From Content to Context: Videogames as Designed Experience

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Interactive immersive entertainment, or videogame playing, has emerged as a major entertainment and educational medium. As research and development initiatives proliferate, educational researchers might benefit by developing more grounded theories about them. This article argues for framing game play as a *designed experience.* Players' understandings are developed through cycles of performance within the gameworlds, which instantiate particular theories of the world (ideological worlds). Players develop new identities both through game play and through the gaming communities in which these identities are enacted. Thus research that examines game-based learning needs to account for both kinds of interactions within the gameworld and in broader social contexts. Examples from curriculum developed for *Civilization III* and *Supercharged!* show how games can communicate powerful ideas and open new identity trajectories for learners.

Although beneath the radar of many educators, November 9, 2004, was the largest-grossing media day in world history. No, the occasion was not the release of *Spiderman2* or the latest *Star Wars* movie. The $125 million grossed on November 9 was for *Halo 2,* the anticipated sequel to the hit Xbox game *Halo.* Immersive interactive digital entertainment, or videogame playing, has emerged as an important medium exerting tremendous economic, cultural, and social influence. Many of today's youth spend more time playing in digital worlds than they do watching television, reading, or watching films (Funk, Hagen, & Schimming, 1999; Williams, 2003). How is all this time that is spent living in virtual worlds affecting people, schools, and our society? How will students react to the "grammar" of traditional schooling when they can buy entire "worlds in a box" for $50 (Gee, 2004; Squire, 2002)? The importance of gaming for education might best be summarized by the rhetorical question an elementary school student raised at the Game Developer's Conference: "Why read about ancient Rome when I can build it?" (Moulder, 2004). Survey studies suggest that game experiences are changing a generation's attitudes toward work and learning. However, these studies are largely overlooked by educators (Beck & Wade, 2004).

Games are an important site of a shift toward a *culture of simulation,* whereby digital technologies make it possible to construct, investigate, and interrogate hypothetical worlds that are increasingly a part of how we work and play (Turkle, 1995). Simulations play an increasingly important role in everything from conducting scientific inquiry to predicting the weather, to debating the future of Social Security (Casti, 1997; Starr, 1994; Wolfram, 2002). For the lay public, however, the medium of videogames is most often our first entrée into the culture of simulation (Starr). Videogame players can lead civilizations, fly aircraft, lead squadrons of urban warriors in foreign countries, or participate in virtual societies with their own languages, cultures, and economies (Squire, 2002; Steinkuehler, in press b). Consider *Full Spectrum Warrior,* a game designed by the U.S. Army in conjunction with the University of Southern California, which is both an urban warfare training tool and a commercial entertainment videogame where ordinary citizens can lead squadrons in urban environments. But games are not just static code; rather, they are sociotechnical networks. For example, *America's Army* is the $8 million game developed by the U.S. Army to attract new recruits. Not only does *America's Army* encode the Army's values into the game play, but it is also designed so that veterans, military personnel, and civilians can play together, creating an Army-owned space to interact with the public (Li, 2004).

America's Army and *Full Spectrum Warrior* are obvious, if not controversial, examples of the experiences that games can provide. However, a deeper look into gaming reveals a plethora of experiences available for children (and adults) that are more or less unknown in school. Farming and town simulators such as *Animal Crossing* and *Harvest Moon,* games aimed at younger children and available on the Nintendo *GameBoy,* make it possible to plan and plant crops, pay off mortgages, and essentially run a farm. Disney's *Toontown* allows kids from around the world to interact in a realtime 3D world where they meet and chat with other kids, engage in collaborative quests, and outfit their own furnishings (Mine, Shocet, & Hughston, 2003). For an even more dramatic example, consider a Chinese 16-year-old playing the Korean-based game *Lineage,* in which she becomes an international financier, trading raw materials, buying and selling goods, and speculating on currencies bought up by players in Europe and North America (Steinkuehler, 2004b). While videogames can be thought of as an extension of earlier media, clearly today's Internet connectivity, computational power, and 3D rendering ability make whole new kinds of experiences available outside school.

In this article, I argue that educators (especially curriculum designers) ought to pay closer attention to videogames because they offer *designed experiences,* in which participants learn through a grammar of *doing* and *being.* Until recently, there has been little study of the medium or of the implications of its attendant social

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structures for formal education (see Gee, 2003; McFarlane, Sparrowhawk, & Heald, 2002; Squire, 2004; Steinkuehler, in press a). However, "serious" games, or games used for purposes other than entertainment, are entering most public spheres and are estimated to be a $75 million annual industry, growing to perhaps $1 billion by the end of the decade (Erwin, 2005). Groups as diverse as the U.S. military, the National Association of Home Builders, and the National Alliance (a neo-Nazi organization) invest in games that represent their ideological views; but traditional educational interests are much slower to respond and less well represented within the serious games movement. Corporations, the military, and nonprofits are turning to games to express their ideologies; the challenge for K–12 educators is not just how to respond, but also how to mobilize and make available their own ideological views.

