Organizational Learning and the Technology of Foolishness: The Case of Virtual Worlds at IBM

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In this paper, we examine how and why organizational learning is affected by virtualization technologies. The literature on organizational learning has identified its many constraints, and the influence of information technologies on overcoming these constraints has also received attention. Little research, however, has addressed how organizational learning is affected by a new type of technology associated with “virtuality”: the characterization of people, objects, and processes by digital representations, providing enhanced opportunities for the interpersonal and organizational interactivity and engagement that stimulates organizational learning. We present an exploratory case study of the engagement with, and use of, virtual worlds at IBM, a leading user of this virtualization technology. Virtual worlds are associated with games; we explore their use in the novel conduct of social interactions in meetings, rehearsals, and brainstorming, and we argue that organizational learning results from forms of play. We explain how such a playful, game-like technology came to be accepted in a serious for-profit science and engineering organization through a process we refer to as convergent recognition. We find organizational learning results from the interrelated processes behind the adoption of the technology and its application. By reference to the distinction between technologies of rationality and foolishness, we theorize how their reconciliation occurs through the mutually reinforcing ways organizations learn to engage with and use new technologies.

Key words: organizational learning; technology of foolishness; IBM; virtual worlds; virtualization

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Introduction
The ability to learn is critical to the performance and long-term success of organizations, and the question of how such learning occurs continues to be an important topic in organization research (Argote and Miron-Spektor 2011). As well as identifying its nature and significance, the literature on organizational learning has long appreciated the extent of the constraints to learning organizations face. Theoretical explanations for these obstacles include the organizational tendency to elevate exploitation over exploration (March 1991) and challenges to high-level learning beyond the everyday (Argyris and Schön 1978). A stream of research has explored the impact of information and communication technologies on organizational learning and its capacity to help overcome such constraints (e.g., Boudreau and Robey 2005, Kane and Alavi 2007, Wang and Ramiller 2009). The mechanisms through which new technologies interact with organizational learning, however, have not been well explained (Edmondson et al. 2001), and research into how such tools affect organizational learning is still in its infancy (Argote and Miron-Spektor 2011).

These latter observations are especially apposite for the new emerging virtualization technologies that provide enhanced interpersonal and organizational interactivity and engagement (Tapscott and Williams 2006, Kohler et al. 2009) and therefore opportunities for organizational learning. These tools, which Bailey et al. (2012) describe as virtuality, characterize people, objects, and processes by digital representations. For example, in one such technology, virtual worlds, people are represented by avatars that can take human form or embody highly imaginative characteristics such as, for example, animals or machines that interact, work, and play with one another in graphically rich, three-dimensional, digital environments.

Many virtualization technologies emerged from the computer games industry, and they are commonly associated with play. In contrast, therefore, to many information and communications technologies such as computer-aided design and management information systems, their immediate connection with organizational efficiencies and productivity is less obvious. Despite their connection with games, virtualization technologies are increasingly being seen as an important organizational tool (Nevo et al. 2011) and are being used, for example, in areas as diverse as medicine (Arvanitis 2006), the design and operation of city systems (Gann et al. 2011), and new product and service prototyping (Brown 2003). Despite
its ability to affect work and organizing—and potentially provide a new mechanism to support organizational learning—virtuality nevertheless remains significantly underresearched by organization scholars (Bailey et al. 2012).

This paper is motivated by an interest in how and why organizational learning is facilitated by virtualization technologies. To help frame our analysis, we use March’s (1976) distinction between technologies of foolishness and technologies of rationality. To overcome and counteract constraints to organizational learning and change, March extols the virtues of technologies of foolishness. Society, he contends, needs processes that induce and sustain the craziness of wild ideas (March 1999, p. 226), and the technology of reason and rationality that contributes so much to organizational performance needs to be complemented by a technology of foolishness that “escape[s] the logic of our reason” (p. 319).

Technologies of foolishness demonstrate elements of playfulness in organizations that question, test, and amend the status quo. For March, “[a] strict insistence on purpose, consistency, and rationality limits our ability to find new purposes,” but in contrast, “play relays that insistence to allow us . . . to explore alternative ideas of possible purposes and alternative concepts” (March 1976, p. 77). Virtualization technologies are an archetypal manifestation of a technology of foolishness because of their capacity to induce elements of playfulness into organizations.

March recognizes how technologies of foolishness depend on technologies of rationality. Technologies of rationality are not so much enemies of foolishness and exploration, he contends, as they are agents of them, and “revolutionaries in pin-stripe suits” can be instruments of exploration hiding behind a façade of exploitation (March 2006, p. 209). This intriguing insight has yet to be explored. We remain largely in the dark on how technologies of foolishness and rationality combine and how their reconciliation facilitates organizational learning.

Our study explores this reconciliation and the ways that new technologies used to encourage organizational learning through enhancing collaboration and play are, in turn, shaped by the processes through which organizations engage with them. In theory and in practice, the analysis of tools for organizational learning benefits from understanding the resolution that occurs between engagement and use. It is this resolution that helps explain the apparent paradox of why technologies displaying characteristics of foolishness depend themselves on technologies of rationality to be introduced, seemingly counter to organizational rationality.

This process of resolution is revealed in the mismatch between potential and reality in the implementation of a range of new technologies (Edmondson et al. 2001). The effect of the introduction of a well-established technology, such as enterprise resource planning systems, is known to be highly contingent and affected by human agency that resists and reinvents that technology’s use (Boudreau and Robey 2005). Emerging new technologies, such as virtualization technologies, have even greater capacity for contingent use. Such technologies do not emerge fully fledged but evolve along with practice in use and developments taking place in the external environment (Orlikowski et al. 1995, Van de Ven et al. 1999, Orlikowski 2000). They are evolving, incomplete technologies, and their uptake and use is iterative and experiential.

Rather than complying with well-known models of innovation diffusion (e.g., Rogers 1995, Venkatesh and Davis 2000) where users and uses are relatively well defined, in the case of emerging, uncertain technologies, uptake is piecemeal, speculative, and experimental. Early tentative investments are informed by diverse and often unconnected experiences of use and determinations of value, which then affect subsequent investments and technological developments. In Swanson and Ramiller’s (1997) depiction, information technology (IT) innovation is an emergent phenomenon that originates and evolves as a diverse community creates and elaborates an organizing vision for it. Technology implementation often requires experimentation, using trial and error to find solutions that work (Thomke 1998), and so learning to engage with and learning through use becomes blurred: they are concurrent and mutually supportive. Such concurrency is likely to be of particular importance when a technology with strong associations with play and games is introduced into a highly rational, for-profit, scientific and engineering organization. It was in such circumstances that we conducted our study.

More specifically, in this article we present the results of an exploratory study of the relationship between organizational learning and virtual worlds in IBM. IBM is a company at the vanguard of the corporate use of virtualization technologies. Our longitudinal case study of IBM’s use of virtual worlds, conducted between March 2007 and November 2009, allows us to improve theorization of the relationships between organizational learning and the introduction and use of a new generation of supportive digital tools. It helps us to explain the processes and context in which serious organizations embrace foolish, playful, game-like technologies.

The rest of this paper is divided into five sections. First, we discuss how existing theory identifies key aspects and constraints of organizational learning affected by new technology, and we analyze some of the major features of virtual worlds with the potential to affect organizational learning through playfulness. Second, we describe our research methods and introduce our case study. Third, we show how, in its early...
Organizational Learning and Technology

Organizational learning is both an organizational process and an outcome (Dodgson 1993), and it occurs as organizations build, arrange, and adapt their knowledge, skills, and routines. It has a strongly social component. Individual learning in organizations is a social, not a solitary, phenomenon (Simon 1991), and problems are solved and knowledge is shared through the development of shared meaning among organizational members (Bechky 2003). Whereas individuals come and go, organizations preserve knowledge, behaviors, norms, and values over time (Daft and Weick 1984). Much organizational learning takes place in the context of social interaction (Kang et al. 2007), and although organizational learning necessarily involves individuals, organizational learning is more than the cumulative effect of individual learning; it involves the “systems, structures and procedures of the organization” (Easterby-Smith et al. 2000, p. 785).

