin 2008, Nardi 2010), activists moving deliberately between real and virtual loci of action (Foot & Schneider 2006, Earl & Kimport 2011, Barahona et al. 2012), and neighborhood-based socializing encompassing online and offline activities (Boase & Wellman 2006). These accounts challenge calls to mingle the virtual and real evident in metaphoric expressions such as "blurring of boundaries" and "porous membranes." Such terms fail to grasp the distinctive experiences afforded by different forms of mediation. Boellstorff (2012) argued, "[O]ntologically consequential gaps . . . constitute the online and offline. In fact, these sharp boundaries are . . . vital topics for anthropological inquiry" (p. 49). Philosopher Isabelle Stengers (2002) offers an analogy that captures the ontological aim: "[T]he success of an ecological invention is not having the bee and the orchid bowing together in front of an abstract ideal, but having the bee and the orchid both presupposing the existence of the other in order to produce themselves" (p. 238). Bateson (1979) asked, "What pattern connects the crab to the lobster and the orchid to the primrose and all the four of them to me? And me to you?" (p. 8). I thus want to rehabilitate the term virtual, recognizing it not as indexing the exotic, dystopian, inauthentic, or unmoored (see Manning 2009, Geraci 2014), or as one term in a false dichotomy, but as a genuine site of human activity supported by crafted objects that open possibilities for social and cultural development. As Humphreys (2007) said of computer games and virtual worlds, we have met something new—digital technologies are not "repurposed 'old' media" but game-changing objects to apprehend in their own right. Boellstorff (2012) noted that the virtuality of digital technology has "no true historical parallel" (p. 53). William Sims Bainbridge, a sociologist at the National Science Foundation who has perhaps done more to bring funding to studies of virtuality than anyone else, observed that in our own practice as academics, conducting meetings and conferences in virtual worlds opens new, liberating possibilities. Describing a conference he hosted in a game world, Bainbridge (2009) remarked, "[We] did not attempt to duplicate the (dreary) experience of traditional academic conventions, where high-status individuals read long papers to passive audiences, rather than engaging in more

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<sup>1</sup> Reworkings of Gibson's concept are in no way a critique of his seminal work; Gibson was not aiming to develop a theory of learning or culture.

equal debate” (p. 10). Bainbridge (2009) used text chat to support conversation in a way that afforded wider, more equal participation and produced a flawless record of the entire discussion.

I use the term real to oppose virtual. Virtual phenomena are, of course, real in the sense of belonging to reality, and the words must be understood in context. Other proposed terms for real include actual, offline, and physical. Although serviceable, each seems inferior to real. “Actual” bears the same semantic fault as “real” but without real’s concision and intensity. “Offline” connotes too specific a break with virtual, or “online,” its more obvious antonym, and does not gracefully accommodate digital mediations such as those of telephony or wearable technology such as Oculus Rift. “Physical” might mistakenly imply that the physical world does not materially undergird and interpenetrate the virtual. “Real world” is a folk term in gamer (and other) discourse, and its consistent use in an established lexicon recommends it in the absence of a better academic term. When I questioned gamers about why they spoke of “the real world,” they replied, “Well, we have to call it something.” By this they meant that there was an “it” to which they felt they must refer, and it carried some quality of tangible “realness,” setting it apart from the virtual worlds they inhabited. Perhaps language is still catching up to technologies that have altered human possibilities in ways we are only beginning to grasp.

The review now turns to studies of the virtual in the realms of activism, work, and play. I narrow the discussion to a few themes in each area to more carefully observe how the studies investigate affordances of virtuality.

