VIDEO GAMES AND LEARNING

Teaching and Participatory Culture in the Digital Age

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“Come on, class. Please tell me that someone read the chapter.”

I looked nervously around the room. “Please don’t call on me,” I thought. Of course we hadn’t read it. Why Jim Douglas, my high school history teacher, even entertained the idea that we might have read it was beyond me. Douglas taught with the Socratic method and expected us to read the entire chapter before we started each new unit. Later, I thrived under this teaching style—because he assumed we were responsible for our own learning.

“So none of you can explain the causal factors behind Spanish colonization?” (Long pause). “Does anyone at least know what ships they had?”

We were getting nervous. Douglas’s policy was that if “there was nothing left to discuss” then we would take the test, which would mean that we would all fail.

I tried to picture what a Spanish ship looked like. An image of a galleon popped into my head. I raised my hand.

“They had galleons.”

“Very good, Mr. Squire. They had galleons. Now why would they have galleons?”

“For carrying gold.”

“Yes, for carrying gold.” Not Alistair Cooke, but we were getting somewhere.

“Yes, that’s right... for gold. And they had war galleons to protect the galleons carrying the gold. These had a lot of guns.” I was warming up. “The French mostly had barques. The Dutch, fluyts. The English, merchantmen. If you saw a pinnace, that was French, Dutch, maybe even a pirate.”

Douglas was surprised, if not impressed. I wasn’t known for “reading ahead.”

But I was rolling. “The Dutch—they were mostly traders. They didn’t have much territory, although Curacao was a great trading base.” As I rambled on about the Caribbean, my friend Jason shot me an incredulous look as if to say, “Where in the hell are you getting this... is it a joke?”
It was, in fact, the result of my spending way too much time playing Sid Meier's *Pirates!* on my Commodore 64. *Pirates!* is an action-role-playing game, in which you are ... well ... a pirate (see Figure 1.1). I first played it in 1987, but *Pirates!* has been updated and re-released several times (including for the Nintendo Wii in 2010).

Here's the gist of it: You are a pirate in one of five time periods (between 1520 and 1700). The Han Solo of the high seas, you swashbuckle through the Spanish Main representing the French, Dutch, Spanish, or English. In addition to engaging in sword fights and ship battles, you trade and smuggle to create a privateering empire. *Pirates!* is open ended; the "story" is the one you create. There are few instructions, few quests, and no set narrative. No two games are exactly alike.

As a (potentially) educational game, *Pirates!* works because it is incredibly specific. Each city fluctuates in size, power, or nationality according to the time period, so players get to see how the Caribbean evolved. In the late 1500s, the Spanish dominate, meaning that if you're playing as the Dutch (my favorite) you're vastly outnumbered. But there is untold opportunity if you become friendly with the French and English, learn where their ports are, and plunder the Spanish (see Figure 1.1).

How the game unfolds is up to you. When I played as the Dutch, a favorite ploy at the end of my career was to capture a town and make it Dutch. I'd earn a title from the governor, then sail out and re-attack the same city, only this time making it French. This earned a huge land gift from the French, but ticked off the Dutch. I'd do this a few more times until the Dutch caught on and no longer welcomed me on
Dutch soil. But I kept my land—and infamous reputation—created by my piratey behavior. The underlying rules encouraged you to think like a pirate.

Players learn as much about Caribbean geography and history as they learn about swordplay. You’re immersed in this world during the game, so you have to learn how the various types of sailors, nations, and geography affect your plans. For example, early on in the game, most players want to sack Panama because it’s incredibly wealthy. But, if you try this, you’ll quickly learn that it’s also well defended and removed from the Spanish Main, which means you’re going to need hundreds of sailors to even have a chance. You can’t build a crew like that overnight. First, you need to build notoriety by attacking smaller ports and building a crew, and then you have to get them all to Panama before they mutiny. I vividly remember taking a wrong turn into the Gulf of Mexico and almost losing my ship because I didn’t know my basic geography.