The constraints on organizational learning are well documented. In particular, learning is limited by a range of group and team dynamics that restrict communication and shared understanding (Argyris 1995, Edmondson 1999). These dynamics are accentuated when groups are multidisciplinary (Dougherty 1992), are geographically separated (Goodman and Darr 1998), and work in different organizations using different tools and methods (Brown 2003). They are particularly challenging for organizations because learning is encouraged by dissimilarity (Dodgson 1993). Much learning occurs through the combination of alternative worldviews that are inevitably distributed throughout various communities (Brown and Duguid 1991) and in groups of people with different backgrounds who meet for a period of time to analyze a problem or work on a project (Easterby-Smith et al. 2000).

Organization theory also identifies the constraints to learning resulting from established routines (March 1991) and from the problems organizations have in maintaining adequate experimentation (March 2006). Organizations learn to improve the things they already do, learn to do new things, and learn about the need to learn (Argyris and Schön 1978). Procedures and routines for learning about what organizations already do are more easily established, but they can inhibit the other two forms of learning (Morgan 1986, March 2006). Organizations cling to outmoded identities that thwart “higher-level” or radical learning (Brown and Starkey 2000), and introspection results from processes of institutional isomorphism (Di Maggio and Powell 1983). March (1991) argues, based on his dichotomy of exploration and exploitation in organizational learning, that the latter often restricts the former. Focusing on what is already known produces returns that are positive, predictable; focusing on the novel produces returns that are uncertain, distant, and often negative. As a result, from the standpoint of value creation in organizations, exploratory learning carries both higher potential benefits and higher potential costs (Hagedoorn and Duysters 2002, Kang et al. 2007). This produces a tendency to substitute exploitation of known alternatives for the exploration of unknown ones (March 1991).

At the same time, organizations must balance exploitative and explorative learning despite the temptations of exploitation (March 1991, Kane and Alavi 2007). The challenge for organizational renewal therefore lies in encouraging shared learning among people with various organizational, professional, and technological backgrounds and in encouraging higher-level or exploratory learning that questions and changes existing routines (Easterby-Smith et al. 2000, Edmondson et al. 2001). There are many factors that can explain how organizations learn, including cultural explanations (Barney 1986) and considerations of power configurations (Dougherty and Hardy 1996). Our concern in this paper lies with the contribution of new technologies to organizational learning.

New information technology is widely acknowledged to be a trigger to changing organizational routines (Edmondson et al. 2001). It can compose part of what Brown and Duguid (1991, p. 54) call the organizational architecture used to “preserve and enhance the healthy autonomy of communities, while simultaneously building the interconnectedness through which to disseminate the results of separate communities’ experiments.” Computer-aided systems are known to have the potential to enhance organizational learning in distributed environments through their ability to provide fast and efficient communication, bridging space and time; to create an organizational memory; and to provide a mechanism where multiple members can dynamically share and update their solutions to problems (Goodman and Darr 1998). Technologies can also act as boundary objects between diverse technical communities (Dodgson et al. 2007).

In an early example of work in this area, Brown and Duguid (1991) analyze the effect on learning of digital technologies that support narrative exchanges in communities. Their focus, as was appropriate in 1991, was email and electronic bulletin boards. More recent digital technologies have the potential to better integrate the various contributors to organizational learning.
and assist learning about technology across organizational boundaries (Tuomi 2002, Dodgson et al. 2007). They have the capacity, for example, to represent, visualize, and communicate knowledge and coordinate integrative tasks across different geographies, organizational domains, disciplines, professions, and “communities of practice” (Brown 2003, Thomke 2003). Digital technology can also enable cheap, rapid experimentation, and it allows users to play with, share, and prototype complex ideas; users can thus determine the value of these ideas before significant investments and disruptions to existing technology and markets are made (Schrage 2000, Dodgson et al. 2005). Virtualization technologies therefore offer important opportunities for learning.

Virtual Worlds and Play

Virtual worlds are representative of the emerging virtualization technologies that have important ramifications for organizational learning because of their capacity to affect organizational concerns as diverse as business models, process management, collaboration, education and training, and marketing and sales (Czerniawska and Potter 2001; Castronova 2005, 2007; Hemp 2006; Au 2008; Nevo et al. 2011). They are a highly innovative technology that emerged from and are commonly used to support multiparty collaborative game playing. Virtual worlds are a graphically rich medium (Schultze et al. 2008) in which people, represented by avatars, can interact, work, and play. Virtualization moves activities that were once carried out by physical mechanisms to some form of electronic or other nonphysical means (Fiol and O’Connor 2005, Overby 2008, Bailey et al. 2012). An example of several avatars holding a meeting in a virtual world is provided in Figure 1.

Researchers (e.g., Fetscherin et al. 2008) have identified a number of features of virtual worlds that are relevant for organizational learning. Virtual worlds enable high degrees of “presence,” or the feeling on the part of a participant of “being there” (Heeter 1992) and participating in the virtual experience. Participants can also experience varying degrees of “being there together,” or copresence, with one or more other participants (e.g., Schroeder 2002). This concept applies to all technologies that allow interaction such as a telephone or instant messaging (IM) but is most strongly experienced in virtual worlds because of the multiple dimensions of interaction (Hemp 2008). The “richness” (van Dijk 1999) of the medium has a strong role to play in the production of copresence, as does the ability of the system to manage things such as social cues and object handling. This environment is especially conducive to multiparty discussions around visual objects portrayed and often created virtually.

The nature of social interaction in virtual worlds has been the subject of a number of studies that address how interaction proceeds within them, what characteristics of virtual worlds affect interaction in what ways, and how those interactions differ from the real world (e.g., Sater and Steed 2002, Garau 2006, Jakobsson 2006). The results point to the advantages for communication of modes of interaction in virtual worlds that mirror interpersonal interaction in many ways, including the importance of gaze and the central role of body language. Virtual worlds utilize these characteristics in avatars and offer the capacity for communication by voice and word as well as the demonstration of presentations and video clips.

Collaboration in virtual worlds has been the subject of increasing attention as the awareness of their potential for its facilitation has grown. Participants find virtual worlds to be highly conducive to collaborative activity of various kinds (e.g., Sonnenwald 2006), and research has shown that virtual worlds allow participants to perform more effectively on a variety of tasks. The use of virtual worlds in many collaborative contexts is seen as an extension of other information technologies such as video conferencing, social networks, and IM, but their intense and rich personal “immersive” experiences and visualization capacities potentially provide new opportunities for effective learning and working.

Virtual worlds are a technology closely associated with play, and understanding play is therefore necessary in understanding the potential impact of virtual worlds. Play is increasingly a focus of organizational study (Mainemelis and Ronson 2006) but one that is notoriously hard to conceptualize (Sutton-Smith 1997). Within businesses it is often associated with juvenilia, and managers are commonly suspicious of its fuzzy, inefficient, and immeasurable nature (Kane 2004). Recognition of its capacity to excite creativity and embrace ambiguity, however, is seen in some organizations as a stimulus to nonroutine, higher-level learning (Kane 2004, Dodgson et al. 2005).

To improve understanding of the features of virtualization technologies that encourage play and organizational learning, we draw on insights from Huizinga’s (1955) classic work on play in culture. Huizinga (1955) argues that play is “a free activity standing quite consciously outside ‘ordinary’ life executed within certain fixed limits of time and place, according to rules freely accepted but absolutely binding” (p. 32). It “is not ‘ordinary’ or ‘real’ life. It is rather a stepping out of ‘real’ life into a temporal sphere of activity with a disposition of its own” (p. 26). Joint participation in play brings “the feeling of being ‘apart together’ in an exceptional situation, of sharing something important” (p. 31). Playfulness can thus be conceptualized as involving a temporary sphere of activity to enable exploration and experimentation and a place where people can work and share ideas coordinated in space and time by the organization and nature.
of the technology. Virtual worlds display all these characteristics, and their connection to play has important potential implications for learning.