## ACTIVISM AND VIRTUALITY: TECHNOLOGY GIVES VOICE

A critical outcome of virtuality is its impact on grassroots political activity, affording communication and collaboration on a scale never before possible. Although “technological determinism” is out of fashion (see Baym 2010, Lievrouw 2014), massive changes instigated by digital technology, palpably felt within the lifetime of every reader of the *ARA*, have led scholars to edge back toward perspectives that put technology front and center. Tufekci & Wilson (2012), for example, asked, “Did social media shape how [protesters in the Arab Spring movement] learned about the protests, how they planned their involvement, and how they documented their involvement?” (p. 363). The answer is, yes, technology did all that, through “connectivity infrastructure” in a complex ecology with multiple affordances (Tufekci & Wilson 2012; see also Segerberg & Bennett 2011). Tufekci & Wilson (2012) noted that television, mobile phones, and social media comprised a set of resources underpinning the activism they studied. They emphasized the critical role of technology in supporting new voices: “[A] number of women interviewed in Cairo . . . told us that Facebook allowed them to express their opinions and participate in political activity . . . when . . . conditions . . . discouraged them from speaking up” (p. 376). The authors noted that people in authoritarian nations may be reluctant to express dissident views because they feel isolated and fearful but that technologies such as Facebook and Twitter “could change that” (p. 376). Such a statement constitutes a powerful assertion that the affordances of technology matter deeply.

Postill (2013) observed that “Spanish protesters have learned to combine two distinct technical affordances—photographic indexicality and social media virality—to great rhetorical and aesthetic effect.” It is as easy to send one email message as it is to send a thousand (virality), in contrast with, for example, posting a letter, a task for which each additional letter requires time and materials (see Faulkner & Runde 2011 for a discussion of “infinite expansibility,” a theoretical notion of virality). Earl & Kimport (2011) argued that “scaling costs” is at the heart of the success of virtual activism: The marginal cost of each additional communication is close to zero. They observed

that “protest campaigns and even entire movements that leverage this affordance can fully emerge as well as thrive at low cost points” (p. 10).

Kendzior (2011) attributed complex changes in political activity among Uzbek exiles living in St. Louis to the Internet: “[T]he Internet changes patterns of political dissent by allowing greater interaction between geographically dispersed, like-minded parties, but also allows the doubts and antagonisms that existed within those parties to be more easily perceived and . . . exacerbated” (p. 559). Kendzior noted that digital technologies are not forces of pure liberation; in Uzbekistan, people accessed the Internet in Internet cafes furnished with computers on which the government had installed firewalls. Uzbek citizens fought back by using proxy servers and anonymizers, recalling Ellul’s (1964) observation that “technology begets technology” (p. 92). Lindgren (2013) examined the impacts of decentralized, distributed network architectures on political protests in Libya in 2011, also noting that emancipatory forms of virtual activism do not preclude repressive countermeasures. Citing Galloway (2004), Lindgren observed that “network architecture is politics”—that is, networks define relations of power (p. 245). Corporations and governments can take digital platforms down or forbid them from entering their nations. Twitter, Facebook, Instagram, and YouTube are blocked in China (Wallis 2011). It is not so easy, however, to completely quash a multiplex computer network (see, e.g., Schlovski & Kotamraju 2011), and people often find workarounds.

Barahona et al. (2012) discussed ways in which political opinions and behavior in a student-led protest in Chile were “formed in the space of mediated communication” in which “diversified and recombining messages [became] . . . increasingly autonomous sources of information” (p. 1). Bernal explained how a global Eritrean community exists virtually through the Internet. “Interactivity” enabled Eritreans to become both producers and consumers of information, gaining more powerful capacity for community building than is possible with traditional media (Bernal 2014; see also DiNicola 2012). Activist uses of virtual technologies occur all over the world (Lievrouw 2011, Coleman 2012, Harlow 2012, Juris 2012, Mercea 2012, Sun 2012, Kavada 2013, Mattoni & Treré 2014, Penney & Dadas 2014), giving voice in remarkable new ways. One of Zhou’s (2005) informants, a Chinese writer, said “[i]f there were no internet, it would never have been possible for me to have my words heard” (p. 779).

