

# **Changing the Game: What Happens When Video Games Enter the Classroom?**

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## **Abstract**

Kurt Squire criticizes the current organization of schools based on his experiences using Civilization III in a high school history classroom. Squire's case study reveals that Civilization III appeals particularly to those students for whom a traditional education is simply not working. Students who do well in the classroom, however, are more reluctant to view gaming as a legitimate learning tool and experience much more frustration when playing the game. Squire looks to the hierarchical organization of the classroom as the reason behind this perhaps surprising result. He outlines the benefits of and obstacles to widespread game implementation, pointing out the failures of the traditional secondary curriculum and detailing improvements that would organize school culture around learning rather than social control.

## **Changing the Game: What Happens When Video Games Enter the Classroom?**

Over the past few years, games have gone from social pariahs to the darlings of the media, technology, and now educational industries. E-learning educators in particular stand to learn a lot about building next-generation learning environments from games (Dalesio 2004). While online courses are usually little more than "online course notes," games offer entire worlds to explore. While educators wonder if it is possible to create good online learning communities, game designers create virtual societies with their own cultures, languages, political systems, and economies (Kolbert 2001; Steinkuehler, forthcoming). While completion rates for online courses barely reach 50%, gamers spend hundreds of hours mastering games, writing lengthy texts, and even setting up their own virtual "universities" to teach others to play games (Squire, forthcoming). In short, while e-learning has a reputation for being dull and ineffective, games have developed a reputation for being fun, engaging, and immersive, requiring deep thinking and complex problem solving (Gee 2003).

Given emerging research on how video games and associated pedagogies work in designed settings (Shaffer 2005), it seems the important question is not whether educators can use games to support learning, but how we can use games most effectively as educational tools. The explosion of research initiatives, conferences, books, and software focused on educational games suggests that computer and video games will have some part in education, just as all media before them have been used for learning. However, the history of educational technology also suggests that educators will abandon media that do not fit the social organization of schooling (Cuban 1986).

Over the past two years, I have studied educational uses of Civilization III, a historical simulation game that has sold many millions of copies, depicted in Figure 1 (Squire 2004). This initiative highlighted a number of important considerations for educators interested in introducing games into the classroom—with respect to selecting appropriate game experiences as well as to evaluating the context in which games might contribute to learning. If, as this study suggests, games do indeed embody significant learning principles, our challenge as educators is to build better game-based pedagogical theories while reciprocally investigating our assumptions about the social organization of schooling.

### *Background*

This paper is a mini-comparative case study (see Stake 1995), drawing on two separate cases where the computer game Civilization III was used as the basis for units and activities exploring world history (see Table 1). Each site was chosen in part for convenience as partnering institutions and organizations expressed an interest in using games as to support learning. In both sites, educators' primary concern was finding experiences to engage kids who felt alienated from school. In the urban high school case, educators were looking for an alternative for students who had little interest in studying history and who did not necessarily believe the mandated, state-sanctioned history presented to them (cf. Wertsch 1998). In the after-school context, educators

similarly sought to engage students to develop historical understandings as well as to become more affiliated with school-based learning in general. I was a co-teacher in both environments, partnering with the established teachers and paid researchers.

### *Replaying Motivation*

What happens when we bring games into the classroom? As Exhibit 1 explains, this question still requires investigation. The first thing we might expect to see is increased motivation; common wisdom suggests that games are at least motivating, if not educational. In fact, early research on arcade-style games demonstrates that games create intrinsic motivation through fantasy, control, challenge, curiosity, and competition (Malone 1981; Cordova and Lepper 1996). We might also hypothesize that games in the classroom would leverage players' desires to develop new skills, participate in new roles, or better understand the world from a new or "professional" perspective (Gee 2005; Shaffer 2004; Shaffer 2005; Shaffer forthcoming). Play is undeniably a powerful, pervasive method of learning outside of schools; indeed, most psychologists would agree that play is a crucial method through which we test ideas, develop new skills, and participate in new social roles (Piaget 1962; Vygotsky 1978).

However, bringing a commercial-quality educational game into the classroom may create as many motivational problems as it solves. When I introduced Civilization III into curricula, I found that students were anything but immediately motivated. They frequently asked, "What's the purpose of this?" and "Why are we doing this?" Even middle school students were not entirely sure how a computer game could teach them about history or geography. In part, this lack of motivation resulted from the fact that most students needed six to seven hours of gameplay to understand even the most basic game concepts. Although after-school students were less resistant and more motivated to learn the game (Exhibit 2), roughly 25% of students in school situations complained that the game was too hard, complicated, and uninteresting, and they elected to withdraw from the gaming unit and participate in reading groups instead.