**Organizational Learning and Virtual Worlds**

The literature reviewed above is suggestive of the role virtualization technologies such as virtual worlds might assume in organizational learning. The need to learn from multiple and diverse connections and in nonroutine ways has provided a circumstance where virtualization assisting rich collaborative experiences might valuably contribute. We still, however, know little about how these contributions might arise and the role this technology can play. The literature, however, does provide some broad clues.

Three broad factors are considered characteristic of contemporary learning organizations: a supportive learning environment, concrete learning processes and practices, and leadership behavior (Garvin et al. 2008). In supportive learning environments, employees recognize the value of considering opposing ideas, taking risks, and exploring the unknown. Concrete learning processes involve formal methods for generating, collecting, interpreting, and disseminating information; experimenting with new offerings and technologies; and identifying and solving problems. Leadership reinforces learning in the other factors and is seen when leaders demonstrate a willingness to entertain alternative viewpoints and reflection and when they encourage the legitimacy of experiments between diverse communities (Brown and Duguid 1991). Leaders contribute to the “technological visions” that help motivate and coordinate actions around new technologies to encourage organizational learning (Dierkes et al. 2001a).

These characteristics of organizational learning resonate with Daft and Weick’s classic (1984) formulation of *enacting* organizations that respond to turbulence by constructing their own environments in which new technologies might be introduced. Enacting organizations gather information by trying new behaviors and seeing what happens. They experiment, test, and simulate, and they ignore precedent, rules, and traditional expectations. This contrasts with other approaches that are constrained, passive, routine, and formal. In enacting organizations, a good idea may be implemented to see if it works by utilizing a trial-and-error learning process.

Another organizational feature identified in the literature that encourages learning is self-organization: the stimulation and support of groups that form their own communities of interest. Brown and Duguid (1991, p. 50) argue that these self-constituted “maverick” communities “evoke the ossifying tendencies of large organizations…. [and offer] a means and a model to examine the potential of alternative views of organizational activity through spontaneously occurring experiments.” The experiments undertaken in enacting
organizations, they contend, occur simultaneously in the technology and the context in which it is used. They discuss the case of the IBM Mag-I memory typewriter, whose value was determined both by the product and the way it was introduced: “The two changes went along together. Neither is wholly either cause or effect” (Brown and Duguid 1991, p. 51).

The difficulties organizations face in learning across boundaries and in ways that stimulate nonroutine behaviors, and the role of virtualization technology and its mode of introduction as a means of overcoming these difficulties, provide the background for our research. More specifically, the research question that motivates this study is, how and why is organizational learning affected by virtualization technologies?

Method
In this section, we describe our empirical study. We chose to conduct a single, in-depth, exploratory case study. Such studies are most appropriate for studying poorly understood phenomena (Marshall and Rossman 1995) and when “(a) contextualization, (b) vivid description, (c) dynamic (and possible causal) structuring of the organizational member’s socially constructed world, and (d) the worldviews of the people under study” are important (Lee 1999, p. 43). Furthermore, case studies play an important role in research on organizational learning, and our work here continues in that tradition (Simon 1991).

A case study is therefore an appropriate method because the organizational genesis and impacts of virtualization have received little attention in the literature to date (Schultze et al. 2008, Bailey et al. 2012) and because our study is exploratory and aimed at theory building (e.g., Eisenhardt 1989, Yin 2003). As researchers, we entered the field to explore a technological and organizational phenomenon in its natural setting, “attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them” (Denzin and Lincoln 2000, p. 3). Our study is therefore interpretive in the sense that it is “aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context” (Walsham 1993, p. 4, italics in original).

Case Selection
We selected IBM because it has a number of “rare or unique” qualities that make it a logical candidate for “theoretical sampling” and because it displays characteristics of a “revelatory case” (Eisenhardt 1989, Yin 2003). First, IBM is a leading technology company with a long history of operating in a dynamic and turbulent industry and of being highly technologically advanced and innovative. It was one of the earliest adopters and most intensive users of virtual worlds (Reuters 2006).

Second, digital technology is at the core of IBM’s business, making the exploration of virtual worlds a business imperative. This ensured that the impact of the technology was a source of considerable interest and attention at all levels of the organization. Third, IBM has a history of being receptive and helpful to academic researchers, and members of our research team had extensive previous experience with the company. Furthermore, our entry into the company was facilitated and supported by the senior managers responsible for IBM’s introduction of virtual worlds, and they acted as sponsors throughout the study. We therefore had excellent access to people and archival material for the study. Fourth, the use of virtual worlds had begun only a few years before the beginning of the study, and surrounding events were still fresh in the minds of interviewees.

The Case
IBM is an information technology and services company, employing more than 400,000 people worldwide, including more than 200,000 scientists and engineers. It is a leader in innovation, with a research and development (R&D) budget of between $5 and $6 billion, and is consistently ranked as the world’s most prolific patentor. With a history going back to the 19th century, the company has enjoyed periods of great success, such as following the introduction of the IBM System/360 mainframe computer in the 1960s and the personal computer in the 1980s, and marked failure, such as its “near-death experience” in the early 1990s. Its resurrection following near bankruptcy is described in Gerstner (2002), and key to its revival was an improved capacity to respond to changes in markets and technologies by more effectively using its internal technological capabilities and external connections. Key objectives were to improve the flow of ideas internally and to be more open to ideas from outside—for example, by embracing open source approaches. It aimed to break away from its past introspection and “not-invented-here” syndrome by breaking down its dependence on large, semiautarkic R&D laboratories and by using social networking technologies to become more “market facing.”

The historical context for IBM’s investment in virtual worlds is shown in Table 1. A number of aspects of IBM’s corporate strategy of relevance that support the use of virtual worlds can be determined. First, it is important to note the rapid transformation into the business of IT services and the concern to continually learn about new ideas to avoid the problems experienced in the early 1990s.

Second, IBM is characterized by a “research and engineering mind-set” that maintains core strength in capabilities for exploration and the capacity in turbulent times to absorb new ideas from outside (Gerstner 2002). This was encouraged by the development of the IBM
Table 1  Context and Chronology of Events in IBM’s Development of Virtual Worlds

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1989</td>
<td>IBM Academy of Technology founded.</td>
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<tr>
<td>1993</td>
<td>Lou Gerstner is appointed as CEO and chairman.</td>
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<tr>
<td>1995</td>
<td>IBM acquires Lotus Notes.</td>
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<tr>
<td>2000</td>
<td>IBM launches Internet Strategy.</td>
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<tr>
<td>2001</td>
<td>The first InnovationJam is held; 52,000 IBM employees attend.</td>
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<tr>
<td>2002</td>
<td>IBM acquires PWC Consulting and intranet and related platforms.</td>
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<tr>
<td>2003</td>
<td>Sam Palmisano is appointed CEO and chairman. Irving Wladawsky-Berger becomes chairman of the IBM Academy of Technology, increasing focus on emerging technologies, especially the Internet.</td>
</tr>
<tr>
<td>2004</td>
<td>The first GIO is published.</td>
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<tr>
<td>2005</td>
<td>IBM sells its PC business to Lenovo.</td>
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<tr>
<td>2006</td>
<td>IBM builds a virtual Wimbledon site in Second Life with a commerce facility for tennis merchandise. VUC emerges from an external blog called Eight Bar in the summer; it includes five members from the Hursley laboratory, UK. Second InnovationJam is held in September; 150,000 attend. This results in the VUC idea of the 3D Internet. Digital Convergence EBO is established with Colin Parris as CTO. VUC grows to 500 members by November and 1,000 members by December. Sam Palmisano presents results on InnovationJam and announces plans to shape the 3D Internet at a virtual town hall meeting in a mock-up of Beijing’s Forbidden City—the first time a Fortune 500 CEO had appeared in Second Life.</td>
</tr>
<tr>
<td>2007</td>
<td>Twenty-four virtual world islands are developed by IBM by January. Virtual world trials identify specific areas of business opportunities. IBM creates virtual bars and a pub crawl for Diageo to celebrate St. Patrick’s Day with its customers. IBM opens virtual world Sales Centre in May. Virtual world Code of Conduct is launched in July. VUC has 5,000 members by September. Innov8, a virtual business game for innovation, is launched in November.</td>
</tr>
<tr>
<td>2008</td>
<td>Fifty-two virtual world Islands are active at IBM by August. IBM Academy of Technology holds its annual meeting as a virtual meeting between October 21 and 23, using Second Life and a number of other virtual communication technologies.</td>
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Note. CEO, chief executive officer; CTO, chief technology officer; EBO, emerging business opportunity; GIO, global innovation outlook; VUC, virtual universe community.
analysts’ reports, and news reports as well as websites devoted to virtual worlds.

