

## Chapter 9

# Games in E-Learning: How Games Teach and How Teachers Can Use Them

**Michelle Aubrecht**  
Ohio State University, USA

### ABSTRACT

*Game-based learning is a dynamic and powerful way to engage students to develop evidence-based reasoning, analytical and critical thinking skills, problem-solving skills, systems thinking, and connect with peers, all of which are 21<sup>st</sup> century skills. Games can lead students to become participatory learners and producers instead of passive recipients. This chapter considers the following three approaches to using games with students: (1) an instructor makes a game for a specific learner outcome, (2) students make a game, and (3) an instructor uses a commercial or online game. The chapter emphasizes the second and third methods. Specific examples of how games are being used with students illustrate ways to teach with games.*

### INTRODUCTION

“Can games teach?” and “What do they teach?” are two questions that are at the forefront of pedagogy. In the name of accountability, educators are confronted with demands from legislators who mandate testing as the primary indicator

of success (Gee & Shaffer, 2010; Squire, 2011; Valli, Croninger, Chambliss, Graeber, & Buese, 2008). However, analysis of these accountability measures by the National Research Council (2011) report *Incentives and Test-Based Accountability in Public Education* has shown them to be ineffectual in increasing student achievement. Concurrently, there is a growing awareness about the importance of incorporating 21<sup>st</sup> century learning skills, many

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of which can be met with digital video games (smartbean, November 2009; Wellings, 2009) and new media literacies into the curriculum. This requires that both the role of the teacher and the way that schools are organized undergo examination and transformation. Gee & Shaffer (2010) call for a “radical” transformation of assessment in order “to succeed in introducing the new ways of learning that computers make possible” (p. 6). Technology, in general, can allow a teacher to move into the role of facilitator (Morrison, Lowther, & DeMeulle, 1999), partner (Prensky, 2010) and coach and advisor (Squire, 2011). Teachers can guide students in thoughtful and researched sharing of ideas, recognizing that they themselves do not have to know all of the answers. The role of the student can also be transformed from passive receiver of knowledge to active producer (Jenkins, 2006; Gee & Hayes, 2010; Prensky, 2010; Squire, 2011).

Because students grow up in a visual culture, it is imperative that they be able to understand and navigate within it. Video games, now well established as an entertainment medium, have the potential to change the way that students and teachers think about learning (McLellan, 1996; Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006; Prensky, 2006; Annetta, 2008; Gee & Hayes, 2010). According to Thai, Lowenstein, Ching, and Rejeski (2009),

*Educational digital games offer a promising and untapped opportunity to leverage children’s enthusiasm and help transform teaching and learning in America. These games allow teachers to tap into their students’ existing enthusiasm for digital games to engage, expand, and empower them as learners. (as cited in Wellings & Levine, 2009, p. 10)*

Video games provide powerful and complex learning tools and environments through their inherent ability to combine such multimedia as video, sound, text (including narrative), vi-

sual information (images, tables, graphs), and simulations, including pulling information from databases in real time. MIT’s Ubiquitous Games project features games in production that are intended for mobile devices and handhelds. Smallab Learning at Arizona State University uses wall- or ceiling-mounted projection equipment and sensors to make use of motion-capture technology to create multimodal, embodied learning games that are projected on the floor. Smallab is also developing a new product, the 3D Interactive Whiteboard, so that the games they are developing can be used with an interactive whiteboard. Tested in classrooms and museums, their library of embodied learning content spans several disciplines including Science, Technology, Engineering, Mathematics (STEM), Language, Special Education, Gaming, and the Arts.

Video games can be an alternative way to demonstrate learning without testing (Gee & Shaffer, 2010). Essentially, games are designed to test and challenge players. Players are actively engaged in problem solving, understanding complex relationships, building upon what they have learned in order to progress, and experiencing the consequences of their choices. David Shaffer (2006) explains the difference between testing and learning by doing as the “difference between ... declarative knowledge and procedural knowledge, or being able to explain something and being able to actually do it” (pp. 91-92).

In this chapter, the author will discuss teaching methods, specific games that have been used to teach, and student projects as well as the educational benefits of students making and designing games. While many of the examples herein are from physical classroom environments, there are also many web-based games that are free and easily lend themselves to online learning environments. The author will distinguish the terms “simulation”, “simulation game”, and “game”, and discuss the ways that “play” and “game” can be understood in an educational context.

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