About another 25% of the students (particularly academic underachievers) loved playing the game, thought it was a "perfect" way to learn history, and considered the experience a highlight of their school year. For these students, many of whom actively resisted school-mandated history curricula that they regarded as "propaganda," the game-based curriculum provided opportunities for replaying history and for considering hypothetical historical scenarios, such as the conditions under which a Native American tribe might have successfully resisted European settlement or even colonized Europe. In post-interviews conducted after the completion of the study, these students developed new vocabularies, better understandings of geography, and more robust concepts of world history (Squire 2004).

Students played the game in very different ways, leading to highly differentiated understandings (Exhibit 3). This excerpt is from an interview with Marvin, a student who enjoyed the game as a simulation of history; reading the Civlopedia and learning about cultural discoveries was part of

the fun. Marvin recalled what he learned through playing the game by drawing on information in the Civilopedia.

Marvin: [The game] shows you the date or year where the wheel was made or the alphabet was discovered. I didn't know that the alphabet was discovered around BC. I forgot what year, but I remember it's like 2000 BC. I thought it was like the 1500 or around the [the age of] knights and kings.

Interviewer: Who do you think invented the alphabet before you played this game?

Marvin: The English, because back then they were the classiest and smartest.

Interviewer: Now who do you think invented the alphabet?

Marvin: Probably the Egyptians with the hieroglyphics. It was the first writing to be done.

These different student reactions demonstrate the divergent responses educators can anticipate in bringing games into the classroom. Games are very particular kinds of experiences. Playing games does not appeal to everyone (even among those under 30), and certainly no one game (or more appropriately game experience) appeals to everyone. The experience of playing Civilization III is a cerebral blend of planning, building, managing, and competing with other civilizations; in this study, that experience appealed to students who were interested in geography or enjoyed building and managing virtual societies and using mathematics in gameplay. Fast-paced action games or massively multiplayer games that require rhythm and timing or encourage participation in complex virtual societies present significantly different pleasures (Bartle 1997; Steinkuehler 2004a). Motivation for the gamers in my study was thus not simply a "property" or variable that they either had or did not have; motivation emerged through the intersection of students' goals and life histories, the game's affordances, and the institutional context. As this example indicates, future studies on the educational uses of games must explore how different players experience different games of different genres and what these experiences might mean for learning.

### *Difficulty and Complexity*

Those unfamiliar with contemporary video games are shocked by their complexity and difficulty, and these terms, as Exhibit 4 explains, signify different aspects of a game's design. Different games offer unique challenges, but part of what makes any game engaging is its difficulty. Besides its difficulty, Civilization III is particularly interesting because of its complexity, flexibility, and replayability. Civilization III takes hundreds of hours to master and can be played dozens of ways; players can win through military, scientific, economic, political, or cultural superiority (and most likely a combination of each).

For many students in my study, however, the complexity of Civilization III was overwhelming, and the game just too difficult. Many said that the game was more difficult than anything they encountered in school. Packing 6000 years of history into one game, Civilization III includes hundreds of game concepts, ranging from its six government types (anarchy, despotism, monarchy, communism, republic, and democracy) to 13 terrain types (grassland, mountains, and so on). To play Civilization III successfully, players must not only understand these terms, but also understand the strategic significance of each variable (e.g., the comparative advantage of cities in river valleys versus woodlands). Indeed, in any given gaming period, students would ask literally dozens of questions, ranging from simple queries about geographical facts (e.g., "Is there oil in Greenland?") to functional questions (e.g., "What are the effects of democracy?") to questions about the game as a simulation (e.g., "Does the game include World War I?"). Considering the difficulty and complexity of Civilization III, it is not surprising that students should have found the game challenging; what is noteworthy, however, is that students found this off-the-shelf computer game, which has been marketed toward a broad audience and which has sold millions of copies, more challenging than their traditional learning experiences in school. Even though the high school students described here all played games outside of school, they found Civilization III's difficulty and complexity problematic within a school setting. If part of what makes games so interesting is their ability to present access to complex professional practices, then managing this complexity (and particularly students' reactions to it in school settings) will continue to be a challenge (Exhibit 5).