## **WORK AND VIRTUALITY: SOCIAL NETWORKS, FREE LABOR, FREE DATA**

Let us now look at how virtuality has produced profound changes in work, examining social networks and new means of producing economic value.

Social networks have long been a mainstay in studies of work, with, for example, Granovetter’s (1973) iconic “weak ties” serving to enhance job searches. What happens when the social network operates in virtual space, scaled and reconfigured by digital technology? As in political activism, new patterns of activity are possible pursuant to new affordances of communication and information. Spinuzzi (2014) studied freelancers and workers in very small firms who networked flexibly and contingently because “[digital technology] . . . lifted the caps on scaling networks . . . allow[ing] . . . something we couldn’t do before: sharing copious amounts of information, laterally . . . across organizational and geographic boundaries” (pp. 155–56). Workers found and managed work virtually, networking with multiple organizations. Such labor relations have important consequences. For example, while traditional labor arrangements absorb risks through various worker protections, those risks are now pushed onto workers themselves as they move rapidly between organizations, none of which feels responsibility for the worker—an increasingly virtual presence—as a person (Boltanski & Chiapello 2005).

Granovetter's participants networked locally, but social networks may now span continents. Takhteyev (2012) investigated how Brazilian software developers, laboring in a cultural and geographic periphery of the software development world, created a programming language, Lua, according to principles that would allow easy porting to other locales and cultures. Lua was "free to travel" virtually, with the United States an especially important destination (p. 140). Lua was designed around crucial affordances including procedural syntax, automatic memory management, and coroutines that would be intelligible to American programmers, allowing it to expand far beyond its local borders (Takhteyev 2012). Burrell (2012) also explored the potential of digital technologies to render peripheries visible in virtual networks, even for highly marginalized populations such as those earning a living through Internet scamming in Ghana. She noted that virtuality may produce experiences different from those of real life, reporting an informant's rueful story: "I like this lady, I want to be her friend, but [it turns out I was] talking to a man" (Burrell 2012, p. 287). Murthy (2013) analyzed online mentoring networks of scientists that "allowed underrepresented groups to surmount geographical distance . . . and access a multitude of advisors" (p. 1016).

In the early 2000s, Terranova (2003) noticed that niche activities such as fan fiction and early reality TV were burgeoning into a prodigious marketplace of "free labor" in which forums, blogs, game sites, social media, and a plethora of other applications and environments contributed economic value to companies and organizations. Web 2.0 applications permitted "the extraction of value out of continuous, updateable [online] . . . labor intensive . . . work." Malaby (2012) examined the Google Image Labeler Game, which challenges participants to label a corpus of billions of images, providing free labor to Google as participants play the game. Tempini (2015) described how the website PatientsLikeMe gathers information used for scientific and commercial purposes. Irani & Silberman (2013) studied Mechanical Turk, Amazon's clearinghouse for low-cost, online labor in which contracts, schedules, worker evaluation, and the work itself are all virtual. Amazon's microworkers are not unlike the knowledge workers Spinuzzi studied, but they make less money and enjoy less autonomy. They all share a radical independence, assuming high levels of risk by taking on work with no benefits. Heeks reported the work of "Chinese gold farmers," i.e., young people in China who work for low wages, participating in games such as World of Warcraft to generate gold in the game's economic system. Game gold can then be sold for real money (Heeks 2008; see also Nardi & Kow 2010, Lee & Lin 2011). Van Dijk (2009) noted that YouTube, with its user-created videos, is profitable for Google. Cooper et al. (2010) explained how the video game Foldit creates value for scientists who devise protein-folding puzzles that gamers solve. Postigo (2010) described the gaming industry's encouragement of "modders"—unpaid players who create and distribute software modifications for commercial games. The companies use the free labor of enthusiastic players "to develop valuable derivative works . . . to license and . . . [from which companies] profit." Game companies provide modders with tools designed with certain affordances that channel mod production in directions advantageous to the companies. Postigo (2010) commented that we should reflect on the fact that "[w]hen we are invited to participate with tools made by others we ought to ask how our contributions are shaped through [the tools'] technological affordances," emphasizing the need to examine who benefits from such schemes. That modders voluntarily mod for fun and personal skill development does not mean that their activity is not "work" in the sense of generating economic value for others (see Chen 2011, Kow & Nardi 2009, Scacchi 2010 on modding).