Learning geography through playing a game such as Pirates is a commonplace experience for my generation. In fact, Levi Giovanetto and I recently surveyed University of Wisconsin–Madison undergraduates and found that most of the students had played SimCity and almost everyone had played Oregon Trail. The majority of the students felt these games helped them in school. The gaming generation is growing up, and they show no signs of giving up their gaming. When parents play Nintendo Wii with their kids and video game conferences include panels such as “I’m Getting Old: When Life Cuts into Gaming,” you know it’s not just teenage fantasy anymore. (See Not Your Big Brother’s Games sidebar.)

Not Your Big Brother’s Games

Many educators believe that the most popular video games have violent themes, and it just isn’t true. Wii has sold as much or more than every version of every Halo game ever made. Every year, the list of the most popular games includes titles such as The Sims, as well as music games, sports games, and racing games. But even that doesn’t capture the diversity of games.

Take, for example, Harvest Moon: a farming-simulation game in which the player runs a family farm. The player has to tend the crops, raise livestock, befrend townspeople, and get married (if you want). Hundreds of thousands of people love this game.

Harvest Moon isn’t alone. Other wildly successful non-violent, non-sexual games include Rock Band (in which you are a musician), Nintendogs (in which you raise a pet), and Brain Age (in which you try to increase mental agility by doing quizzes and puzzles).
Yet probably because of the size and cultural influence of the baby boom generation, video games are regarded by many as a fringe medium, and some still argue that games are trivial. This position is baffling, given the social, economic, and cultural impact of games. Games already operate as a medium for learning, whether or not we design educational games. Millions of people have learned some history from Pirates! and have explored the basic concepts of urban planning from SimCity. As Stephen Johnson (2005) popularly argued, even when games aren’t “educational,” the intellectual play of video games is productive in its own right. Video games are all about problem solving. Just as we recognize chess as a complex game and use it for studying the mind (think of how we program computers to play chess against chess masters), video games enable us to study how people who are spread across thousands of miles collaborate in real time to solve problems in games such as World of Warcraft (see World of Warcraft sidebar).

Video games now include a diverse range of experiences, from music simulation to multiplayer role-playing games with new models of distributed leadership (see Steinkuehler, 2006).

For educators, the questions are practical as well as philosophical. How does playing a historical game shape our thoughts about history? Can games be used for learning? If games do become widespread, what does this mean for the future of schools?

World of Warcraft

World of Warcraft, or WoW, is one of the most influential video games ever produced (with around 12 million sales). In this well-designed, massively multiplayer game, players create characters and interact in a virtual world that is populated by participants from all parts of the world. Players explore this world as they complete quests, form groups to take down bosses, join guilds (more permanent social groups) to meet friends, and compete in skill-based tournaments.

As an example of its cultural impact, consider the following scenario. One player, Ben Schultz, created a character named Leeroy Jenkins and filmed a video of Leeroy eschewing all social norms and running straight into a battle while his teammates were busy strategizing and calculating the odds of success. The video went viral (i.e., was widely viewed and distributed among people on the Internet) and became so widely known that it was referenced in South Park and Leeroy became the answer to a Jeopardy question.
Will Wright, designer of SimCity, The Sims, and Spore and one of the most important creative geniuses of our time, explained the educational potential of the medium: “Start with systems,” Will said. “Games teach about systems in ways that no other medium can.”

Will was right. Pirates! isn't about teaching declarative facts such as “the Spanish conquistadors colonized the Americas for gold.” Pirates! puts the player in a micro-world of the ancient Caribbean in which they experience it as a system. Through cycles of action and feedback, players learn some facts (e.g., galleons are for carrying plunder), but, more importantly, they learn the rules underlying that world, the relationships of these rules, and the emergent properties of the system (e.g., to start a raid on Panama you must have a string of friendly ports, a fleet of galleons, and a lot of luck). James Paul Gee (2005) argues that what gamers learn is embodied empathy for a complex system. Video game players develop a feel or intuition of how systems work.