### *Failure and Choice*

These students' experiences remind us of something that constructivist educators have already learned: contemporary pedagogical practice, which breaks problems down into bite-sized, easy-to-learn pieces, often creates a sense of "learned helplessness" in students (particularly high achieving students) who only encounter short, solvable problems with all necessary information laid out in front of them (Cognition and Technology Group at Vanderbilt 1990; Loewen 1995; Schoenfeld 1987). Games, on the other hand, present players with complex holistic problems (Gee 2005). Furthermore, failure—a time-honored notion in educational technology (Schank, Fano, Bell, and Jona 1993)—functions somewhat uniquely in game-based learning environments. Unlike traditional school settings where learners build representations of systems and examine how they succeed or fail in explaining observations, game-based learning environments start with failure. As learners play games, they build a model of the game world based on experiences both within the game and outside of it (e.g., expectations of how galleys will behave in the game). Through bumping up against the rules of a game system like Civilization III, which include tens of thousands of interacting variables and are thus incredibly complex and challenging to master, players begin to learn concepts important to subjects like geography and history. This learning cycle is critical to both intellectually engaging gameplay and academic learning, which illustrates the potential of educational games. However, the unique operation of failure in game-based learning environments further suggests that games may be a poor fit for learners who come to school with "damaged" beliefs about learning—and particularly

for those students who interpret failure as a value judgment on them as students rather than the beginning of a valuable learning experience.

In my study, failure was not only a "problem" but also a critical precondition for learning. Failure forced students to confront gaps or flaws in their current understandings through cycles of recursive play. As one student explained, "Playing the game forces you to learn about the material. It actually forces you to learn about other civilizations in order to survive." For this student, failure necessitated learning the identities, origins, and resources of various civilizations through cycles of identifying problems, developing causal interpretations of events, brainstorming possible solutions, implementing solutions, and examining results. After going through these cycles of recursive play, students' thinking became more complex. Success and even survival in the game required deep thinking across diverse problem spaces. Students learned to see game challenges, such as building a happy civilization, as the result of more factors, such as available luxuries, entertainment, religion, and economics. As one student summarized, "You can't separate geography from economics from politics."

For other students, failure caused frustration. Whereas the stronger, more confident students saw failure as a learning opportunity, other students did not. These students lacked either sufficient interest in the game or the requisite self-efficacy with games, or perhaps they just had bad days during which playing such a difficult game was unattractive. As anyone who plays Civilization III would attest, defeat after a good 25-hour game can be maddening, and on some days, even the most avid gamers are just not up for that kind of humiliation. Interestingly, failure affronted those students who self-identified as gamers, suggesting that educational games may not be such an easy win for this population of students—who may be inclined to reject educational games out of hand if such games challenge or compromise their identities as gamers.

Another probable reason some students (including gamers) rejected the game experience in school was because playing Civilization III in a school context was compulsory. Advocates of game-based learning must consider if requiring games eliminates some of the choices that make them engaging (Malone 1981). Even if students have the choice to play games, there are potential contradictions in situations with heavily mandated curricula. If part of what makes games so appealing and educative is that they give us meaningful choices (Zimmerman and Salen 2003), how will they fare in situations where there are very prescribed learning outcomes? Further, for many, gameplay involves social transgression. Games allow us to bend or temporarily dismiss social rules in order to try new ideas and identities. Most often, these transgressive themes reach the radar of popular culture when they involve violence, but games such as *Deus Ex*, *Hidden Agenda*, or *Freedom Fighters* have politically subversive messages as well; indeed, Steinkuehler (2004b) argues that massively multiplayer games are so compelling precisely because they critique contemporary culture. How games may be adapted to schools, institutions designed to reproduce existing power relations, is questionable; however, at the minimum, educators need to be careful that bringing games into schools does not rob them of precisely those qualities that make them so engaging.

### *What Game Are We Playing?*

Indeed, just as no one game appeals to all students, neither does any one curriculum, and games challenge us to ask to whom traditional curricula appeals and whom it leaves behind. Our traditional secondary curriculum is largely an experience of mastering a pre-defined set of objectives, mostly through listening or participating in structured activities with well-defined, pre-determined outcomes. In post-secondary schools, the activities are more open-ended, but mostly mediated through secondary accounts of phenomena through the use of textbooks and lectures. College students mostly listen to lectures, read texts, and if they are lucky, discuss them with peers or an instructor. Those who prefer to develop understandings through building, tinkering, or more direct experience are left behind.

Looking at who wins and loses through a game-based curriculum reminds us that curricular issues are also about power and control. A curriculum based on Civilization III overturns traditional hierarchies, supplanting those adept in traditional schooling with those failing school. The successful students were concerned that their more traditional school-based expertise was not honored in this classroom, and they were not convinced that success in a game-based unit would help them on college entrance exams or in college classrooms, both of which rely on more traditional literacies. They believed that Civilization III was insufficient preparation for the "game" of higher education, and perhaps they were correct. Yet, students who were failing in school (or whom school was failing) developed and demonstrated complex understandings within a game-based curriculum that go undeveloped or unrecognized in other school experiences.