Fuchs (2013) pointed out that all such labor is possible only because the decentralized nature of the Internet affords thousands, millions, billions of sites of local activity whose output can be aggregated into one system. Van Dijk (2009) argued that despite the "fun" of games, the satisfactions of socializing with "patients like me," and so on, the new labor relations are a gold mine of economically valuable data: "Notwithstanding neologisms touting the user as a 'producer'

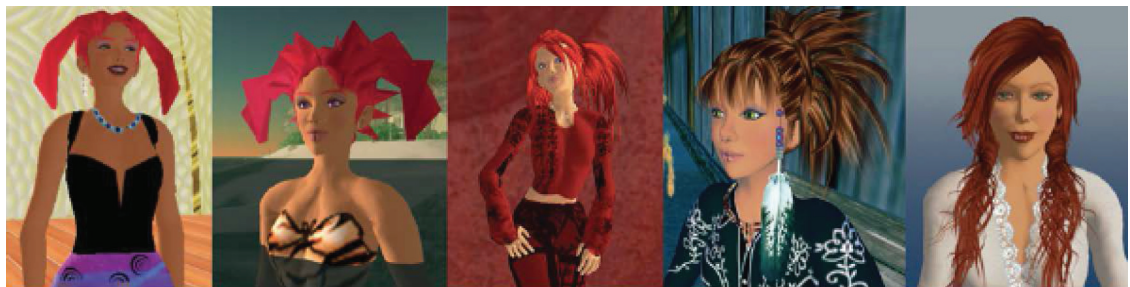


and ‘cocreator,’ the user’s role as a data provider is infinitely more important than his role as a content provider” (p. 49). Ekbja & Nardi (2014) theorized free and low-cost virtual labor, including data production as “heteromation,” that is, the completion of large technical systems with inputs of human labor. Without the participation of patients, there would be no PatientsLikeMe. Without the participation of people playing a game to label images, there would be no image database. In some cases, labor could be automated, but at considerable cost; it is often cheaper to insert human labor into a technical system (Ekbja & Nardi 2014).

## PLAY AND VIRTUALITY: DESIGNING LIVES

What happens when the objective of virtuality is inhabiting virtual life itself? In political activism and work, virtual activity still retains the activity’s core historical concerns, however much technology alters what is possible. Virtual worlds, on the other hand, including video games and multipurpose worlds such as Second Life, push further. Early text-based worlds such as LambdaMOO attracted passionate adherents (Schiano & White 1998) but were superseded by astonishing graphical worlds that began to appear in the 1980s. Systems such as Habitat (Morningstar & Farmer 1991) created three-dimensional spaces where named avatars moved through virtual space, conducting natively virtual activities (see Boellstorff et al. 2012). Sherry Turkle (1995) wrote of “life on the screen.” Bruce Damer (1998), an independent software developer, coined the term avatar for virtual world characters. In 2007, Bainbridge wrote a seminal article for *Science* on the importance of virtual worlds. It became clear that the vibrant social life in video games (Chee 2006, Williams et al. 2006, Bardzell & Odom 2008, Ducheneaut 2010) was as compelling and thrilling as the phone phreaks’ experiences in the 1960s. The evolution of simple graphics to highly pixelated renderings drove the image of the avatar toward ever more beauty and expressivity. See **Figure 1**.