To date, educational research that treats videogames seriously has been slim, with the bulk of existing work examining representations in games. However, a mature body of educational games scholarship should address three interrelated areas: the critical study of games as participation in ideological systems, "learning as performance," and educational games as designed experiences. Central to the serious study of games are questions of how players make sense of these digitally mediated experiences: If games are "possibility spaces," then researchers need to account for how players inhabit them and the mechanisms by which meanings become interpreted from these experiences. For educators designing games, this shifts the question from one of "delivering content" to one of "designing experience." Many important questions persist—such as how games create and mobilize hybrid identities for players, and how these identities are enacted across contexts. However, given the contradictions between the grammar of games and the grammar of schooling, a bigger question looms: How will students react to the "designed experience of schooling" with its attending potential identities? Right now, it appears that corporations, the military, and private interests are ready to capitalize on this mismatch between the compelling learning potentials of educational media and schools' slowness to react to the changes. As these other groups leverage games toward their political agendas, the question is how the public sector will respond.

Games as Participation in Ideological Worlds

In a 2002 Missouri court decision on the legality of restricting access to violent videogames (*Interactive Digital Software Association v. St. Louis County,* 2002), Senior U.S. District Judge Stephen N. Limbaugh wrote:

> This court reviewed four different video games and found no conveyance of ideas, expression, or anything else that could possibly amount to speech. The court finds that video games have more in common with board games and sports than they do with motion pictures.

Eventually, the 8th Circuit Court overturned Limbaugh's decision, with Judge Morris S. Arnold writing that videogames "are as much entitled to the protection of free speech as the best of literature'" (*Interactive Digital Software Association v. St. Louis County,* 2003, p. 5). Indeed, most games communities and the games press picked up on the logical contradiction behind Limbaugh's decision: If games cannot represent a point of view, then why care who plays them? (See Figure 1.) The notion that *Grand Theft Auto: San Andreas* or *Deus Ex 2* might communicate ideas is becoming increasingly accepted, but research and theory on how to make sense of games as interactive texts lags behind. Contemporary criticism of games—from a multiplicity of perspectives—assumes that the *presence of* violence or misogyny in a game world is necessarily equated with *advocating* violence or misogyny and thus creates violent or misogynist attitudes in players.

To illustrate the problem with this view, it is worth examining *Grand Theft Auto: San Andreas,* a controversial game representing aspects of 1990s Los Angeles urban culture, as an interactive text. The player inhabits the character of Carl Johnson, a Black man who is returning to the city of San Andreas to attend his slain mother's funeral. The player is handed a bicycle, which he is told to ride home, but after the first mission the player is more or less free to do as he or she pleases. The game does not require players to run over, shoot, or harm a player character in the game; these are choices that players might make. To be sure, there is a particular ideology at work in the game. The violent streets of San Andreas are rife with gang warfare, and certain actions are rewarded in ways, while others are not even possible. Thus we can talk about *San Andreas* as a *world,* and it is a world with particular rules that give consequence to actions. To survive in this world, players need to learn the underlying rule systems and how they interact.

Of course, *San Andreas* is not "any old world" but a stylized rendition of 1990s California, containing a mixture of authentic and fictitious California landmarks and neighborhoods, mostly in the Los Angeles area. And the "Los Angeles" depicted in *San Andreas* is not "any old Los Angeles," but one created by a team of developers from Dundee, Scotland, most of whom first visited California during preproduction for the game and were a little

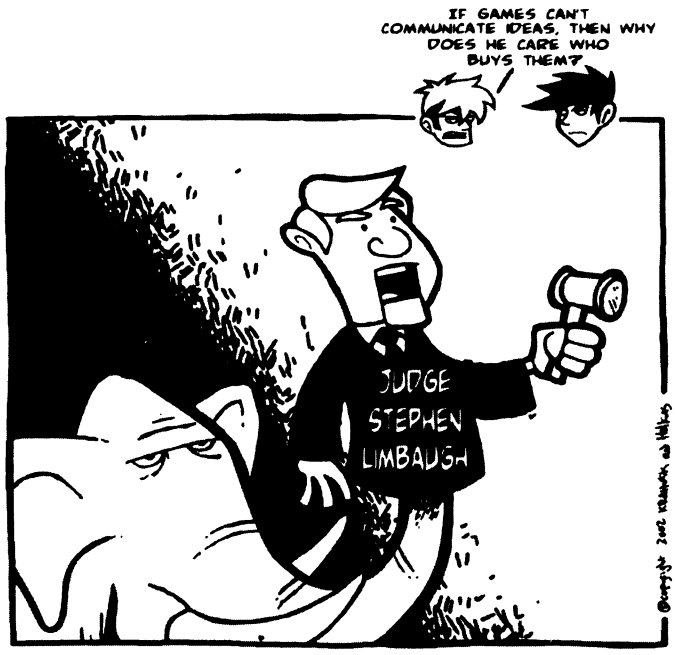

FIGURE 1. *A Penny-Arcade cartoon mocking Judge Limbaugh's ruling. The cartoon was quite popular and represented typical gamer discourse surrounding the decision. From* http://www.penny-arcade.com/view.php3?date=2002-04-26&res=l, *reproduced with permission of publisher.*

surprised that it was not as described in popular media. Thus *San Andreas* is a curiously global artifact, the product of a team of Scottish developers who, having been raised with the fictitious Los Angeles of N.W.A.'s music and Spike Lee's films, now export that culture back to Americans. Players are invited to try on the persona of an inner-city Black gangster, experiencing in stylized form *some* of what it means to live in a 1990s hip-hop world. For some players, inhabiting Carl Johnson may be an empowering experience, enabling them to understand America's fear of and fascination with the urban African American male. Other players might ponder the limited choices and identities presented to African American males or representations of African Americans in popular media, or America's fetishization and marginalization of hip-hop culture.

