

Digital Games: Learning through Play

Author: Hlodan, Oksana

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Digital Games: Learning through Play

OKSANA HLODAN

The *Horizon Report*, the go-to guide for emerging educational technology published by the New Media Consortium (www.nmc.org/horizon), projected in 2005 that educational gaming would become a significant learning tool within two or three years. The 2008 report identifies game play as one of the seven metatrends that continue to affect pedagogy, evolving to include virtual worlds, augmented reality, and massive multiplayer modes. Yet there are still those who consider electronic games mindless entertainment that fails to confer academic benefits.

Eric Klopfer, winner of the 2008 AIBS Education Award, directs the Scheller Teacher Education Program (STEP) at the Massachusetts Institute of Technology (<http://education.mit.edu/drupal>) and explores the educational potential of games at Education Arcade (<http://educationarcade.org>). Klopfer's research on the development and use of computer and simulation games provides a convincing argument for engaging students in learning science and complex systems through play.

STEP's project MyWorld has added "wireless ubiquitous play" to gaming, so that students can play in the "interstitial" spaces in and out of school. The first MyWorld game, *Palmagotchi*, takes players to the Galápagos Islands to simulate the evolution of Darwin's finches. All the birds and flowers that players must sustain have genetically determined traits, and the game requires players to make decisions to ensure that the organisms stay alive and well. Augmented reality simulation games, also found on the STEP Web site, take this idea a step further. Participants explore a real-world location, such as a museum or zoo, with handheld computers that allow them to collect location-specific data and engage in hypothetical scenarios.

The reluctance of some educators to integrate digital games into educational programs may be a symptom of a generational shift. Marc Prensky, a leading figure in game philosophy and design for education, describes those who grew up without digital technology and adopted it later as "digital immigrants"; a "digital native" is someone who has grown up with it. He points out that digital natives are wired for gaming: by the time they leave college, students will have spent more than 10,000 hours playing video games, as opposed to about 5000 hours reading books. Digital natives, he stresses, are "accustomed to the twitch-speed, multitasking, random-access, graphics-first, active, connected, fun, fantasy, quick-pay-off world of their video games." Some say these traits promote a short attention span. Prensky, however, believes that pedagogies stressing linear thought processes are at odds with the way today's students think, and so are counterproductive to learning.

Not all games, of course, lend themselves to the curriculum, and the issue of regulating content is now a serious academic endeavor. Educators, researchers, and developers are collaborating at all levels of the education system to ensure games are an effective learning tool. Games must have clear rules and goals and a strategy that allows for competition and winning, and most important, they must be fun to play. To qualify as an "edugame," they must also adhere to pedagogical criteria.

Immune Attack (<http://fas.org/immuneattack>) meets all of these requirements. Cocreated by the Federation of American Scientists, the University of Southern California, Brown University, and Escape Hatch Entertainment, with funding from the National Science Foundation, the current game version (released in May) is designed to teach immunology to high-school students; a

version for undergraduates is in the works. In this game, a teenager discovers she has a unique immunodeficiency in which her immune system is "present, yet nonfunctional," as if all her immune cells have forgotten what to do. With the help of her teacher, she creates a nanobot with the ability to teach cells how to fight infections. During the game, participants learn about the different cells and environments in the human body to help the teen figure out how to train her immune system.

Commercial electronic games should not be ignored. Two examples that may expand students' concepts in the biosciences are *EcoQuest* and *Spore*. *EcoQuest* is a pair of adventure games designed to teach the importance of environmental ethics. The young protagonist seeks help from creatures found in various ecosystems of the world to combat pollution in the first game and cure a disease afflicting rainforest residents in the second. With *Spore*, players create a unique creature and guide it on an epic journey through five stages of evolution. The player's creature begins in the primordial ooze and adapts to its environment as it goes from the microscopic to the macrocosmic with the aid of the player.

It is a fact that electronic games are a significant factor in students' lives. More studies may be needed to confirm their value as learning tools and dispel any qualms about their use in the classroom. It is already clear, however, that research into the learning needs of digital natives can be a fun exercise for everyone.

Oksana Hlodan (e-mail: ohlodan@aibs.org)
is editor in chief of *ActionBioscience.org*,
an AIBS education resource.

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