It is thus not surprising that a multitude of video games, as well as venues such as Second Life and Blue Mars, audaciously suggested that real life was not the only game in town. New existential possibilities arose. Some people came to prefer aspects of virtual life (see Gray 2009, Cabiria 2011, Cole et al. 2011, Nardi 2010, Consalvo & Begy 2015). In the words of one of my World of Warcraft informants, “If only real life was this addicting” (Nardi 2010, p. 126). Consalvo & Begy (2015) described how in Faunasphere, a multiplayer game involving virtual pets, older women took solace in their pets and the social life of the game. Bleak real lives were softened by the aesthetic and social gratifications of the virtual world. “I have empty nest syndrome, my fauna were my babies,” said one player. Another said, “I have no family and no pets. Faunasphere helped fill those painful gaps in my life” (Consalvo & Begy 2015, p. 96).



**Figure 1**

Jackie Morie’s (2014, p. 98) “continually evolving” Second Life avatar (used with permission).

The increasing uptake of virtual worlds indicates that we should closely examine how their design supports or inhibits activity. In a study of virtual religious practice, Geraci (2014) observed that avatars inhabiting space recall Eliade's notion that religiosity involves orientation to "sacred axes" that interrupt the homogeneity of space. The abstraction of a chat room or website cannot provide such an orientation, but, for example, in Second Life, "Buddhists can 'touch' a prayer wheel to set it spinning and thereby achieve spiritual merit" (Geraci 2014, p. 269; but see Becker 2011). Black & Reich (2012) discussed how the children's virtual world they studied imposed limits on learning opportunities because of "safety" concerns: "The design features of Webkinz World . . . limit the capacity of the site to support learning because meaningful interactions are minimal. Users cannot communicate freely, share ideas, or contribute to the design, activities, or structure of the site" (p. 224).

Twitter is as easy as 140 characters, and Facebook presents a simplistic format of pictures and text. However, in virtual worlds, the embodied avatar, imaginative geographies, virtual pets, immersive pursuits such as gaming, commerce, education, and spirituality, and creative extensions via software modifications, avatar customization, and world building constitute a leap toward the possibility of inhabiting truly complex designed worlds. Thus it is critical to ask, "Who will design the worlds?" We have seen that game mods develop organically within player communities, and online communities assert their own interests in venues such as Faunasphere. But more generally, the answer to this question is that designers will design the worlds. The affordances designers deem important will shape a significant portion of human social activity now and in the future. Taylor's (1999) question—"What will we look like and who will we be in a world where technology so deeply intersects our lives?" (p. 436)—remains vital.

"What we will look like" bears on issues with which anthropology has been preoccupied for decades. The appearance of the avatar concentrates a mind-boggling number of political, gendered, racial, geographical, ethnic, and class- and age-based presumptive normative dispositions into a single artifact. Artists have always represented the human form, and the embodied avatar (Taylor 2002) is the next step. Now, though, the formerly static form speaks. It moves. Should the avatar blink? Should it stand stock still or be programmed with "moving hold" animation to avoid robotic stillness (Ventrella 2014)? Will the avatar be presented in the first person or the third person? How will gaze, proxemics, facial expression, body animation, and object manipulation be treated? Cultural aspects of personhood and how they inform such questions have scarcely been studied. How realistic will the avatar be? A realistic avatar gazing back at its user can be unnerving (Ventrella 2014). How will the avatar interact with objects in the environment? Brown & Bell (2004) reported that in *There.com*, objects were an important component of social activity, becoming a focus of collaboration. Which affordances will structure interpersonal communication? In an early study of three virtual worlds, Becker & Mark (1998) observed that possibilities for communication included greeting and leave-taking behaviors, group formation, and sanctions for asocial behavior. A curated sociality emerges—algorithmically encoded, and definitive of what it means to be social within the world. Ventrella (2014) suggested that in the future we will design grammars of gesture and interaction for virtual worlds, continuing the process of encoding culture within sets of selected affordances. Tanenbaum et al. (2014) observed, "[Avatars'] body language . . . must be treated as a distinct linguistic system [to] be learned in order to communicate" (p. 357). Geraci (2014) noted, "Increasingly, virtual technologies are colonizing everyday life . . . and will encompass a substantial share of social interaction" (p. 373). Dyer-Witheford & de Peuter (2009) and Kosminsky (2009) argued that virtual worlds are powerful engines of economic growth, bearing the imprimatur of the neoliberal ideology of the capitalist economy in which the worlds have been developed. More work is needed to further explore the political economy of virtual worlds. Their powerful generality affords the possibility of modeling any domain, extending their reach to countless human activities:

religion (Bainbridge 2013, Geraci 2014), education (Squire 2005, Ang & Zaphiris 2008, Lin 2008, Simkins & Steinkuehler 2008, Barab et al. 2012), entertainment (Duncan 2009, Bardzell et al. 2012, Paul 2012), science (Djorgovski et al. 2009), social movements (Blodgett & Tapia 2010, McKenna et al. 2011), and many more.

## CONCLUSION

Without question, life is increasingly lived virtually. Golub (2010) explored the tenacity and passion with which participants undertake projects in virtual worlds, expending tremendous energy on accomplishments meaningful only within a world. So compelling can these projects become that participants may, for example, be devastated by the closing of a game such as Faunasphere (Consalvo & Begy 2015), or migrate with denizens of a closed world to new worlds (Pearce 2009), or, within the ongoing rhythms and minutiae of virtual life, reject invitations to intimacy until a video game's objectives are completed (Nardi 2010). It is imperative to address the ways virtual artifacts are designed and to whom they ultimately answer. Game modding offers a cautionary tale; although companies encourage players to mod, as soon as a particular mod does not fit corporate dictates, it is disabled, with no input from gamers. I saw this happen repeatedly in the years I played World of Warcraft. As anthropologists, we must study the subject position of designers and corporate managers, carefully scrutinizing their products and actions. In virtual worlds we see just how very much technology is anything but neutral, as Langdon Winner (1977) observed decades ago.

Anthropology, dedicated to rigorous empirics, has a critical role in interpreting the transformations under way, in addressing the “mystifying force.” Lindgren (2013) remarked that “[u]ltimately, the issue of what [technology] might achieve . . . is not a philosophical or theoretical question, but an empirical one that can be explored through systematic analysis of actual circumstances and patterns” (p. 208). Such analysis requires meticulous attention to the technology itself—something often elided in the accounts of social scientists. Karpf (2012) remarked of Moore's Law, “If technology writers have relied too much on Moore's Law as a concept, social scientists have all but ignored it” (p. 640). Failing to comprehend technical concepts such as Moore's Law (digital capacity doubles every 18–24 months) deprives us of deeper understandings of how remarkably powerful such laws are as analyses of technology and, also, as stories people tell about technology. Reluctance to engage the crafted object is apparently not new; Carpignano (1999) remarked, “One paradox of media studies is that over many years scant attention has been paid . . . to . . . the medium” (p. 178). The research examined in this review has begun to turn this situation around, generating rich accounts of the affordances of technologies of the virtual and how they are mingled with, and affect, human activity.

Unlike many topics we study, virtuality concerns not only our research, but our own practice. We are just as entangled in the virtual as our informants. Examining the difficulties of transitioning *Cultural Anthropology* to open access, for example, Elfenbein (2014) observed that because open access software is so “overwhelmingly focused on access to documents,” search is problematic. “I can put text up on the internet and call it published, but if nobody can find it, does it really matter?” (p. 295). Out there in the vast virtual reaches of the Internet, how do we provide action possibilities that will make our work visible, make it count? How do we, more generally, provide action possibilities for using technology to cultivate generative cultural actions such as the political activism examined in this review? How do we interrogate and evaluate troubling realities of virtuality such as exploitative labor and asocial patterns of communication? A crucial goal of anthropology is, in my view, to deploy our powerful methods of inquiry in service of a true and just virtuality.

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## Errata

An online log of corrections to *Annual Review of Anthropology* articles may be found at <http://www.annualreviews.org/errata/anthro>