Among game players, the *Grand Theft Auto* series is most noted for the free form play it allows. It is common knowledge that most players never complete a majority of the missions, instead using the game as a driving- or chase-scene simulator of sorts. For players, part of what makes *San Andreas* interesting is the material that it provides for creating interesting interactions—whether in driving into the countryside in a "pimped-out" 1970s-style sedan or stealing a hot dog truck and driving it through a recreation of a 1990s Compton neighborhood. It is critical that researchers examine what players actually do with games, rather than assuming that there is any one "game itself" as it is meant to be played.

If a hallmark of games is their *interactivity,* their ability to grant players *agency* within the narrative fiction of the gameworld and its rules, then theoretical models need to account for players' actions in creating the experience. Indeed, because play is instantiated only through players' actions, tensions arise over who exactly is the "author" of the game experience. As noted game designer Doug Church (2000) describes, "Our desire to create traditional narrative and exercise authorial control over the gaming world often inhibits the players' ability to involve themselves in the game world" (cited in Kreimeier, 2000). Many designers have come to see games as vehicles for player expression, thinking of game design as choreographing the rules, representations, and roles for players, in other words the contexts, in which players can generate meaning (LeBlanc, 2005). As such, game designers "write" the *parameters* for players' experience, and the game experience as such is best described as an interaction between the game designer and player (Robison, 2004).

If player agency is central to the medium, then we can only understand games' meanings by understanding what players *do* with them and the meanings that players construct through these actions (Malone, 1981; Murray, 1997). Too often, past analyses have focused on representations in the games or on the games' surface features, without examining gaming practices or experiences, or the games' meanings for their players (Jenkins, 1992; Jenkins, in press; Provenzo, 1991). Whereas traditional critiques of games have focused solely on the text, images, and animations, the fact that games can be enacted only through the player requires theoretical models that span the game and its contexts of consumption. As the case of *San Andreas* suggests, understanding a game's context of production may also be important for understanding the layers of meaning in a text.

For an example closer to education, take *Civilization III* (the third installment of the top selling *Civilization* franchise), a strategy game where the player rules a civilization from 4000 B.C. to the present. The game is based on a geographical-materialist game system where players build cities to gather resources (food, natural resources, and commerce; Friedman, 1999). Players also build cities, engage in trade, and of course wage war, giving rise to situations such as civilizations negotiating (and perhaps warring) over scarce resources such as oil. The central features of the game system present an argument for the fates of civilizations as largely governed by geographical and materialist processes, an argument also made by Jared Diamond (1999) in his Pulitzer Prize–winning *Guns, Germs, and Steel.* A single game requires about 20 hours to play, and achieving mastery requires one hundred hours or more (Squire, in press a).

A number of educators and critics have raised valid concerns that what players learn from games is not the properties of complex systems but simple heuristics (e.g., one learns the strategic necessity of always keeping two spearmen in every city). The fear is that without access to the underlying model, students will fail to recognize simulation bias or the "hidden curriculum" of what is left out (see Starr, 1994; Turkle, 2003). In a dissertation study of poor African American ninth-graders playing *Civilization III,* Squire (2004) found that most students turned the game into a simulation of European colonization, asking, Why is it that Europeans colonized the Americas, and why did Africans and Asians not colonize America or Europe? In school, most of these students were given a historical narrative of the steady march of Western liberty, democracy, and rationality (see Dunn, 2000; Manning, 2003). In contrast, *Civilization III* can offer a story of advantageous geographical conditions that provides access to global trade networks, resources, technologies, and limited opportunities for population expansion. In the words of one student, the game shows "how geography and gold (i.e., materialist goods) determine how history plays out" (Squire, in press a). Thus *Civilization III* enlisted students' identities as gamers and created a space where they could bring their own experiences to the study of world history.

Although *Civilization III* was designed more as entertainment than as a political statement, many contemporary videogames *are* designed with politics in mind. *Deus Ex* is a popular science fiction game series full of government-sponsored terrorists, powerful corporations, and duplicitous leaders. The goal behind the original game, according to designer Warren Spector, is to give the player moral choices between trusting organizations and trusting individuals, and to let the player rethink who is considered an "enemy" of the state. In *Deus Ex 2,* the player must continuously decide whether to ally with multiple competing organizations (governments, corporations, family loyalties) in a world where every choice involves moral ambiguity and no decision is ethically "right." Personal politics aside, it is clear that games are introducing players to powerful ideas, some of which may align with school, some of which may not.

Games provide high graphic, dynamic "worlds in a box," but these worlds are not full representations of reality; they are stripped-down worlds, with limited opportunities for interaction. A *Civilization III* player cannot invent a new religion, and a *Deus Ex 2* player cannot (really) make love to an NPC (nonplayable or computer character). Thus games focus our attention and mold our experience of what is important in a world and what is to be

ignored. The game designers' choices, particularly of what to strip away from a world, can be read as ideological when considered in relation to other systems (Starr, 1994). We are only beginning to understand how these games are interpreted and understood by their players. Building from work on other media (see Black, 2005; Jenkins, 1992), we can predict that some of this interpretive work occurs through *interpretive communities* where meanings are produced, negotiated, and given legitimacy (Dewey, 1938; Scardamalia & Bereiter, 1996).