This systemic thinking is valuable because it helps people solve problems holistically, rather than focusing on single-cause solutions. Video game players learn that if you change one variable, for instance, the type of ships available, it affects the entire system (e.g., the placement of cities). Systemic thinking isn't valued much inside schools today (particularly because it isn't captured well by standardized tests), but this type of thinking is important everywhere outside school, from ecology to engineering to politics. If video games can support systemic thinking in these areas, they could be powerful educational tools indeed.

So far we've focused on the intellectual aspects of gaming, but isn't that missing the point? The allure of video games for education is that students learn while being thoroughly engaged in play. Might we design similar learning environments for schools?

**DESIGNING EXPERIENCE, OR THAT EVASIVE “FUN FACTOR”**

One response might be, “Of course Pirates! is fun. You get to be a pirate.” It’s true that learning history is more fun when you approach it as a pirate. But is that a bad thing? Why not learn academic content by playing interesting roles, such as learning history by becoming a privateer or studying science as a forensic investigator?

Studying video games in depth teaches us that a game isn't automatically fun just because it’s about pirates. Every year many games are released in which players are pirates, soldiers, or other interesting characters, but the games aren’t very good and don't sell well. The difference between good and bad games is more in the polished game experience than in the content. The textbook example of this is Diner Dash, the game about being a waitress (see Diner Dash sidebar and Figure 1.2).
**Diner Dash**

*Diner Dash* illustrates how good games can arise from boring content. *Diner Dash* is a real-time strategy game that “found” the game in balancing a section of tables (seating patrons, taking orders, delivering food in a timely fashion, and getting the check out fast). The designers added the story of a waitress thumbing her nose at her corporate job and struggling to start her own business. *Diner Dash* was one of the most compelling games that year.

How is it that a game like *Diner Dash* is fun (despite the lack of sex and violence), whereas others with sexier, more interesting premises are not? There are many answers. Good games are cleverly designed. They involve hours of play-testing. The player’s experience is sculpted so that it feels like a warm hug. Let’s return to *Pirates!* to see how it works.

**An Orchestration of Time**

When *Pirates!* is compared with other pirate games, the prevalence of overlapping short-, medium-, and long-range goals stands out. From the moment you pick up the box, the long-term goals (plunder cities, win fame and fortune) are enticingly communicated. Short-term goals are presented by the game system. Vulnerable merchantmen ships sail past. Unguarded cities lay ahead. These potential goals “pull” players toward their long-term destiny of reaching infamy.

![Figure 1.2: Diner Dash](image)
To see how well *Pirates!* is designed, try playing it with a stopwatch. Short-term goals (restock supplies, sail to the next harbor, battle) take between 45 seconds and 2 minutes. Completing a short-term goal (such as restocking a ship) should not take an hour.¹ In contrast, *Sea Dogs* has fully 3-D cities. What could be wrong with that? It's a feature players clamored for. While it's visually interesting, the 3-D design means that it takes 5 to 10 minutes to do simple housekeeping tasks in port, such as restocking supplies. Many critics panned it for being a pirate game in which you “spend your time walking around town.” We can infer a design rule from this comparison: “Make short-term goals doable in a short amount of time.” Interestingly, *Pirates!* and *World of Warcraft* can both be divvied up into short-term goals of 60 to 90 seconds, medium-range goals of 45 to 60 minutes, and long-term goals of 3 to 4 hours. *World of Warcraft* battles take 45 to 60 seconds, hunts (3 or 4 overlapping quests) take just under an hour, and raids go on for 3 to 4 hours, including preparation and debriefing.²

*Overlapping Goals*

A second design rule is to provide overlapping goals. When a *Pirates!* player sails into town for the first time, the governor instructs him or her to visit a neighboring city and receive a reward. So now the player has a long-term goal (earn fame and riches) and two short-term goals (attack a ship and visit a neighboring port). The short-term goals compete with one another, which gives the player an interesting choice: Do I attack that ship on the horizon, or do I sail to the next port?