Armed with this background, we conducted interviews with IBM employees and managers at various levels in the organization. We followed a semistructured interview approach, exploring their experience of engaging with virtual worlds and their thoughts on its use and effects (see Appendix A).

With the more senior members of the organization, we focused on the leadership aspects of the technology, whereas with other members of the organization, we focused more on the technology in use and the experience of encountering and working with this new technology. We interviewed several of the respondents on more than one occasion and also sent questions to them individually by email when clarification or further information was required.

In total, 32 software engineers, technology managers, and senior leaders were interviewed at IBM. Many of these were interviewed and consulted on more than one occasion. Appendix B indicates all the respondents, identifying them by the positions they held in IBM and showing the dates and locations of interviews. Interviewees are not identified by name to maintain confidentiality.

Data Analysis

The analysis of the data took place in three stages. In the first stage, we organized our data into an “event history database” (Van de Ven and Poole 1990). This was done by chronologically ordering descriptions of events taken from the raw data—workshop outcomes, interview transcripts, interview and field notes, primary sources such as IBM documents, and secondary sources such as journalists’ accounts—and juxtaposing multiple accounts against each other to ascertain the degree of convergence. In the second stage, we worked through interview notes and documents for references to the ways in which organizational learning interacts with virtual worlds.

The final stage involved the search for and identification of relationships by iteratively moving among data, emerging patterns, existing theory, and research until the patterns were refined into robust and comprehensive conceptual categories (Eisenhardt 1989). This permitted a synthesis anchored both empirically in our data and theoretically in the literature.

Findings

Learning to Use: Enhancing Collaboration and Integration

By 2009, it was clear that the most efficacious use of virtual worlds in IBM was in the conduct of meetings and rehearsals. Rather than working, sharing information, and developing new understanding face-to-face or via teleconferencing or video conferencing, IBM staff used the novel means of communicating through the medium of avatars in virtual spaces. We found evidence of virtual worlds allowing people with different disciplinary and professional backgrounds and from different geographical locations to coordinate tasks and share ideas in meetings in new ways in support of organizational learning. One aspect of virtual worlds that encouraged this sort of collaboration lies in the ways they could be used to create interesting and appropriate spaces for discussion, i.e., a formal boardroom or meeting room with PowerPoint presentations, a comfortable lounge, or around a log fire. One of the initiators of the use of virtual worlds, for example, said,

We were passionate about the opportunities of cocreating content in virtual worlds and created a virtual campfire where we met to discuss the possibility of becoming a thought leader and developer. (Interviewee 6)

Virtual worlds created a shared, immersive environment where disparate contributors could operate with a sense of copresence or being there together. They provided the possibility for exploring ideas in the intermediate space between physical meetings and conference calls.

In 2008, IBM’s annual meeting of its Academy of Technology was cancelled because of the global financial situation and the need to reduce travel costs. The decision was therefore made to hold the meeting in a virtual world. The academy meeting was held over three days and was evaluated very positively by the four participants we interviewed in the course of the wider study. Information was shared and new ideas generated by scientists and engineers from different disciplines in different geographical locations not by conventional means but by exchanges between their avatars. The high levels of interest the meeting attracted led to an expanded role for virtual worlds in the company. In addition, by holding the meeting in virtual world, it is estimated to have saved IBM more than $300,000.

The success of the meeting led to its replication over four days in November 2009, with an increase to approximately 800 participants. The experiences of a contributor from Australia (Interviewee 32) are revealing, given the challenges of time shift for his participation; he was “pleasantly surprised” at the meeting, which was “interesting and surprisingly engaging” in its combinations of talks, meetings, poster sessions, and side conversations that were often highly technical and detailed. He said it was a “high-fidelity” event. At the same time, some problems arose. In particular, given the differences in time zones, he said he would have rather attended the meeting in person because he would not have to cope with the demanding and immersive requirements of teleconferencing at night or juggle between handling interruptions from his young family and having to engage fully with work colleagues during the day.
In another example, in 2009, a group of IBM senior engineers needed to work together on a project to articulate and measure the attributes of an IBM technical leader. Travel restrictions precluded the team meeting face-to-face, so the group decided to hold a virtual session in which eight members participated. The agenda for the session included brainstorming a long list of potential leadership attributes, working on this list through group discussion to collapse or expand categories, and voting on attributes to select and rank those most suitable for use in a measurement system.

Using Second Life, a leading virtual world platform, the group met in a purpose-made, virtual brainstorming studio on September 28, 2009 (see Figure 1). Work involved virtual presentations, discussions, and the use of virtual sticky notes to provide new ideas for further discussion. As can be seen in the figure, virtual sticky notes were assembled on virtual whiteboards. Once initial ideas had been assembled, the team discussed each point, embellishing or rejecting attributes; this helped sharpen the overall focus of each category. Once categories had been assembled, the team members voted on their individual preferences, explaining why they had made their choices. In collating this evidence, it became necessary to reorganize categories, and a second virtual whiteboard was quickly created to allow attributes to be assembled and selected and to visualize and store the material. Because all activities were recorded and decisions automatically stored, it proved easy to recall why some categories had been developed and others not. Final results were available immediately with digital lists of the attributes selected and rejected, ranked in order, and containing explanations of the decision process. According to participants, this approach also allowed the diverse group to learn quickly how to work together. The learning outcome was enhanced by the technology and the way it enriched the learning process in a nonroutine manner. It allowed the shared learning that is stimulated by the collaborative development of visual representations of ideas to be undertaken among a geographically dispersed group.

Virtual worlds overcome the limitations of existing technologies for communicating. Teleconferencing, for example, imposes a physical restriction on the number of people who can participate. Initial tests in IBM showed that meetings in virtual worlds had the capacity to convey more human signals and engage in richer environments for social interaction and collaboration than did teleconferencing. They provided experimental spaces where new people could join and allowed people to express themselves by gesticulating and handing documents and objects to one another. They created an environment where people’s representations of themselves as avatars in a community induced a sense of sharing something important. Another engineer suggested that “virtual meetings can be engineered to create serendipitous events…” (Interviewee 7).

According to one virtual world user,

In general, . . . a lot of the value you get from holding meetings and conferences here in the virtual world space isn’t the “attending lectures” part, it’s the “schmoozing and meeting and greeting” part. (Quoted in King 2007, p. 9)

Virtual worlds allow the construction of environments designed for specific well-defined purposes, such as a boardroom, or locations for scientific meetings or brainstorming. Their malleability can also create spaces that encourage social interactions, thus increasing the probability of a chance event. Creativity in the design of spaces is also seen in selections of avatars. We learned that a notoriously well-known, active, and highly glamorous young female avatar was in fact a middle-aged, bearded engineer.

As IBM pursues its strategy of moving from a traditional multinational to a globally integrated enterprise (Palmisano 2006), there is an increasing premium being placed on productive interaction, communication, and coordination among people of diverse cultures and values (Schultze et al. 2008). Increasingly complex service engagements, often involving hundreds of people, inevitably require pulling together remotely located participants into culturally and professionally diverse teams. Virtual worlds used as spaces for rehearsal bring diverse organizations and skills together to assist collaborative learning and innovation in ways that could not be achieved with other technologies.