Knowledge as Performance

To date, there are few studies of learning through game play, although games are rich sites for studying learning, for both practical and theoretical reasons: Practically, it is important to know what players are taking away from games such as *Grand Theft Auto, Civilization III,* and *Deus Ex 2,* as well as such games' potential as educational media, given recent interest in games in e-learning (Aldrich, 2005). Theoretically, games are interesting in that they are sites of naturally occurring, intrinsically motivated learning. Early studies of games showed how they use challenge, curiosity, control, and fantasy (as well as opportunities for social interaction, competition, and collaborative play) to engage players (Malone, 1981; Malone & Lepper, 1987). These same design features have been used to increase learning on pre-post gains in controlled studies using mathematics software (Cordova & Lepper, 1996). Such studies suggest the promise of deriving learning principles from studies of games but are focused on a relatively general level of abstraction and do not account for innovations from the last two generations of games, such as *interactive narratives, collaborative problem solving,* and *game players as producers* (Squire, 2003).

Digital Games as Microcosms for 21st-Century Learning Environments

Today's generation of games contain a whole new set of features, making them intriguing suites of learning. Specifically, they are sites where we can look at learning both as (a) interaction in the social and material world, where learners participate in open and closed problem solving; and (b) participation in distributed social organizations such as self-organizing learning communities, which are "microcosms for studying the emergence, maintenance, transformation, and even collapse of online affinity groups" (Steinkuehler, in press a). In short, just as previous generations of psychologists studied expert chess players, Vai tailors in West Africa, or the navigators of destroyer warships as examples of "cognition in the wild," we might study games as sites of digitally mediated learning (Chase & Simon, 1973; Hutchins, 1995; Lave & Wenger, 1991). James Paul Gee (2003, 2004, 2005) argues that videogames are an ideal laboratory for studying learning principles because, as the games increase in complexity, game designers embed structures to help players learn them. Examining these features may provide insights into the design of other learning environments—particularly educational software. Virtual worlds, in particular, might help us understand how to design distributed communities of practice, or affinity groups stretched across physical space and linked by telecommunications technologies such as the cell phone and Internet.

Learning by Doing

A core characteristic of games is that they are organized around *doing.* They are uniquely organized for a *functional* epistemology, where one learns through doing, through performance (Squire, in press a). Cognition in digital worlds is thoroughly mediated by players' capacities for action: The player's actions are his or her interface with the world (Clinton, 2004; Young, 2004). Legendary game designer Shigeru Miyamoto claims to design games around the verbs that players enact, and these verbs—the running, jumping, diving, punching, kicking, and swinging through enemies and obstacles—are the building blocks by which players *become* action heroes, civilization leaders, or L.A. gangsters (Clinton, 2004; Sheff, 1993; Squire, 2005a). It is no coincidence that players new to a game start by picking up a controller and seeing what they can do, as figuring out "what the body can *do* in the world is figuring out who you *are* in that world" (Clinton, 2004, p. 3). Of course, game players aren't doing just anything in these worlds, they are motivated by challenges set up by designers (or constructed by the players themselves), and are limited by the constraints of the game system.

Perception of the game world is the other half of the perception/action system. Games' graphics are more than pretty pictures; they are signs that the player must learn to read. As players interact with the world to ascertain possibilities for action, they develop a *professional vision* for the affordances of the world (Gee, 2005; Goodwin, 1994; Jenkins & Squire, 2004). This vision is shaped by the strategic significance of the world's signs; a *Viewtiful Joe* player, for example, learns to read the signs of the system in terms of his or her goals and needs in the space (the first being to stay alive), pointing to the importance of *intentionality* in cognition and understandings (Barab et al., 1999; Squire, in press b). Critically, games require players to learn to read the game space under what Dewey might call "the threat of extinction." The game is quite literally over for the player who fails to "read" *Viewtiful Joe.*

Through recursive cycles of perceiving and acting, thinking and doing within the game system, a player begins to adopt a particular perceptivity of an avatar within the game world; the player becomes a hybrid version of himself or herself playing as Carl Johnson in *San Andreas* or the leader of a civilization (Gee, 2005). Examining games from a socially situated linguistics framework, Gee (2003) argues that games set up *projective identities* for players, spaces where they develop unique hybrid characters, which Gee calls the "Jim Gee playing as Lara Croft" hybrid. The resultant game actions are a synthesis between the character and the affordances—capacities for action of the avatar. Critically, players learn not just facts or procedures but how to "be" in the world as the game character, developing the appreciative systems of the avatar as well. This problem—how to set up transformative identity spaces—is also a core enterprise for educators, who want to help students become scientists, doctors, or global activists (Shaffer, Squire, Halverson, & Gee, 2005). Educators in general, and educational technologists in particular, might benefit by thinking of videogames as a "research and development lab" for educational theory and practice.

Participating in Social Worlds

Given the technical sophistication and visual appeal of videogames, it is tempting to focus on the properties of games-as-objects;

however, videogames and their use are mediated by social structures, such as families, peer groups, affinity groups, or classrooms (Crawford, 1982; Hakkarainen, 1999; Mitchell, 1985; Salen & Zimmerman, 2004; Squire, 2002, 2003). Indeed, if we observe them, most children playing games will be talking, sharing strategies, downloading FAQs from the Internet, or participating in online forums (to say nothing about the media—drawings and stories—that they create about games). Game play, as an activity, frequently spans multiple media (Squire & Steinkuehler, in press). Most gamers describe their play as a social experience, a way to connect with friends, and rare is the player who truly games "alone" in any meaningful sense (Kuo, 2004; Johnson, 2005a).