But it gets better. As the player sets sail, he or she might also see an enemy town that is ripe for the picking. Attacking this port becomes a new medium-range goal. *Pirates!* constantly presents players with these overlapping goals. The importance of clearly communicating such goals can't be understated. Video games do a lot of work to make these goals compelling to players. These goals *seduce* players into pursuing them. As video game designers, it's always shocking just how much you have to lead players by the nose.

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1. Interestingly, ship battles in the original *Pirates!* often went on longer, but in subsequent versions, designers used tricks to shorten them.

2. In fact, instances (typical five-person group activities) were designed to take 2 to 3 hours in earlier versions of the game, but when you had a bad group of players, your whole evening could be ruined. So Blizzard trimmed down group hunts to about an hour. Now, an instance is just one part of a gaming evening. A potential downside is that this design decreases players' commitment to the group. If you have a bad group, you don't have to learn how to fix it; you just move on. Raids (the longer activities, with a constant set of members) still recruit such group commitment.
As we design learning environments, video games teach us to ask: What goals do I offer players (or learners)? Will relatively trivial goals be attained quickly? Are they clear and overlapping so that my players feel compelled to continue? Does my environment constantly advertise new, seductive things to do? Is the game designed to produce emotionally satisfying experiences?

Anyone can theorize about design for learning, but good games execute these goals. We often think that this is because entertainment games have huge budgets, yet this isn’t always the case. Many wonderful, small-budget entertainment games like *Flower* or *World of Goo* put their educational brethren to shame. Good game developers tweak games for months or years after many educational developers would have already shipped their educational game. Famously, Blizzard won’t ship a game “until it’s done,” even if that means extra years of development and testing.

Throughout this book, I analyze both entertainment and educational games. This method is similar to what Doug Church calls *formal abstract design tools*. Church, a veteran game designer (now at Electronic Arts [EA]), uses concepts such as overlapping goals or power-up curves (the rate at which players gain new skills) to understand game design. Church invented these terms to help game designers learn from games across genres and to teach them to look beneath the surface of game features and toward interacting systems.

This spirit of studying one another’s games—and then “stealing” features that work—is one reason that the games industry has grown and improved so rapidly. Commercial game designers play one another’s games *all the time*. If there’s a feature that works in one game, it will be adopted by others in the next product cycle. Ideas jump across games at a dizzying pace that puts academic “knowledge dissemination” to shame. Educational technologists rarely make their work available for others to critique, let alone build on.

**Possibility Spaces**

But video games aren’t just about polished experiences; they can be more deeply transformative experiences in which we can do new things and become new kinds of people. Game designer Raph Koster (2004) talks about this in cognitive terms in his *Theory of Fun for Game Design*; games are fun because they provide new problems to solve. We stop playing when we get bored—when all the learning is done. We might contrast these open possibilities with closed ones. Games (or careers) with developmental paths that lead nowhere are like dead-end jobs. In *Civilization*, it’s knowing how your game will end before you ever start. In *World of Warcraft*, it’s that moment when players say, “So I get better gear to do bigger battles to get bigger gear. What’s the point of this again?” It’s being
able to predict every move in a game before it happens. Good games (think of classic nonvideo games, such as chess or basketball) refresh themselves, offering new lessons the more that we play.

Games like Pirates! or Civilization advertise these possibilities well, but there is nothing like a multiplayer game to amplify these possibilities. Multiplayer games continuously refresh themselves as we learn to be different kinds of people in social groups. Consider the first time a newcomer walks into a city in WoW. The experience is one giant exposure after another to interesting "possibilities." New players see a variety of characters riding outlandish-looking mounts. They see curious flying contraptions, rogues bouncing up and down, or goblins selling their wares. This is to say nothing of the chat channels, which now brim with esoteric conversations. Each element points to potential futures for the player.