Rehearsing, which implies practicing ahead of time, is used to produce higher project success rates and can also be a significant aid in training staff, such as sales teams. To do this, IBM has been developing “rehearsal studios” in the virtual world. A manager explained,

Rehearsing client engagements was one of the first robust rehearsal environments we built…we have continued to build some specific environments [for sales rehearsal, etc.] for scalability and building some middleware to make the design and deployment in virtual worlds an easier task. (Interviewee 26)

The ability to rehearse virtually has other potential business benefits. Users can take advantage of copresence to conduct research and learn about how diverse professionals and users might work with new services, they can explore the use of unstructured data mining, and they can create instruments for specific data collection.

Learning by Playing

Although the computer games industry is a significant component of many economies, the use of games themselves is commonly associated with frivolity and time wasting, and as a result, it can be difficult to sanction in large organizations. IBM couched its use of virtual worlds in terms of encouraging play. This in itself was not controversial. IBM’s bureaucratic culture in the early 1990s
impeded its ability to explore new fields and adapt (Gertner 2002), and such a culture would not easily embrace playfulness. The resonance of play with games playing and fun at work, where rules are relaxed, may explain some reported initial reticence toward embracing virtual worlds in certain quarters in IBM (King 2007). Although the concept of play was enthusiastically promoted by parts of the firm, others saw it as one of the barriers to use. As one senior engineer put it,

Tensions exist between the disruptive and incremental innovation sides of a business like ours. It’s interesting to note that it’s the more conservative/incremental side of business that has tended to look down on virtual worlds as “too much play.” Indeed, the close relationship between virtual worlds and games environments only helps to support this negative view. This is an unfortunate view—but it is still held by many. (Interviewee 31)

Virtual worlds were nonetheless recognized in IBM as a technology that facilitates play, including those activities where people experiment, explore, prototype, rehearse, and tinker with new ideas, often in combination with others with different skills. The company developed a virtual world strategy document in 2007 that acknowledged this; it referred to the importance of collaboration, learning, and play. Through its use, the company recognized that virtual worlds provided a space where experimentation is relatively quick and inexpensive and where activities are built upon the copresence of many people from diverse backgrounds. They also conveyed fun and enjoyment and allowed the cocreation and codevelopment of new ideas assisted by their visual representation. A senior technologist said,

You have to experiment. People learn better through play. They learn through interaction and simulation rather than by lectures. Simulation is where there is a lot of opportunity. (Interviewee 31)

A repeated factor identified in interviews was that users of virtual worlds were given “permission to play.” In IBM’s case, according to a senior manager, people needed permission to experiment and be playful, and it was provided by the company’s most senior management, who sanctioned the use of virtual worlds (Interviewee 11). Influential reports on innovative developments in games were presented in 2003 to IBM’s most senior managers, which helped elicit senior management’s endorsement for their use. One of IBM’s most senior technology leaders explained why they did so:

One of the drivers of innovation in this area will be the ability to play games. This will allow us to explore a gigantic design space through experimenting together on ideas. (Interviewee 2)

As an indication of senior managers embracing the playful aspects of the technology, the results of the company’s “InnovationJam” were announced by avatars of IBM’s leaders at the world’s first virtual town hall meeting in a mock-up of Beijing’s Forbidden City—this was the first time that a Fortune 500 CEO had appeared in Second Life. The InnovationJam was a massive, online, 72-hour, idea-generating event, where tens of thousands of IBM employees and partners examined key business and social issues and sought new ideas for innovation (see Bjelland and Wood 2008).

The playfulness the technology engenders is also seen in the products IBM develops for its customers. As well as developing a virtual pub crawl to celebrate St. Patrick’s Day, IBM has designed a digital workspace for the globally dispersed R&D teams of Diageo, the world’s largest wine, beer, and spirits company. “Matching the mood of the meeting” was central to this effort. In the brainstorming area, members of the team were encouraged to type up any idea they may have, which forms a bubble that floats around in the space. The next colleague who entered could assess the idea and click on it if he or she likes it. This makes the bubble grow bigger, thus attracting more attention from other colleagues who enter the space. Participants found this form of interaction both effective and playful, enhancing collaboration and innovation in novel ways.

Learning to Engage Through Convergent Recognition

We characterize IBM’s engagement with virtual worlds as convergent recognition. It involves the increasing combination, integration, and focus of a widespread organizational appreciation, acknowledgment, and acceptance of virtual world’s benefits and limitations. Convergent recognition sees growing and increasingly collective views in the organization about the benefits and limitations of virtualization technologies among the technological community, senior management, and those responsible for new business development and the users of the technology, such as marketers and trainers. Through interrelated choices about technology, shared experiences with it, and formal processes that encourage “bottom-up” support for new initiatives and gain commitment of business leaders, IBM learned to engage with virtual worlds.

Two key aspects of this model that grew out of our data analysis are the model’s emergent properties and concurrency. The management of unpredictable and complex technologies cannot be prescriptive because the technology evolves and changes along with the markets in which it is used (Van de Ven et al. 1999). In these circumstances, value lies in initially keeping options open and with increasing focus only as applications become clearer through exploration and testing. This form of learning benefits from organizational practices that encourage collaborative experimentation and preparation of ideas and from business processes that support emerging high-potential candidates for future development. These conditions and processes occur simultaneously and iteratively: each is informed and influenced by
the others, as shown in the model presented in Figure 2. There is no linear sequence of progression; new ideas are embraced without complete understanding of where they are leading.

**Organizational Practices: Developing and Sharing Expertise.** Virtual worlds spread rapidly in IBM through the creation of an internal community of users—the Virtual Universe Community (VUC). The VUC grew so informally and organically that there is some debate within IBM on the exact date of its formulation. It took recognizable form by September 2006, however, following an idea posted on ThinkPlace, IBM’s internal ideas development site. The idea of virtual collaboration was further developed through brainstorming events held alongside the InnovationJam. This component of the “Jam” was a self-organized collaboration referred to as 3D Jam, involving approximately 130 IBM employees.

The idea of exploring virtual worlds and creating the VUC evolved from work in IBM’s emerging technologies group at its Hursley Laboratories in the United Kingdom. An external blog was formed by this group to encourage discussions about the development of virtual worlds as a platform for collaboration. Many IBM employees involved in the VUC learned how to become residents in virtual worlds in their own time, on evenings and weekends. The community became self-organizing, and according to an instigator of the ThinkPlace posting, it was impossible in retrospect to determine who had done what to promote virtual worlds in the business (King 2007).

By November 2006, the VUC had grown to more than 500 members. The VUC idea logged in the InnovationJam was voted in the top 10 out of 50,000 entries. By the end of 2006, the community had grown to more than 1,000 members. The VUC celebrated its first anniversary in September 2007 with more than 5,000 members.

The initiators of the VUC quickly identified a range of issues and problems that would need to be resolved if virtual worlds were to flourish and support business. They recognized, for example, that etiquette for using 3D environments would need to be developed. They promoted the use of trial sites quickly within IBM and through its external networks to learn from experience in use. To progress these issues, and overcome some of the risks involved in exploring an unknown technology, several of IBM’s researchers created promotional roles, including those of “intraverse evangelists,” who were to promote and support the use of virtual worlds within IBM, and “metaverse evangelists,” who would promote virtual worlds externally; one researcher adopted the persona of “ePredator,” inhabiting Second Life with the goal of establishing good behavior.

This concern for appropriate behavior led to the development of a code of conduct and etiquette guidelines for use by all IBM staff working in virtual worlds. As one of the initiators of the VUC said,

> The rules of play, these are the virtual world guidelines developed by those using the system, and the measures of value are increase in profits, decrease in overload, and improved employee experience. (Interviewee 6)

These sorts of self-regulation are examples of the necessity to adapt existing, and to develop new, organizational practices as convergent recognition proceeds.