The most intense social learning is found in massively multiplayer games, games where players interact with thousands of other players in real time over the Internet. Unique to these games is the *persistent game world.* The game world itself is online 24 hours a day, 7 days a week, across sessions, so that if my character on *Star Wars Galaxies* owns a house, it is in the world whether I log in or not. Players' avatars also persist across sessions, so that their online avatar becomes another identity that they inhabit. Psychologist Sherry Turkle (1995) calls this unique state *pseudonymity.* Players have a degree of anonymity, but it is mediated through avatars' histories and roles within the community. The most noted example of these spaces has been the way that they allow players to explore new identities, particularly ones where they inhabit worlds through different genders (Bruckman, 1999; Steinkuehler & Chmiel, 2005). Already, a number of legal scholars, economists, and sociologists are using them as laboratories to gain fundamental insights about their fields (Castronova, 2001; Ondrejka, 2004). A growing number of educators are doing the same (Lemke, 2004; Steinkuehler, in press a).

Once the domain of "computer nerds and hackers," persistent online game worlds are now entering the mainstream. Disney's *ToonTown,* a massively multiplayer online role-playing game (MMORPG) aimed at elementary-school-aged kids, now reaches more than a hundred thousand subscribers and is rising (Woodcock, 2005). In *ToonTown,* players create cartoon avatars and band together in teams to play pranks on "cogs," evil cartoon villains who want to turn *ToonTown* into a drab office environment (Mine et al., 2003). *World of Warcraft,* the current king of MMORPGs, boasts 6 million global subscribers as of this writing (Woodcock, 2005). Aimed at a general gaming market, *World of Warcraft* (somewhat like *Everquest* before it) is also attracting a large number of school-age children (Squire, 2005b). The social pressure of such games, where players literally live second lives in virtual worlds, has yet to become much of a mainstream issue in the United States, although China and Korea both have experienced social friction from online gaming (British Broadcasting Corporation, 2005). In China, legislation has been passed limiting youth access to online games, affecting *World of Warcraft* (with over 2 million Chinese subscribers), among others. As global gaming cultures continue to grow, everyday American game players are beginning to experience the kind of social, economic, and cultural issues (virtual sweatshops, virtual racism) that arise from a global gaming market where virtual currencies and labor flow freely across national boundaries (Loftus, 2005; Steinkuehler, 2004a; Thompson, 2005).

As designed cultures, persistent world games function more like digital nations than like traditional games, making them intriguing sites for studying how people reciprocally inhabit and create culture (Bartle, 1996; Squire & Steinkuehler, in press). At a minimum, to be an expert player means not just learning a specialized language—knowing the difference between "kiting" and "trolling," "beta vets" and "n00bs," "twinking" and "nerfing"—but also participating in practices in socially valued ways. "Being" a competent druid, princess, droid maker, architect, or speculator in an online world demands learning new geographies, literacies, rule systems, and ways of expressing oneself (Leander & Lovvorn, 2004; Steinkuehler, 2003; Squire & Steinkuehler). One productive tract for inquiry is studying such environments as laboratories for how societies function (Steinkuehler, 2005). A second may be to examine the disconnect between the kinds of identities made available for players in games (e.g., international money trader), and those available to students in school (passive recipient of knowledge).

In popular media, videogames are frequently blamed for a decline in literacy, intellectual life, and even civic engagement (Solomon, 2004). Despite the many "literacy" scares based on fear that games will replace text, Steinkuehler (in press a, in press b) finds that participation in Massively Multiplayer Online (MMO) Discourses *is itself* a literacy activity. Facility with written language is central in the community as players use text to negotiate activities, enact identities, and apprentice others into the community. Using discourse analysis, Steinkuehler (2004b) describes a defining feature of apprenticeships as *joint participation in mutually valued practices,* wherein an expert, modeling expert behavior, guides practice by focusing attention on important environmental features and gradually entrusts control to the apprentice. All of these practices occur within legitimate game play and with all information given just-in-time. As Steinkuehler emphasizes, players are "socialize[d] into certain ways of being and understanding the virtual world, ways that are tied to particular values" (pp. 6–7). In short, participation in MMOs constitutes participation in social practices with real consequences for its members.

To date, there are still relatively few studies of what players do in these environments or what the consequences are for participation outside the game context. Participation in online gaming—much like high-end participation in any part of today's popular culture (i.e., Pokemon, fan fiction), demands a range of (primarily written) social practices, eliciting an enormous amount of reading, writing, research, analysis, and argumentation (Black, 2005; Jenkins, in press; Johnson, 2005a; Leander & Lovvorn, 2004; Steinkuehler, 2004a; Steinkuehler, Black, & Clinton, 2005). Typical game practices—including mentoring, writing FAQs, participating in message boards, developing fictional back-stories, and creating mathematical models of game systems are quite similar to many practices valued in school (Steinkuehler & Chmiel, 2006). As such, they could be *leading activities,* activities that orient learners to academically valued practices and their underlying purposes, both of which are critical for academic success (Brown & Cole, 2002). Given contemporary theories of transfer as preparation for future learning, whereby "good learning" is that which prepares one for future success, games and other forms of popular culture could be educationally important, raising important equity issues about who has access to such communities (Johnson, 2005a, 2005b). Outside school, in

games such as *Star Wars Galaxies,* students have opportunities to become architects, shopkeepers, designers, warriors, Jedi, financial traders, or dancers, and can make real world wages while playing a game. Will we provide students similarly diverse opportunities for experience in schools?