This struck me the first time I saw a tauren druid decked out in the Cenarion Rainment, the "tier 1 dungeon set" (see Figure 1.3). Simply the existence of a gear set made out of tree branches inexplicably delighted me. What were those things? How do you get them? Do they have special powers? And what shoes do you wear with those?

**Opening Social Horizons**

These moments open horizons or players. Curiosities are piqued, desires are stoked, and feelings of wonder are stimulated. For a brief moment, anything is possible. When I saw that druid, I wanted to become a powerful, nature-channeling, bad-ass cow too. I imagined slaying monsters, saving friends, and emerging with cool-looking tree-branch shoulders that symbolized my exploits.
In essence, people's characters themselves are walking billboards for the game's possibilities. Each glowing sword, flame-hooved horse, or YouTube video of a hilarious prank advertises new possibilities. A key WoW design decision may be not starting newbies in large, populated cities but instead waiting until they had experienced core game systems, such as combat, quests, and grouping, before lifting the veil and showing the game's depth. This moment happens around the 4- to 6-hour mark, which is about the time that a nonhardcore player would be just about ready to put the game down after a night or weekend of playing. Only then do the designers go for the kill and get you hooked.

I can still recall my inaugural voyage into Ironforge. My first character was a night elf, so it was a hike. Trekking through swamplands and snowy mountains, I saw crocodiles, gnomes, dwarves—outlandish creatures nothing like the denizens of my forest home. I struggled to navigate the crowded thoroughfares until a friend logged in and offered to show me around. He pointed out the giant cauldrons of Ironforge, with its blacksmiths and their clients in their crazy helmets, fancy pants, and glowing swords. He showed me trainers, vendors, and the Auction House where players buy and sell stuff, much like an “in-game eBay.” He told me to make friends with a crafter to help with my gear. He believed that a shrewd trader could make more money buying and selling goods than hunting, but it required dedication and an in-depth knowledge of WoW’s markets.

SOCIAL GAMING: POSSIBLE IDENTITIES

Games' possibility spaces are deeply social, even in single player games. I first learned to play Civilization by having a college roommate show me the basics. On consoles, kids show off games such as Madden (see Madden sidebar) or Ico (see Stevens, Satwicz, & McCarthy, 2008) to peers crowded behind them on the couch.

As studies of game players in their natural habitats (inasmuch as they exist) reveal, gaming is a deeply social activity for most players. Research shows that it is often players, not designers, who publicize possibilities through sharing stories, formal and informal apprenticing, and group activities (Steinkuehler, 2006).

Massively multiplayer games enable people to play together and collaborate in activities to achieve mutually desirable goals, and this intensifies learning. Massively multiplayer games researcher Constance Steinkuehler (my wife, who will be cited

3. WoW has changed over the years to require less social interdependence. Now, you can get goods through the Auction House or by making random requests in town, making it less personal and social. Stop me before I long for the days of crafting in Star Wars Galaxies.
throughout this book, as I’ve learned a lot from her) shows how even mundane activities such as a group hunt have instruction embedded within them. That Ironforge tour I described earlier may seem pedestrian, but my friend was showing me how to read the environment. He showed me what was worth noticing and what wasn’t, what practices made up the world, and what kind of a character I could become.

**Madden**

Many games—not just strategy games—recruit systemic thinking. Sports games such as *Madden* are classic examples. Play a lot of *Madden*, and you will see patterns in how games unfold. I learned to “see” soccer games by playing *FIFA* with my brother (who was good enough at soccer to explain what parts were realistic and which parts weren’t). I was surprised to learn that pro players play video games to learn, too. When asked what helped him make the transition between basketball and football, Antonio Gates, an All-Pro NFL tight end and *Sports Illustrated* (Silver, 2004) wrote:

> You know what helped? Playing Madden. I was always the Chargers. After I got here, I’d play the game and notice things about the defenses. I started recognizing formations in the [video] game, then I’d get to practice and see them there [in actual practice].