Not surprisingly, many of the students who performed well in the game-based unit were just those who felt disaffected from school because they preferred "hands-on" activities in which they could learn through doing and "figure things out for themselves." Oddly, this is how learning occurs everywhere but school and, again, is precisely how workers are asked to learn in the new economy. Ironically, the skills required by the game curriculum—problem identification, hypothesis testing, interpretative analysis, and strategic thinking—more closely align with the new economy than does the "factory" model of curriculum that privileges following directions, mastering pre-defined objectives, performance on highly structured tasks, and intellectual obedience (Gee, Hull, and Lankshear 1996). In short, schools are designed around factory models of education where the goal is to efficiently produce standardized learners and, most importantly, sort students into those groups; games, however, are products of the new economy where the goal is to think creatively with digital tools (Bowles and Gintis 1976; Lagemann 1989).

### *Conclusion*

Educators hoping that digital games will be a "silver bullet" because they are exciting and motivating will be disappointed. The real challenge is not so much in bringing games—or any

technology—into our schools but rather changing the cultures of our schools to be organized around learning instead of the current form of social control. This change would include:

1. Organizing curricula around driving questions of personal relevance to students and open-ended, genuine intellectual merit, such as "what causes contribute to the long and short term fates of civilizations?"
2. Opportunities for different students with different interests, abilities, and capacities to learn different topics, at different rates, and through different media, such as books, games, and film.
3. School days and curricula not organized by the Carnegie unit but by rather students', parents', and teachers' goals for the student so that a student interested in history could study a topic at intervals different than "45 minutes per day, every day, every alternating semester" (which was my experience in high school).
4. Not limiting the learning experiences in the classroom to the media that administrators or teachers find useful (i.e., books and film). In short, a teenage student who plays Civilization outside of school ought to be able to integrate this into his or her formal learning of social studies through building simulations or some similar activity.
5. Treating assessments primarily as opportunities to support learning as opposed to evaluative structures that function largely to support social reproduction (cf. Mabry 1999).

Of course, we already have some schools designed to give students skills they need for the new economy, but unfortunately they are in our private or highly performing suburban schools. As a former Montessori teacher, I can easily imagine students using Civilization III to investigate historical questions within that system, a system which is organized around students pursuing questions of intellectual interest. The system also affords considerable freedom, so those students less interested in this particular game could pursue other activities. Indeed, games such as SimCity (which was designed by Will Wright, a former Montessori student himself) are already in suburban schools; witness schools like Erving Elementary in Erving, Massachusetts that has built a city planning curriculum around SimCity. Creative teachers in communities with ample resources and supportive parents are beginning to explore such pedagogies; it is only too bad that they are reserved for students of privilege.

As schools go online, we have tremendous opportunities for rethinking the culture of our classrooms. E-learning educators are wise to look toward games as models of next-generation learning environments. They long have been best models of engaging activity and, more recently, excellent examples of learning environments. Yet, as challenging as it is to design a good educational game, it may be more challenging to design a good educational system for an educational games to flourish in. Right now, even if you had the ideal game—a more polished Civilization III or perhaps a Full Spectrum Scientist—it is not certain that such a game could even survive in today's educational environment as our contemporary educational systems do not know how to sustain a curricular innovation built on the properties that make games compelling. In order to realize the potential of such gaming technologies in education, it will indeed be



necessary for us to "change the game" in more fundamental ways with regard to our current institutions of learning.

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## **Exhibit 1:**

### **What happens when games enter the classroom?**

Given the popularity of games such as Sim City, Civilization III, and Railroad Tycoon, it seems logical to assume that educators have investigated the effects of games in the classroom. However, most studies on games and education involve simplistic games that make minimal use of simulation, character, and multi-player interaction, and that hardly compare to commercial video games (Cordova and Lepper 1996). Before this study (Squire 2004), few studies on the classroom use of commercial-quality games had been published.

Furthermore, until recently teachers had used games such as Sim City most often as an unstructured activity during recess or free time, although Maxis has published a teacher's guide on its Web site. This extremely limited use of games reflects both educators' uncertainty about the appropriate use of games in the classroom and the reluctance of game companies to market to schools for fear of being labeled "edutainment"—a label considered the kiss of death in the games industry.

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**Figure 1:**

Screen shot from Civilization III

For a full description of Civilization III, see Squire (2004) or the Firaxis Web site.