Games as Designed Experience

Given the complexity of games such as *Sim City* and the ability of gaming technologies to support interaction among thousands of users in photorealistic worlds and in real time, it is no wonder that games are attracting attention as a medium for learning (Aldrich, 2005; Games-to-Teach Team, 2003). On the one hand, given that nearly every other medium has been used for learning, it seems self-evident that games eventually will become a part of our educational system. On the other hand, games embody values (collaborative learning, learning through failure, personalized learning) that are at odds with the grammar of formal schooling (Beck & Wade, 2004). The history of educational media suggests that media that do not conform to the values of the broader system will not be taken up (Cuban, 1986). Although drill and practice games and relatively simple simulation activities have long been used in formal learning environments, today's contemporary games, which frequently last for 40 hours or more, operate under different assumptions (see Table 1). The game provides a set of experiences, with the assumption being that learners are active constructors of meaning with their own drives, goals, and motivations. Most good games afford multiple trajectories of participation and meaning making. Content is delivered just-in-time and on demand to solve

Table 1
Contrasting Game Types

Aspects	Exogenous Games[a]	Endogenous Games[b]
Learner is . . .	An empty receptacle. An example is *Math Blaster,* where the learner is "motivated" to learn a prescribed set of skills and facts.	An active, sense-making, social organism. An example is *Grand Theft Auto,* where the learner brings existing identities and experiences that color interpretations of the game experience.
Knowledge is . . .	Knowledge of discrete facts. The facts are "true" by authority (generally the authority of the game designer).	Tool set used to solve problems. The right answer in *Civilization* is that which is efficacious for solving problems in the game world.
Learning is . . .	Memorizing. Learners reproduce a set of prescribed facts, such as mathematics tables.	Doing, experimenting, discovering for the purposes of action in the world. Players learn in role-playing games for the purposes of acting within an identity.
Instruction is . . .	Transmission. The goal of a drill and practice game is to transmit information effectively and to "train" a set of desired responses.	Making meaning/construction, discovery, social negotiation process. Instruction in *Supercharged!* involves creating a set of well-designed experiences that elicit identities and encourage learners to confront existing beliefs, perform skills in context, and reflect on their understandings.
Social model is . . .	"Claustrophobic." Players are expected to solve problems alone; using outside resources is generally "cheating."	Fundamentally group oriented. Games are designed to be played collectively, in affinity groups, and distributed across multiple media. They are designed with complexity to spawn affinity groups and communities that support game play.
Pre-knowledge is . . .	Set of facts, knowledge, and skills to be assessed for proper pacing. In *Math Blaster,* players' self-efficacy in mathematics is not addressed.	Knowledge to be leveraged, played upon. Pre-knowledge is expected to color perception, ideas, and strategies. In *Environmental Detectives,* challenges are structured so that players become increasingly competent and learn to see the value of mathematics.
Identity is . . .	Something to be cajoled. If players are not "motivated" to do math, the game developer's job is to create an "exciting" context for the learner.	Something to be recruited, managed, built over time. In *Environmental Detectives,* learners develop identities as scientists.
Context is . . .	A motivational wrapper. The context in *Math Blaster* is something to make learning more palatable.	The "content" of the experience. In *Civilization,* the geographical-materialist game model is the argument that situates activity and drives learning.

[a]Games in which the context is extrinsic to the game play.
[b]Games in which the context and game play are inextricably linked. (These terms are from Rieber, 1996).

problems. An emerging model of games suggests that they excel by providing learners with situated experiences of activities, whereby they develop new ways of thinking, knowing, and being in worlds (Shaffer, Squire, Halverson, & Gee, 2005).

Entertainment Games Used for Learning

Many in the current generation of students first experience history, urban planning, or business not through school, television, or movies but through videogames. The *Sim City, Civilization,* and various *Tycoon* simulation games are now about 15 years old, and for about as long, educators have hypothesized that they could be effective learning tools (e.g. Berson, 1996; Hope, 1996; Kolson, 1996; Prensky, 2001; Teague & Teague, 1995). Although teachers around the country use or have used *Sim City, Civilization,* and *Rollercoaster Tycoon* in urban planning, world history, or physics classes, there has been little academic study of how learning occurs through such programs or how conceptions of history or urban planning change as they are represented through digital media.

Emerging studies of educators using videogames suggest that the videogames are much more complex than earlier game-based media. For example, turning *Civilization III* into a colonial simulation affected the kinds of questions students asked as well as the observations and interpretations they made about history. For the most part, students interpreted their game events in terms of preexisting notions of colonization or geography but expanded and modified their understandings of colonization in the process of playing. As players managed natural resources, they learned not only where oil, coal, or sugar cane is located but how these resources affect the growth of civilizations. Ross Dunn (2000) called this approach to world history the "patterns of change" model, wherein world history consists of patterns of human activity across broad time-scales, as opposed to the traditional national or "Western civilization" approach.

Students used these game experiences to think about why civilizations grow, flourish, and fade, and how wars, revolutions, and civilizations evolve as the products of interweaving geographical, social, economic, and political forces. Many students who rejected traditional school-based curricula as "heritage" or cultural myths of "Western progress" found that *Civilization III* allowed them to "replay history" and learn history through geographical materialist lenses rather than the ideology of Western progress. In one discussion (reported in Squire & Barab, 2004), students explain what they learned through playing *Civilization III:*

> *Tony:* Luxuries buys you money and money buys you everything. The right location gives you luxuries gives you income more income gives you technology which affects your politics. It all connects.
>
> *Kent:* Geography affects your diplomacy because it gets you more resources and affects how they treat you.
>
> *Tony:* Geography can affect the growth of your civilization.
>
> *Dwayne:* It affects your war.