Lauren Silverman (2009) studied athletes and video games and found that players ranging from the University of Wisconsin baseball team to the Boston Red Sox use them as visualization tools. It helps them see the playbook, identify patterns, or generally just keep their heads in the game on off days.

This mentoring is routine in collaborative gaming. Anyone who has run an endgame group in a WoW instance (a dungeon that takes 2 to 4 hours to complete) should understand this. Let’s say I’m a newbie “tank,” which means my job is to absorb damage so that the healers and damage dealers in my group can do their jobs without dying. As we prepare for the battle, someone will ask, “OK, who has been here before?” Players fess up about who knows what battles. Because some monsters are “chained” together (pull one and they all come after you), there are strategies for me, as the tank, to keep the monsters focused on me and for damage dealers to “control” monsters by putting them to sleep or freezing them and so on. The approach is contingent on group makeup, meaning different constellations of players use different strategies.
As the group members negotiate, they’re debating not just procedures, but also the goals of the activity itself. Will the group play as efficiently as possible? Or is there room for experimentation and error? Whereas some people value quick achievement, others (like me) enjoy the unexpected. I’m not happy unless everyone is operating right at the edge of his or her competence, and I like to court danger with taunts on occasion. (I’m not sure whether it’s always appreciated).

We see these values negotiated most often when the group confronts failure. Is it OK to occasionally make a mistake, especially if it means a better experience, or should every battle be methodically planned? Games let us play with different value systems (which is more difficult to do in our real lives at home or at work). In the simplest of situations, players’ activities are coordinated in ways that shape knowledge, skills, values, and even identities.

This form of learning—having people (including novices and experts) engaged in joint problem solving—is considered by learning theorists such as Annemarie Palincsar and Ann Brown (1984) to be perhaps the “best” form of learning. Yet it is rarely utilized in schools, which focus on individual work and are segregated by skill level. Typically in each class, there is one “expert” (the teacher), whose job it is to impart knowledge to the students, who are supposed to diligently work on their own learning. Educators have tried a variety of peer-to-peer approaches with good success, particularly when they leverage the diversity of abilities that exist in class (no matter how much we may try to track students). My own teaching experiences have been in multiage classrooms, so this idea of segregating people by ability has always seemed a little odd to me (see Chapter 3). Games excel at promoting different levels of expertise, and educators might embrace, rather than apologize for, this capacity.

**POSSIBLE CULTURES**

Thus, to understand how games operate, we need to look beyond the game itself and toward the broader cultural contexts in which it is situated. In many game communities, players themselves become the content, making them emblematic of participatory media culture. When my friend showed me around Ironforge, he was a central part of my game experience. This is also true of game communities around single-player games (see Chapter 7), particularly within the resource sites created for the games.

Online communities are also an integral part of massively multiplayer games such as WoW. The WoW community has actively cataloged every monster, item, and so on, to the point that the game is basically mapped out. Plunk the name of any item into Google (or better yet, thottbot.com or wowwiki.com, the WoW-specific information databases) and you will find everything you need to know.
about the item’s origin, attributes, and value. The current site du jour is Elitist Jerks, a guild site visited by people from around the world for its quality resources and discussion. As designers respond to this increasingly savvy player base, they ramp up the game’s complexity so that the game and players literally co-evolve. In fact, game designer Soren Johnson (in press) has argued that WoW is one big evolutionary struggle between players and designers toward creating a complex, fair, and balanced game system.

Let’s compare this open, participatory culture to the environment of most schools. Gamers are surrounded by walk-throughs, guides, even videos explaining and demonstrating almost every nuance of the game. If, for example, a player wants to become a good tank, he or she can find forum threads, spreadsheets, and guides explaining gear, strategy, or how to deal with annoying damage dealers who don’t do their jobs. In educational terms, there are examples, nonexamples, and worked problems for players to analyze to improve their performance. It’s as if students had access, not only to the teacher’s notes, but also to the guidebook, the Cliff notes, and experts in the field in question. Schools, in contrast, segregate learners by ability level and erect strong barriers between classrooms and authentic communities of practice.

