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The Classroom of Popular Culture

What video games can teach us about making students want to learn

by James Paul Gee

Why is it that many children can't sit still long enough to finish their homework and yet will spend hours playing games on the computer? Video games are spectacularly successful at engaging young learners. It's not because they are easy. Good video games are long, complex, and difficult. They have to be; if they were dumbed down, no one would want to play. But if children couldn't figure out how to play them—and have fun doing so—game designers would soon go out of business.

To succeed, game designers incorporate principles of learning that are well supported by current research. Put simply, they recruit learning as a form of pleasure. Games like Rise of Nations, Age of Mythology, Deus Ex, The Elder Scrolls III: Morrowind, and Tony Hawk's Underground teach children not only how to play but how to learn, and to keep on learning.

Children have to learn long, complex, and difficult things in school, too. They need to be able to learn in deep ways: to improvise, innovate, and challenge themselves; to develop concepts, skills, and relationships that will allow them to explore new worlds; to experience learning as a source of enjoyment and as a way to explore and discover who they are. Let's look at how this kind of learning works in cutting-edge video games. We might learn something ourselves.

Producers, Not Consumers

To start with, good video games offer players strong identities. In some games, players learn to view the virtual world through the eyes of a distinctive personality, like the solitary Special Forces operative Solid Snake in the espionage action game Metal Gear Solid. In others, like the epic role-playing game The Elder Scrolls III: Morrowind, each player builds a character from the ground up and explores the game from that character's point of view. Game designers recognize that learning and identity are interrelated. Learning a new domain, whether physics or furniture-making, requires students to see the world in new ways—in the ways physicists or furniture-makers do.

Game designers let players be producers, not just consumers. Players codesign a game through their unique actions and decisions. Many games come with software that allows players to modify ("mod") them

to produce new scenarios or whole new games. For instance, in the Tony Hawk skateboarding games, players can design their own skate parks. At another level, an open-ended game like The Elder Scrolls III: Morrowind, in which each character undertakes his or her own journey, ultimately becomes a different experience for each player.

Players can also customize games to fit their learning and playing styles, since well-designed games allow problems to be solved in multiple ways. For example, in the two Deus Ex games, many of the problems a player faces can be solved in at least three ways: using stealth, confrontation, or persuasion. Many games also offer levels of play for beginning, experienced, or advanced players, letting players choose the degree of challenge they are comfortable with. In some games, players can test their own skills. For example, the real-time strategy game Rise of Nations asks, “How fast can you get to the Gunpowder Age? Find out if your resource-management skills are good enough.”

Features like these encourage players to take risks, explore, and try new things. If they fail, the consequences are minimal—they can start over from their last saved game. All these factors give players a real sense of agency, ownership, and control. It’s their game.

A Cycle of Mastery

But learning goes yet deeper in well-designed games. Research has shown that when learners are left completely free to solve a complex problem, they may hit on creative solutions. But these solutions may not necessarily help them generate good hypotheses for solving later problems, even easier ones. A simple classroom example is the case of the young child who comes to think that reading means memorizing words. This may work perfectly well—until the child is swamped by the marked increase in vocabulary in more complex books.

In good video games problems are well ordered, so that early ones lead the player to formulate hypotheses that work well for solving later, harder problems. For example, if stealth is important in a game, the first levels will clearly show the player why confrontation is a less effective option, so as not to reinforce skills that will later undermine the player’s success.

This well-ordered sequence creates an ongoing cycle of consolidation and challenge that enables players to confront an initial set of problems, and then practice solving them until they have routinized their mastery. The game then throws out a new class of problem, requiring players to come up with new solutions. This phase of mastery is consolidated through repetition, only to be challenged again. In this way, good games stay within, but at the outer edge of, the player’s competence. They feel doable, but challenging. This makes them pleasantly frustrating, putting players in what psychologists call a “flow” state.

Video games operate on the principle of “performance before competence.” That is, players can learn as they play, rather than having to master an entire body of knowledge before being able to put it to use. Research shows that students learn best when they learn in context—that is, when they can relate words, concepts, skills, or strategies to prior experience. In fact, many students are alienated from what they learn in school because those connections and experiences are absent. Video games are simulations of new experiences and new worlds, yet they are able to engage players with languages and ways of thinking with which they have no prior experience. Players encounter

new words and techniques in the context of play, not as abstract definitions or sets of rules. This holds their interest and spurs them on to develop new skills, vocabularies, relationships, and attitudes—irrespective of factors like race and class.

One way players can increase their competence is to seek advice from other players. There are websites and Internet chat rooms for almost any game, where players trade tips and stories, and where questions can be posted. Experts can help novices and peers can pool information. New knowledge is available just in time—when players need it—or on demand—when players ask for it.

Preparation for a Complex World

Finally, good video games nurture higher-order thinking skills. They encourage players to think in terms of relationships, not isolated events or facts. In a game like Rise of Nations, for example, players need to think about how each step they take might affect their future actions and the actions of their opponents as they try to advance their civilizations through the ages. These kinds of games encourage players to explore their options thoroughly rather than taking the straightest and swiftest path, and to reconceive their goals from time to time—good skills in a world full of complex, high-risk systems.

Video games teach players to capitalize on “smart tools,” distributed knowledge, and cross-functional teams. The virtual characters one manipulates in a game are smart tools. They have skills and knowledge of their own, which they lend to the player. For example, the citizens in Rise of Nations know how to build cities, but the player needs to know where to build them. In multiplayer games like World of WarCraft, players form teams in which each player contributes a different set of skills. Each player must master a specialty, since a Mage plays differently than a Warrior, but the players must understand each other’s specializations well enough to coordinate with one another. Thus, the knowledge needed to play the games is distributed among a set of real people and their smart tools, much as in a modern science lab or high-tech workplace.

In his bestselling book The World Is Flat, Thomas Friedman argues that the United States is facing a looming educational crisis. Even highly skilled jobs in radiology, computer science, or engineering are being outsourced to low-cost centers. Any job that involves standardized skills can be exported. To maintain their competitive advantage, workers in industrialized countries will need to go beyond a mastery of standardized skills to become flexible, adaptive, lifelong learners of new skills. Yet U.S. schools are focused more than ever on the “basics,” measuring their success with standard-ized tests that assess standardized skills.

It is ironic that young people today are often exposed to more creative and challenging learning experiences in popular culture than they are in school. The principles on which video-game design is based are foundational to the kind of learning that enables children to become innovators and lifelong learners. Yet how many of today’s classrooms actually incorporate these principles as thoroughly and deeply as these games do? Let’s ask ourselves how we can make learning in or out of school more “game-like”—not in the sense of playing games in class, but by making the experience of learning as motivating, stimulating, collaborative, and rewarding as the experience of playing a well-

designed video game.

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For Further Information

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R. Koster. Theory of Fun for Game Design. Phoenix: Paraglyph, 2004

Go to www.academiccolab.org/initiatives/gapps.html for many other papers related to games and learning.