As students interacted with the game and discussed it in class, they began to understand its ideological bias and at times, took it up as a framework for explaining world history. But simulation games also remediate games in ways that educators ought to consider more deeply. When asked to describe what he learned from this unit, Tony commented, "I learned that no matter how it plays out, history plays by the same set of rules."

Games as New Educational Media

If we take McLuhan's "the medium is the message" seriously, then it is interesting to think about how representing ideas through games remediates how we experience those phenomena (Holland, Jenkins, & Squire, 2003). Conceptualizing domains through the medium of games means taking content and rethinking it in terms of designed experience, as represented through challenges, goals, and practices (Games-to-Teach Team, 2003). Such an approach might allow educators to go beyond traditional notions of education as "exposure to content" and reimagine it, along progressive lines, as enrichment of experience (Dewey, 1938; Gee, 2004). Contemporary games function in ways very different from traditional "educational" games; whereas traditional educational games use context as a motivational wrapper for the game experience, contemporary games literally put players *inside* game systems. Expanding on Rieber's (1996) distinction between endogenous and exogenous games, we can contrast games where the context *is* the game play with games where the context is irrelevant to game play (see Table 1).

As an example of what a game-based pedagogy might look like, consider the physics game *Supercharged!* that was developed at MIT to help students learn basic concepts in electrostatics (Jenkins, Squire, & Tan, 2004). Studies of physicists in labs show that, in order to understand physics phenomena, the physicists frequently put themselves *into* problem spaces. Ochs, Gonzales, and Jacoby (1996) write that "scientists express their subjective involvement . . . by taking the perspective of (and empathizing with) some object being analyzed and by involving themselves in graphic (re)enactment of physical events." Electrostatics, a foundational area in physics, is particularly difficult for students to grasp because—although they may use electricity or even play around with magnets—they have no *direct experience* of charged particles interacting or moving through magnetic fields. Given that one of the affordances of games is the way that they place players within systems, the designers of *Supercharged!* hoped to give students the experience of entering the arena of physics problems just as physicists do, an instructional strategy common to the qualitative physics approach (diSessa, 1998; Forbus, 1997; Jenkins, Squire, & Tan).

In *Supercharged!,* players enter a world of electrostatic charges and must lead a group of virtual classmates through levels that are matched to classic physics thought experiments. Building on diSessa's notion of intuitive physics, game levels are designed to confront players' understandings of physics phenomena and to help them develop more robust intuitions of electrostatic physics through a playful rethinking of traditional physics curricula. Figure 2, for example, shows a level designed to build players' intuitions about electrostatic forces and distance; players, attempting to go straight through the level and toward the goal frequently hypothesize that the forces generated from each charge will negate one another or create a balance of forces. In reality, because the strength of a force diminishes over distance by the square of the distance (Coulomb's Law, $F = kqQ/r^2$), the player quickly moves toward the charge that is closest to his or her position (the point of view of the camera). As players confront a variety of levels designed to elucidate this mathematical principle, they begin to intuit how electrostatic forces interact.

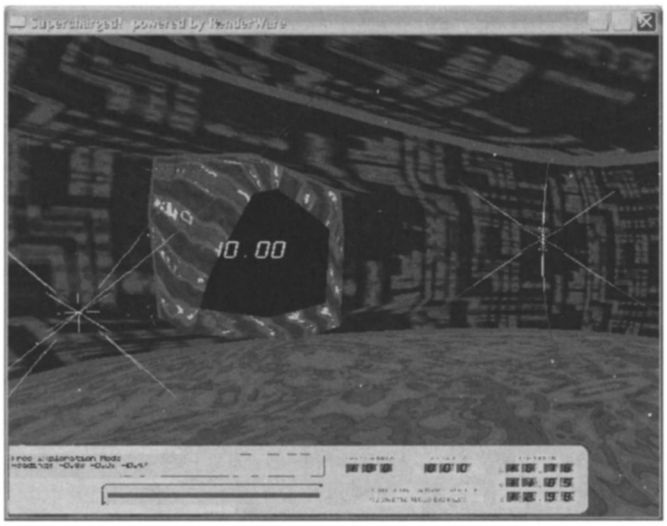

FIGURE 2. *Screen shot from* Supercharged! *The player's position is represented by the camera position. The black hole is the goal and the numbers indicate the distance to the goal. The stars indicate negative electric charges; the lines are field lines showing the force of the charge. Copyright 2006 by Massachusetts Institute of Technology. Reproduced with permission.*

In a study of *Supercharged!* in a middle school classroom, Barnett, Squire, Higgenbotham, and Grant (2004) found that students who participated in a unit based on playing *Supercharged!* outperformed students in learning physics through hands-on experiments, demonstrations, and viewing simulations. In an interview following the game, one student described how he learned the meaning of field lines (a scientific visualization technique) in the game. "The electric goes from the positive charge to the negative charge like this [drawing a curved line from a positive charge to a negative charge]. I know this because this is what it looked like in the game. . . ." The most dramatic results, in fact, came from students who were unsuccessful in school, suggesting that game-based formats may make complex science thinking accessible to a broader range of students.