But games aren’t just open environments; they are carefully crafted learning experiences. Take the trajectory of how players learn about gear in WoW. The player’s first task is to choose the “right” type of equipment after completing a quest. For example, do I choose cloth or leather? This is really a faux choice; there is one correct answer (whichever type your class wears). But seeing the items “previews” statistics that will soon matter. Next, players find new items in the world and must compare them to learn more about item attributes. Is the new item I found better than what I have? Again, this decision is straightforward, as there is only one variable initially (armor points). Soon enough, players must compare items in detail. I recently decided which of the two items in Figure 1.4 I should get for tanking. Even seasoned WoW players might have a hard time discerning the difference between them.4

4. If a WoW player asks a question in general chat, such as “Where do I get the Cenaron Shoulders?” the response is usually “thottbot” or “wowiki,” meaning, go look up the information yourself rather than clog the chat channel with simple requests for information that anyone could find on the Web. The logic of this system valuing self-directed learning is contrary to the values reflected in the design of our schools.

5. The answer is: “It depends.” The general consensus is that the trollwoven spaulders are better tanking gear than hateful spaulders because the trollwoven spaulders enable better damage-dealing, which is good for “holding aggro” (keeping the monsters aggressive toward you and not your party). Critical strikes are useful in generating threat, and the trollwoven include almost twice the attack power, even if you add a gem for agility.
DIGITAL MEDIA AND LEARNING

Although games are a vivid example of participatory culture (especially when compared with broadcast media), a profound shift is occurring across media and institutions. Digital development and production tools such as GarageBand, iMovie, and YouTube are reshaping music and video. Blogs like *Daily Kos* are reshaping public discourse. The list goes on. These media present opportunities for ordinary people to follow a passion, develop expertise in a particular domain, and then reach a global audience through online publishing (for a thorough description, see Jenkins, 2006, or Black, 2008). What games do is guide and scaffold this trajectory.

Ironically, we can point to examples across almost every aspect of life where this takes place except for formal schooling. While schools remain static, learning is changing; every day, millions of people log on to *Daily Kos* to learn about politics or join a Flickr group to hone their photography skills. Researchers such as Doug on the hateful spaulders. Plus, the extra expertise (with a weapon) provided by the trollwoven spaulders is important because it helps negate your opponents’ chance to parry or dodge your attacks. As you can see, both items are viable, but when you get into optimizing gear, the trollwoven spaulders will make a bigger difference when multiplied across 16 items.
Levin and Sousan Arafah (2002) have found that kids' Internet use shows that when they want to learn something personally meaningful, they look online. Online learning is personally meaningful, tailored to their interests and ability level, and provides immediate feedback.

In many respects, the promise of video games is about realizing age-old visions of education proposed by Maria Montessori or John Dewey. However, digital media make new things possible—such as leading a Civilization game or collaborating in real time with people around the world. We need to rethink what we want out of education in the digital age.

**THEORY AND PRACTICE**

Returning to our question, "Why study video games?" we have four responses:

1. People are developing academic interests and learning academic content through games, regardless of whether or not we design them for education. Players learn the basic facts of their games (the names of pieces, the maps, the terms), but, more important, they learn the emergent properties of the game as a system. How learners interpret game experiences and relate them to other aspects of life is explored further in chapter 7.

2. Games are deeply engaging for those who play them, and we can study games' educational design principles, such as orchestrating time, providing overlapping goals, constructing open-ended problems, and maintaining open social horizons. Even if we don't bring a game into every classroom, we can incorporate these principles in our instruction.