As this self-organizing community was emerging, there were concerns about the use of virtual worlds on the part of some individuals. Commitment to learning was required of individual users, and the continuing difficulties of using the technology provided a deterrent. One senior technologist pointed out that “the technology remains immature” (Interviewee 2). As one senior scientist said,

> People in IBM have not overcome the barrier of how they will crawl up the learning curve. [They] are struggling to gain the level of engagement in virtual worlds that they are used to in face-to-face events. Some people hesitate to invest the time that is needed to go up the virtual world learning curve. (Interviewee 27)

**Technology Choices: Avoiding Technological Lock-in.** Technological pluralism emerged as an important theme in our analysis. The development and use of virtual worlds in IBM has followed a path of experimentation and the trial of many different virtual world platforms. As one way of dealing with the unpredictable, complex, and potentially destabilizing aspects of such a technology, IBM’s strategy was not to lock its exploration into particular virtual world products. As one manager said, “We are going platform agnostic in developing our tooling” (Interviewee 26), and the group’s approach could be likened to “creating scaffolding” for other people to work from. She claims this structure allowed other parts of the organization to use the virtual world experimentally and allowed business partners to collaborate and cocreate ideas more effectively.

At the time of our study, one of IBM’s most influential technology leaders contended that with virtual worlds, “the hype is over and the hard work has begun. Significant brainpower is now being applied to real applications” (Interviewee 2). Through a process of exploration...
and testing, choices about the use of platforms for particular purposes were being made. Convergent recognition occurred as the efficacy of particular virtual world platforms and focus of their application became increasingly appreciated. This did not preclude the development and use of other platforms and applications in the future, and although some narrowing of focus occurred, their successful use increased their effect on the organization.

The learning process involved using the technology to assist its further development. According to a senior technologist,

Internally we use the 3D environment to help us develop the tool itself. Like any development project, we have lots of requirements and limited resources, so we have to prioritize and decide which ones we’re going to put in the development pipeline and which ones we’re going to hold off. This is just a good way to get together with people all over the place to visually participate in this ranking process. (Interviewee 31)

**Business Processes: Supporting New Opportunities.**

Virtual worlds had high-level organizational endorsement at IBM. One of IBM’s most senior technology and innovation leaders said they “help to lever the vast creativity in the population of its users” (Interviewee 4). In addition, IBM is totally dependent on them for the work we do. I believe that the fact that we are so used to collaborative technologies and platforms has made it natural to explore virtual worlds. (Interviewee 2)

Following the identification and support of virtual worlds through the InnovationJam, a formal process for selecting and developing new technological investments in them came into use and was identified as being critical to the company’s successful engagement. IBM’s Digital Convergence Emerging Business Opportunity provided the organizational structure for capturing, assessing, and managing the opportunities presented by virtual worlds. The Emerging Business Opportunities (EBO) process was created in 2000 to improve IBM’s capacity to learn about new technologies and businesses outside of its core areas. Run by IBM’s vice chairman, the process provides a comparatively small amount of approximately $2 million to be invested from a central budget in 20 or so projects. The Digital Convergence EBO’s objectives ranged from the creation of virtual world cell-based mainframes to 24-hour virtual service desks staffed by avatars. In September 2006, a new senior manager post was created to lead IBM’s business development in virtual worlds. He developed a strategy document on potential business opportunities to be exploited using virtual worlds between 2007 and 2009.

Although IBM is reputed to be one of the largest investors in virtual worlds, its actual investment in the technology to date has not been large by IBM’s standards. Initial costs were low because of the preexisting community of people capable of using and developing virtual worlds, whose knowledge had been developed in their spare time. It is estimated that there was already the equivalent of several million dollars of work done before IBM formally committed resources. In this sense, a low-cost experimental strategy has been pursued. Once IBM’s research in virtual worlds became visible in the organization, other parts of IBM became involved and leveraged what had already been done, creating a low-cost development path. People built and reused components, significantly reducing the amount of investment required and improving the receptivity of virtual worlds throughout the organization.

In less than two years, the process of convergent recognition saw IBM move from a position of early exploration of the potential of virtual worlds by a limited number of researchers to one where clear business opportunities were being determined and pursued by a large user community. A technology associated with games had become reconciled with the rational objectives of scientists, engineers, and businesspeople in a for-profit organization.

**Discussion and Conclusions**

Our intent has been to understand the relationships between organizational learning and the introduction of new virtualization technologies, framed in the context of the reconciliation of technologies of foolishness and rationality. March’s (1976) suggestive distinction has not been explored empirically with respect to organizational learning, and the resolution between technologies of foolishness and rationality deserves further theorization.

Our empirical study of IBM shows how some of the difficulties of organizational learning identified in the literature (e.g., Dougherty 1992, Argyris 1995, Goodman and Darr 1998, Edmondson 1999, Brown 2003) can be addressed by the use of virtualization technologies. It shows organizational learning was technologically facilitated and mediated using the decidedly nonroutine method of communicating using avatars as a medium in virtual spaces. Because of their immersive nature, visualization capacities, and opportunities for serendipity, virtual worlds enriched communications, shared understanding, and enabled learning across organizational and other boundaries—disciplinary, geographical, professional—in ways other information and communications technologies could not achieve. The technology incorporates and encourages forms of playfulness absent in many large, bureaucratic organizations and that many organizations find difficult to manage. These forms of playfulness included new ways of experimenting and exploring with the social interactions that underlie organizational learning. Examples of dispersed and diverse groups of IBM’s scientific and technical personnel and marketing teams...
using avatars to communicate, develop and share ideas, and reach decisions illustrate the nonroutinized forms of learning this technology enables. The opportunity to produce stimulating spaces and uninhibited personae is conducive to learning beyond the everyday. The technology assisted IBM staff to develop new skills, knowledge, and routines for working in virtual environments.

The context in which virtual worlds were engaged with and used was one of IBM’s significant commitments to science and engineering and an organizational culture based on technology. Organizational learning has a particular technology focus when, as in IBM, strategies for technological accumulation are core elements of competitiveness (Starbuck 1992). Technologically successful organizations tend to base their self-image around their technology (Schein 1985), and the ways they manage, organize, and legitimize technological change is also a reflection of their culture. A culture encouraging open collaboration, experimentation, and sharing ideas by using virtualization underpinned the learning processes around virtual worlds in IBM. Even in firms that have cultures accepting of innovation, however, new ideas often fail to be explored because they suffer from internal “illegitimacy” (Dougherty and Heller 1994, Leonardi 2011). The case of IBM shows that acceptance of virtual worlds was facilitated by the three characteristics of learning organizations identified by Garvin et al. (2008)—supportive learning environments, concrete learning processes, and leadership.

A key condition for the use of virtualization technology to encourage learning in IBM was its emergence in a self-organized community: the VUC. This participative, organic development, especially when it is actively promoted and guided by both its initiators and top management and self-regulated with codes of conduct, overcomes constraints of innovative technologies such as virtual worlds. The high levels of motivation engendered encouraged people to work in their own time, gaining added learning in the organization of the value of the technology.

The formal selection and endorsement brought about by a supporting business process for identifying and developing emergent technologies—the InnovationJam and Emerging Business Opportunities program—added substantially to the legitimacy of the idea of using virtual worlds, as did endorsement from senior representatives of the technology community. Playing with developments on the edge of core business provided IBM an opportunity to experiment with and explore new and unusual technologies and their possible applications. This reinforces learning processes and allows organizations to engage, test, and share ideas that otherwise might have become threatening (March 1991).

Substantial corporate backing and support of leaders and champions of technology—seen, for example, in the company’s CEO appearing in a Second Life reconstruction of Beijing’s Imperial Palace—are further illustrations of a legitimization process characteristic of learning organizations (Garvin et al. 2008). Leaders provided “permission to play” with virtual worlds. IBM’s virtual world strategy is a classic “enacting” model in Daft and Weick’s (1984) sense based on high-level organizational learning in dynamic environments. Its approach has been one of experiment and trial, of measured responses reflecting a desire to keep options open in uncertain circumstances. The convergent recognition process provides the means by which technologies emerging at the boundaries of the organization engage with supportive organizational and business practices and structures to turn them into business opportunities.

The size and complexity of IBM, which helped create the conditions for the constrained learning that so affected the firm in the 1990s (and therefore necessitated focused attention to its negation), also provides many advantages. The company has the resources and space needed for experimenting and playing with new technologies within its substantial internal market, among a large population of technology-savvy users.