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## **Exhibit 2**

Students' difficulty in learning Civilization III, and their subsequent dissatisfaction with it, is often more pronounced in school situations than out of school. Both in my dissertation study (2004) and in my subsequent studies (forthcoming and in progress), students in after-school centers have generally taken to the game much more quickly, and found it much more "learnable," suggesting that the encompassing social context is important in shaping players' reactions to the activity.

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### **Exhibit 3: Excerpts from student interviews**

In interviews, the observations by students reflected a variety of understandings in response to their experiences leading virtual civilizations. For example, the game helped Tony see interconnections between geography, economics, and politics. Specifically, he began to see the game as a geographical materialist explanation for the rise and fall of civilizations, an idea that is core to the game and which quickly spread through the class. In closing interviews, he expounded on these relationships:

Tony: If you're next to the ocean, that's a good place to any city to be. It has food, water, the climate would be moderate, and that's a good place for a city to flourish. If you have luxuries around water, that brings in trade – brings in money that you can talk with other Civilizations. If you have enough money you can buy a lot of things and you can sell a lot of things.

Further connections of this sort were made in a rather different way by Amy, who— playing the role of an Iroquois leader—was asked to explain the historical causes of European colonization of the Americas. She cites inventions coming as the product of global trade networks, an interpretation consistent with many historians' analysis of colonization (c.f. Diamond 1999).

Interviewer: Why did the Celts colonize North American instead of the Iroquois colonizing Europe?

Amy: Because they could get different inventions from the Romans, Chinese, and different people so they could make a boat to sail across. I had only myself to get the inventions...I couldn't discover things fast enough. Then, I did keep discovering things and they wouldn't trade with me. They wouldn't take my money.

Interviewer: Did you meet anyone else?

Amy: Persia. I think that's it. And the Aztecs.

Interviewer: Why didn't someone like China come over?

Amy: Because they [the Celts] are greedy. They had a big army and were strong. And they thought they could wipe me out.

In an interview with Vicky, questions of political ideology and governance took on added immediacy due to her simulated experience as a "despotic" ruler.

Interviewer: What is despotism?

Vicky: It's like kind of a government that you are.

Interviewer: Would you want to live under despotism?

Vicky: No. I think I had despotism though. I'd rather have monarchy.

Interviewer: Why?

Vicky: You only have one God. And people are saying that it's good.

Interviewer: Do you know what a monarchy is?

Vicky: It's almost like you get to rule better and people look at you as a God.

These interviews show how the learning that occurs through playing Civilization III is less about the "names and dates" of factual history (something which is of relatively little use to many history educators, c.f. Wineburg 2001), but rather about developing interpretive lenses which can be used for historical analysis, such as the causes of colonization.

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#### **Exhibit 4: Difficulty and complexity**

Game theorists typically distinguish between difficulty and complexity. In a game like chess, for example, has relatively simple rules but is difficult to master, whereas tic-tac-toe has both simple rules and low difficulty. Civilization III, which is both complex and difficult.

The issue of complexity has created a dilemma in educational gaming: educators can use more simple games that try to do some of what games do well—like the game Supercharged, created as part of MIT's Games-to-Teach project (now concluded, but replaced by the Education Arcade initiative)—or create large scale, complex games that leverage more potentials of the medium. Because they play on existing instructional formats (tutorials, for example), games like Supercharged fit into classrooms much more neatly than more complex games, and likely will become more standard. While these games have educational potential, they often lack precisely the qualities that make games so compelling (complexity, ambiguity, opportunities for creative expression); their exclusive use thus risks sullyng the reputation of educational games.

## **Exhibit 5: Managing game complexity**

The Civilization series may be unique in its specialized, historical language and in the sheer volume of its units, but it is not unique in its complexity or difficulty. Most of the top-rated games from the past five years contain similarly complex choices and strategies. However, Civilization offers less assistance to users for managing its complexity effectively than other games in similar genres, such as Rise of Nations, whose designers have experimented with multiple tutorial formats to assist users in managing such complexity. James Paul Gee (2004) offers an excellent analysis of such tutorials.

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**TABLE 1:**  
**Cases included in study**

Case	1. Media School	2. YWCA After School
Setting	Urban high school	Working class urban after school program in school building
Age	Grade 9-10	Grades 6-7
Class size	18 students	10 students
Time	18 hours (6 weeks X 3 50 min. class periods)	20 hours (8 sessions X 2 1/2 hour enrichment class)
Teacher/Researchers	1 teacher, myself, paid researcher	Teacher, researcher

**Author note:** The two cases in this mini-comparative study have been taken from a larger study addressing the use of *Civilization III* in educational settings (Squire 2004).

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