3. Third, games are emblematic of a broader shift toward participatory culture and suggest ways of structuring participatory educational experiences. Gaming communities push players from consumption to production. This is a useful model for educators (see chapters 4 and 7).

4. Finally, and most important for me, games, when they work, are aesthetically enlivening experiences, worthy of study in and of themselves as part of human experience. In my mind, this property should make them intrinsically valuable to anyone responsible for designing experiences for others. However, the moral imperative to study enlivening experiences is especially true for educators, who are responsible for shaping the daily lives of children attending school out of compulsion. Any time that we turn a child off to learning rather than awakening their intellectual curiosity, we've failed. In
fact, in a digital, participatory age, awakening students' interests and curiosity and empowering them to pursue them may be what constitutes a "basic" education.

This first chapter tried to make the case for studying games as an important site of learning. The next chapter digs deeper and asks, "What should a good educational game look like?"
THE MOST FUN YOU CAN HAVE WITH MODEL RAILROADS WITHOUT SNIFFING GLUE

"Mostly sunny with a 25% chance of . . ." the morning DJ cut off as my roommate hit snooze. It was 6:00 a.m., which meant that I'd played Railroad Tycoon II (1998) for nearly 7 hours. "I'll quit just as soon as I connect Chicago and New York . . ."

A Digital Model Railroad

Railroad Tycoon II (RT2), the sequel to Sid Meier's 1990 Railroad Tycoon, is a linked series of scenarios such as connecting New York to Chicago, building the first transcontinental railroad, creating the Orient Express, and so on. Scenarios become campaigns, which, like military campaigns, allow you to build a company through time, so that RT2 feels somewhat like a role-playing game (RPG). Trains get faster. Production and technology become more complex. As in SimCity, you need money to build in RT2, so much of the game is strategic expansion, linking up profitable routes, managing your company's stocks and bonds, and, of course, running the trains on time. You can also build new maps, create scenarios, or play online.

RT2 is not only a powerful railroad simulation but a formidable financial one as well. You can participate in all the financial wheeling and dealing of the Guilded Age and progressive era: Create shell companies and float yourself a loan from the main company; drive the stock of your primary company into the dirt and then buy it back, build it up, and flip your stock for profit. Some players for some reason altogether and make it a financial game of buying and selling companies. In short, you can do everything except create the savings and loan crisis (or more recently WorldCom). In fact, you could probably do that too in the right scenario.

Powerful Simulation Editor + Railroad Enthusiasts = Geek Heaven

"Railroad buffs have definitely loved RT2. Some folks complained about the speed of the game when they had 1,400 trains running simultaneously," noted Phil Steinmeyer, head designer of RT2. Wait, 1,400 trains? At one time?
night scenario topped out at about 15 trains. Who is building 1,400 trains?

To find out, I investigated fan sites such as the Indianapolis Depot, which has historical trains, custom maps, and new scenarios ranging from Santa Claus’s railroad to historical routes in India. I talked to the head conductor Wabash Banks, who described RT2 as an extension of his long-standing interest in railroads. Many railroad buffs are enthusiastic supporters of the game for its factual accuracy and underlying models.

RT2 works because it is more than a digital train set; it simulates railroad baroning, which extends the concept of model railroads by enabling players to do the following:

- Adopt a unique perspective (a baron), control financial variables, and interact with geography in a way that is inaccessible with a model railroad.
- See how a system behaves over time. Digital simulations are good at compressing or stretching time. RT2 squeezes a decade of railroading into 90 minutes.
- Explore “what if” scenarios. There is no one way to beat the game. Players solve problems instead of guessing the designers’ intentions.
- Learn the properties of the simulation through increasingly complex scenarios. No newbie player could play RT2’s financial game right away, but the mission structure walks players through different game systems.
- Design their own interactive content for other players. It’s like players creating tools for other players to create their own railroads.

In fact, watching your trains run is a little like building a model railroad. Set it up, sit back, and watch your trains take folks from San Francisco to Atlanta. Without the sticky glue.