Implications for Theory and Practice

Our concern lies with theorizing how and why organizational learning is affected by virtualization technologies. Part of the explanation lies with the characteristics and possibilities of the technology. Although there are studies on the relationship between organizational learning and information technologies, these remain in their infancy (Argote and Miron-Spektor 2011) and have yet to consider the technologies of virtuality (Bailey et al. 2012). A number of features of the virtualization technologies explain their capacity to affect organizational learning. Organizational learning is based on social interaction, and users of virtual worlds were motivated to work and collaborate in a graphically rich, high-fidelity, interactive media that offer presence and copresence, or shared experiences. The sense of “being there together” is enhanced by the technology, providing the capacity to create appropriate spaces for various forms of social interaction. These use “locational clues” to construct spaces conducive to different objectives, from creativity to information sharing. Particular types of interactions in certain spaces may help to bracket off a space; for example, for play, a conversation around a fire on the beach—as in the case of the origins of the VUC—has a different feel from a meeting in the boardroom. The use of visual objects, ranging from the characteristics of avatars to the use of virtual sticky notes, adds to the richness of the medium. These interconnected characteristics—copresence, adaptability of space, and use of virtual representations of people and artifacts—reflect elements of virtuality that differentiate such technologies from other information technologies. Although
these technologies cannot emulate the fidelity of face-to-face social interactions or those provided by high-quality video conferencing, they allow the construction of imaginative new environments: unbounded and unconstrained spaces where interactions can take creative, emergent, and playful forms.

Virtual worlds support Marchian exploration by making it possible to make small experiments with weird ideas and diffusing the ones that prove to be good (March 2006). Other practical implications of our study include identification of the capacity of virtualization technology to deal with some of the unpredictability of using innovative new technologies to support organizational learning by restricting costs and managing complexity. Costs of coordination between disparate parts of the organization are significantly lower when the need for face-to-face meetings is reduced. Compared with other Internet applications or group systems, virtual worlds can provide a more realistic, intense experience, aiding communication. They can also deliver time savings, thereby reducing costs. As the opportunities increase to prototype new products and services virtually rather than physically (Schrage 2000, Thomke 2003), and IBM’s identification of the potential capacity of virtualization technologies to be used in collaborative product and service development processes is increasingly realized, the costs of innovation will potentially be reduced in the future.

Our study develops theorization of the relationship between technology, organizational learning, and play. Virtual worlds are an exemplar technology of foolishness because of the playfulness they engender. In Marchian terms they can counter the constraints of organizational imagination that direct efforts toward immediate efficiencies rather than future options. They were adopted despite skepticism about their value as “games” and the highly exploratory and speculative nature of the their use. March argues, “A strict insistence on purpose, consistency and rationality limits our ability to find new purposes,” whereas “play relaxes that insistence to allow us . . . to explore alternative ideas or possible purposes and alternative concepts” (March 1976, p. 77). Play provides “some temporary relief from control, coordination, and communication” (March 1976, p. 80). By replacing physical transactions and moving exploration and experimentation into virtual, playful environments, virtual worlds help overcome difficulties and constraints to organizational learning identified in the literature. The characteristics of play that assist that process resonate strongly with those identified by Huizinga (1955). Users’ activities in the virtual world are bounded by the possibilities of the technology, defined by accepted rules of behavior, and executed toward organizational objectives.

Practically speaking, this finding points to how rather than being antithetical or complementary to work, the freedom of action associated with play—albeit bound by established rules of behavior—can potentially provide a model for work by constructing a more fulfilling sense of self than simply doing what we are told (Sutton-Smith 1997). In considering actionable suggestions for organizations, we emphasize that it is also important that the people who work with virtual worlds are given sufficient room to see this work as play. The name and physical appearance of an avatar give important clues about the role and identity of the person behind it: a certain playfulness in the design of these attributes may be vital to establish credibility in a particular community of innovators. An IBM manager asked,

Is the corporate world drawing the boundaries around virtual worlds too tightly? What are we losing by excluding play and fantasy from institutional adaptations of virtual worlds? For instance, in our development work, there is active and lively discussion as to whether participants in a business meeting held in Second Life can show up as a rabbit (she can, and she did, though the meeting was about virtual worlds . . .). (Schultze et al. 2008, p. 361, italics in original)

Our final theoretical contribution lies with developing greater appreciation of the connections between technologies of rationality and foolishness. As March suggests, technologies of rationality underlie technologies of foolishness. Our paper explains the rationality of organizational practices, technology choices, and business processes that provide the conditions in which a foolish technology is introduced. These categories are combined in a model of convergent recognition. Our contribution to understanding the combination of technologies of rationality and foolishness lies with explicating the mutually reinforcing processes of engagement and use. Technologies used to encourage foolish play and exploration result from rational, deliberate, and reasoned processes and their resolution derives from an organizational convergence in recognition of their utility. The concurrent and mutually supportive processes of learning to engage with the technology along with learning through its use reconcile technologies of rationality and foolishness.

Limitations
Our study has several limitations beyond its single company and technology focus. We chose to focus on a restricted number of issues: there are other aspects of organizational learning affected by virtualization technologies, such as the construction of virtual teams, conduct of training programs, or use in online communities (e.g., Faraj and Johnson 2011), that warrant greater attention. Furthermore, our study was conducted in a company known for its leadership in innovation, and other organizations may view virtualization technologies differently. Despite being prompted to record positive and negative responses, interviewees accentuated the favorable contributions of virtual worlds at the expense of potential adverse consequences, although where these were
discussed (e.g., regarding ease of use, problems of time zones), they are reported. As the technology further develops and diffuses, greater negativity may be recorded. We can envisage, for example, that circumstances may arise where overreliance prevents the development of highly socialized interpersonal trust, which is so important to many projects. The negative effects of virtual worlds on collaboration warrant further exploration.

At the time of our study, virtual worlds were a new and quickly evolving technology, and there remains uncertainty on their projected pattern of diffusion and use. The technology was likened by a senior figure in IBM in 2009 to being in the same situation as the Internet was 15 years earlier in terms of development and use (Interviewee 2). It retains continuing problems in its ease of use, and there is a cost in learning how to operate virtual worlds. It is difficult to ascertain their likely pattern of development because the phenomenon under observation is highly emergent and its use highly contingent, so it conceivably may be subsumed or replaced by other technologies. The interface problems caused by the use of keyboards may be addressed by advances in haptic technologies that control physical/digital interactions through movement, such as Nintendo’s Wii and Microsoft’s Kinect. Virtual worlds nonetheless provide a useful example of a new generation of “game-like” visualization technology that can contribute to organizational learning.

Questions for Future Research
There are many rich research opportunities yet to be pursued to understand the conditions for effective virtual communications. How does the choice of virtual surroundings affect collaboration and interaction? What effect does the form of the avatars chosen by participants have on their innovativeness? In what circumstances is a meeting facilitator most useful, and what is his or her skill set, especially in culturally diverse settings? How do these conditions vary when the meeting is with internal versus external collaborators? The use of virtuality to assist communications between different organizations is of particular interest and relevance. Technologies that simulate and virtualize are continually developing along with the progress of social networking tools, and researchers face the continual threats and opportunities of studying newly emerging and presently unforeseen platforms.

Technologies such as virtual worlds provide an opportunity to test and develop theory on how new practices become institutionalized and legitimized. Virtualization technologies have implications for theories of leadership, especially how leaders respond to potentially disruptive signals from the periphery of organizations. They provide a particularly rich research field for the study of the importance of play and its relationship with work. And they can add to our understanding of the contribution of organizational culture, particularly those with strong technological identification, in affecting attitudes toward, and use of, new technologies. They provide fertile grounds for future research in organization and technology, and by the playful nature of the technology, they may provide insight into how technologies of foolishness and rationality come to be reconciled not by March’s revolutionaries in pin-striped suits but by their ingenious avatars.

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This research has benefitted from close communications between the authors and senior managers within IBM, which was crucial in allowing access to technologically and commercially sensitive information. IBM did not financially sponsor the research, nor did the researchers gain financially from it. No consultancy or other forms of advice were provided to the company resulting from the research. Like many universities, our respective employers do have a range of research and commercial relationships with IBM, but IBM had no rights to review or comment on our research findings. We acknowledge that our deep engagement with the company as researchers has continually affirmed our interest in technological matters that may color responses from respondents by emphasizing these rather than other factors.