Supercharged!, originally designed to help MIT students in physics, does not include many other aspects of science learning that would be critical for less science-minded populations, such as coming to see, think, act, and be in the world as a physicist might—coming to inhabit the identity of a physicist. One can imagine games that provide students with experiences as scientists, environmental engineers, or doctors, much as role-playing games offer experiences as government agents, urban gang members, or leaders of civilizations. However, videogames that are designed to provide experiences of inhabiting identities within ideological worlds are much more complex to make. They must provide objects, characters, and interactions that are believable. They need to immerse players so that they experience the world as scientists, replete with perceptions, actions, conversations, and modes of expression where they participate in social practice as scientists. The possibility of creating such games in fully digitized media is now visible on the horizon; with appropriate funding it can be done (Holland, Jenkins, & Squire, 2003; Shaffer, Squire, Halverson, & Gee, 2005).

Such models are being prototyped with emerging technologies such as augmented reality simulation games (Klopfer & Squire, in press). Klopfer and colleagues have been using augmented reality simulations, simulations that span real and virtual worlds, to incorporate the world around them into gameboards. Augmented reality simulations attempt to place students in roles as investigators, scientists, or activists, leveraging players' emotional connections to physical locations. Players begin with a challenge, such as investigating a friend's death that might be tied to environmental poisoning. Using handheld technologies, players take readings from simulated stations to measure toxins (such as trichloroethene flowing through groundwater) or to interview virtual characters. Working in teams, players must identify problems, pose data-gathering strategies, draw conclusions, and reframe their hypotheses as they work.

A core feature underlying such simulations is that they give students the experience of being competent, independently thinking problem solvers, enabling them to develop identities in relation to an established community of practice. Thus these augmented reality simulation games share much in common with professional practice simulations, where students learn as doctors, architects, or journalists (Shaffer, 2004). Shaffer argues that participating in such simulations, particularly when built on ethnographies of practice, allows students to develop *epistemic frames,* or coherent ways of thinking that they can bring to new situations. Students with experience in "being" environmental engineers gain a way of thinking that they can draw from in other academic areas. Thus it is important that role-playing games such as *Environmental Detectives* give players access to ways of *thinking* and *being* in the world, as opposed to just asking them to memorize facts.

Role-playing games such as *Environmental Detectives* try to draw on the engaging features of *Deus Ex, Grand Theft Auto,* or *Civilization* by providing players with designed experiences in a world constructed by a particular set of rules where they can learn through performing a certain kind of role, a certain way of being in the world. Hopefully, the ideological nature of such pedagogies is clear; educators using game-based pedagogies are designing experiences for students that privilege certain worldviews and ways of being in the world over others. Therefore, serious consideration needs to be given to what kinds of experiences our students ought to have. At a minimum, such experiences, which are based on participation in ideological systems and which draw on learning as performance, include a hidden curriculum of active participation in problem solving, as opposed to docile reception of school-sanctioned content (Apple, 1992; Gee, 2004; Squire, in press a).

Conclusions

Although digital games have largely been ignored by educational researchers, they are a powerful new medium with potential implications for schooling. In videogames, knowing is at its essence a kind of performance, as learners learn by doing, but within powerful constraints instantiated through software and social systems. The focus is on experience that enables students to develop situated understandings, to learn through failure, and to develop identities as expert problem solvers (Gee, 2003; Squire, in press a). In this article I argue that educators might profit by studying these *designed experiences,* experiences resulting from the intersection of design constraints and players' intentions.

Possibly more important, videogame cultures represent tacit assumptions about knowledge, learning, expertise, and formal institutions that may be at odds with those of schools (Beck & Wade, 2004; Gee, 2004; Lankshear & Knobel, 2003). Videogames epitomize a potentially destabilizing wave of technologies whereby students can access information and social networks at any time, anywhere. As students confront more sophisticated digital worlds outside school, educators are challenged to react: Do we present and expect students to pursue print-based literacies, ignoring the visual culture and computer mediated worlds they inhabit out of school? And, perhaps most important, what identities do we make available to students in school? Our schools ask students to learn all at the same rate, in the same way, and at the same time; but games make a variety of learning paths available. Schools ask students to inhabit a limited and very particular set of identities as recipients of ideas and agendas prescribed for them; in contrast, games require players to be active participants in co-constructing their worlds and identities with designers. Games and their associated technologies may not render schools obsolete, but the educational community should pay attention to the kinds of learning that occur through games and digital worlds.

As videogames mature as a medium, the question becomes not whether they will be used for learning but for whom and in what contexts. If games have the dramatic potential to immerse players in complex systems, allowing them to learn the points of view of those systems and perhaps even develop identities within the systems, it is not surprising that the military, "advergaming" advertisers, and private groups have begun using games to support their agendas (Squire, 2005b). Perhaps it is also not surprising that games have been taken up most stridently in the military, which is largely charged with training those who have fallen through the cracks of the American educational system. As the military, private businesses, and nonprofit groups use games to spread their ideologies, it is crucial that educators with an interest in democracy and K–12 education examine the medium's potential to spread their influence. With the U.S. Navy and Air Force planning similar games, and middle-class parents playing *Pokemon* or *Civilization* with their children, we need to ask, What will happen to families that cannot afford such technologies? And what will become of formal schools if they are the last to recognize the potential of this powerful medium?

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