Appendix A. Consolidated Questions Used Across IBM
1. How does IBM view its own readiness to adapt to external shocks and adopt new approaches by engaging in new technologies?
2. How easy/difficult has it been for IBM to integrate new technologies—and specifically virtual worlds—internally? What insight/comments do you have on how it feels to use virtual worlds? What is the actual experience like, including positives and problems?
3. What was the relationship between the previous investments and commitment to other forms of digital collaboration and virtual worlds? Were they seen as complementary or is this a disruptive technology? What are IBM’s strategies towards platform selection?
4. When did you first become aware of virtual worlds, and when was it that you decided that this was something that IBM should take seriously? When did Nick Donofrio (Executive Vice President of Innovation and Technology), Lou Gerstner, and Sam Palmisano come on board?
5. What role did the Virtual Universe Community play in raising awareness of virtual worlds, and how did it relate to the work going on at Hursley? How was the VUC supported by senior management?
6. Was there an explicit strategy of working with virtual worlds within IBM, getting comfortable with it, before any attempt was made to work with it with partners and customers?
7. Do you have concrete examples of using virtual worlds in intra- and interorganizational collaboration? What does a virtual world allow you to do with collaborators that you couldn’t do before? How many users of virtual worlds are there in IBM, what is the extent and focus of their use and patterns of change? How many Virtual World Islands does IBM operate?

8. What activities are easiest to “virtualize”? What activities seem to be resistant to moving to virtual worlds? Have virtual worlds facilitated collaboration between multiple parties (different professional and functional groups, geographical locations, clients, suppliers, etc.) and led to new ways of learning? Is there a virtual world culture developing? A sort of online culture? Is this technology changing the culture of IBM more generally? We are interested in examples of what we call the “playful” use of virtual worlds—i.e., the way they encourage experimenting with new ideas in an unconstrained and fun environment.

9. What about people who are against this? Do some think IBM time and money might be better spent somewhere else? Are there competitors for time and money (pervasive computing, Internet of things, . . .)? Are there losers somewhere?

10. What do you envisage to be the next steps in the use of virtual worlds?

11. Do you know of any existing literature on the history of virtual worlds in IBM or any work that you think captures IBM’s innovation strategy really well?

12. What do you think the main uses of virtual worlds in IBM will be over the next five years?

Appendix B. Interview Respondents

<table>
<thead>
<tr>
<th>Int. no.</th>
<th>Position</th>
<th>Date of interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Distinguished engineer</td>
<td>2007–2009 (continuing discussions in London and Hursley, UK, and Armonk, NY, and conference calls)</td>
</tr>
<tr>
<td>2</td>
<td>Chairman emeritus</td>
<td>2007–2009 (continuing discussions in London and New York, and conference calls), most recently, March 2, 2009 (New York) and October 13, 2009 (London)</td>
</tr>
<tr>
<td>3</td>
<td>Director</td>
<td>June 2007 (London), August 14, 2008 (conference call)</td>
</tr>
<tr>
<td>4</td>
<td>Executive vice president</td>
<td>November 23, 2007 (London), March 17, 2008 and August 5, 2008 (Armonk, NY), August 12, 2008 (Sydney, Australia)</td>
</tr>
<tr>
<td>5</td>
<td>Distinguished engineer</td>
<td>November 5, 2007 (Hursley, UK)</td>
</tr>
<tr>
<td>6</td>
<td>Metaverse evangelist</td>
<td>November 5, 2007 (Hursley, UK)</td>
</tr>
<tr>
<td>7</td>
<td>IBM 3D Internet and Virtual Business</td>
<td>November 5, 2007 (Hursley, UK), July 21, 2008 (conference call)</td>
</tr>
<tr>
<td>8</td>
<td>Vice president</td>
<td>March 17, 2008 (Yorktown Heights, NY)</td>
</tr>
<tr>
<td>9</td>
<td>Director</td>
<td>March 17, 2008 (Armonk, NY)</td>
</tr>
<tr>
<td>10</td>
<td>Executive IT architect</td>
<td>March 17, 2008 (Armonk, NY)</td>
</tr>
<tr>
<td>11</td>
<td>Vice president</td>
<td>March 17, 2008 and August 5, 2008 (Armonk, NY)</td>
</tr>
<tr>
<td>12</td>
<td>Senior vice president</td>
<td>March 17, 2008 (Armonk, NY)</td>
</tr>
<tr>
<td>13</td>
<td>General manager</td>
<td>March 17, 2008 (Armonk, NY)</td>
</tr>
<tr>
<td>14</td>
<td>Director</td>
<td>March 18, 2008 (Hawthorne, NY)</td>
</tr>
<tr>
<td>15</td>
<td>Vice president</td>
<td>March 18, 2008 (Hawthorne, NY)</td>
</tr>
<tr>
<td>16</td>
<td>Research staff member</td>
<td>March 18, 2008 (Yorktown Heights, NY)</td>
</tr>
<tr>
<td>17</td>
<td>Research staff member</td>
<td>March 18, 2008 (Yorktown Heights, NY)</td>
</tr>
<tr>
<td>18</td>
<td>Global director</td>
<td>April 17, 2008, May 2, 2008, and September 8, 2008 (conference calls)</td>
</tr>
<tr>
<td>19</td>
<td>Manager</td>
<td>April 17, 2008 (London)</td>
</tr>
<tr>
<td>20</td>
<td>Executive director</td>
<td>August 1, 2008 (conference call)</td>
</tr>
<tr>
<td>21</td>
<td>Vice president</td>
<td>August 5, 2008 (Armonk, NY)</td>
</tr>
<tr>
<td>22</td>
<td>Senior vice president and director of research</td>
<td>August 5, 2008 (Armonk, NY)</td>
</tr>
<tr>
<td>23</td>
<td>Vice president</td>
<td>July 21, 2008 (Hursley, UK)</td>
</tr>
<tr>
<td>24</td>
<td>IBM Fellow, vice president, and vice chair, Board of Governors of IBM Academy of Technology</td>
<td>August 13, 2008 (conference call)</td>
</tr>
<tr>
<td>25</td>
<td>Chief technology officer and distinguished engineer</td>
<td>August 15, 2008 (conference call)</td>
</tr>
<tr>
<td>26</td>
<td>Manager</td>
<td>August 27, 2008 and November 7, 2008 (email correspondence)</td>
</tr>
<tr>
<td>27</td>
<td>Distinguished engineer and developer of Virtual World Academy of Technology Meeting</td>
<td>March 5, 2009 (Poughkeepsie, NY)</td>
</tr>
<tr>
<td>28</td>
<td>Director</td>
<td>March 5, 2009 (Yorktown Heights, NY)</td>
</tr>
<tr>
<td>29</td>
<td>Vice president</td>
<td>March 5, 2009 (Pleasantville, NY)</td>
</tr>
<tr>
<td>30</td>
<td>Chief technology officer</td>
<td>March 5, 2009 (Pleasantville, NY)</td>
</tr>
<tr>
<td>31</td>
<td>Chief technology officer and co-chair of Virtual World Academy of Technology Meeting</td>
<td>March 8, 2009 (conference call)</td>
</tr>
<tr>
<td>32</td>
<td>Distinguished engineer</td>
<td>November 23, 2009 (Sydney, Australia)</td>
</tr>
</tbody>
</table>
Endnotes

1See Dierkes et al. (2001b) for a comprehensive overview of the large literature on organizational learning.

References


Overby S (2008) Strategic planning in the real world: Everyone agrees that having a strategic plan for IT is a good thing, but most CIOs approach the process with fear and loathing. *CIO* 21(8):28–37.


Mark Dodgson is a professor and director of the Technology and Innovation Management Centre at the University of Queensland Business School. He received his Ph.D. from Imperial College. His research encompasses innovation management and policy and the changing nature of the innovation process.

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