Chapter LXVIII
Designing Games for Learning

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ABSTRACT

This chapter discusses two games that were designed to target learning as well as implications for the design of future games intended for this purpose. It illustrates how the ADDIE model of instructional design can be leveraged to produce digital game spaces as well as the limitations that designers face based on the goals of the project, the chosen technology, and the audience chosen for the digital intervention. The goal of this chapter is to use real-world examples of learning game design processes in order to prepare instructional designers for the complexity of using game and instructional design principles as a means of improving student motivation, learning, and other psychological factors that prepare them for engaging meaningfully in the educational experience.

"Program a map to display frequency of data exchange, every thousand megabytes a single pixel on a very large screen. Manhattan and Atlanta burn solid white. Then they start to pulse, the rate of traffic threatening to overload your simulation. Your map is about to go nova."

From William Gibson's *Neuromancer*, p. 43

INTRODUCTION

Gibson's 1984 novel depicted a future world in which everyone is online, data exchange is a primary profession, and computer viruses complicate a worldwide digital network dominated by large corporations. Since then, many of his predictions have come true and our learners live in a world full of digital media, video games, data exchange,

and the daily threat of viruses turned against their home computer systems. Over the last decade, students have begun to regularly participate in online learning environments of the 2-D variety like WebCT Vista and Blackboard that deliver instruction and course content, assess learning, and provide them with opportunities to share with one another on a massive scale. Beyond their immersion in these flat digital realms, a secondary phenomenon has emerged along with a $10 billion dollar industry. In their non-academic or work time, learners are playing video games on various dedicated consoles from the XBOX 360 to the Nintendo Wii and their mobile phones. According to the Entertainment Software Association, 36% percent of U.S. parents say they play computer and video games while 80% of these parents note that they play games with their kids who now make up 28.2% of all game players according to the industry (Entertainment Software Association, 2007). Beyond games, online 3-D environments such as Linden Labs' *Second Life*, have become homes for learning with lectures taking place in dedicated spaces, movies being made available for learners to view, and objects providing additional, interactive information that learners can use to better understand models through simulating real-world experience.

During that same period, an additional challenge has arisen in academic institutions from kindergarten through undergraduate education in which student motivations to engage in academic tasks are noted to be in decline over the last decade (Anderman & Leake, 2005; Anderman, Maehr, & Midgely, 1999). Video game usage among all age groups has been steadily increasing for the last decade with one recent study suggesting that one in five individuals over age 30 are gamers (ESA, 2007). These observations have raised questions, such as how can we as researchers and designers leverage this interest to improve our learning environments whether they are dedicated entirely to teaching, support face-to-face instruction directly, or used occasionally as motivating activities in our classrooms?

The creation of these environments pose special challenges to instructional designers, content developers, researchers, the classroom teachers who use them, and the students themselves. This chapter will explore several of the issues that arise during the design, development, implementation, and evaluation phases of two games designed for learning. The first is a 3-D multi-user virtual environment (MUVE) called *Anytown* that was developed in order to support student-writing practice, note-taking skills, reading comprehension, and recall by leveraging a multi-path set of linear stories in which students engage in a role-playing game as investigative reporters (Warren, 2006b; Warren, Barab, & Dondlinger, in press; Warren & Dondlinger, under review). The second is an alternate reality game (ARG) (Martin & Chatfield, 2006) called *The Door* that was part of a hybrid undergraduate course that focused on engaging students with a contextual immersion in a two-tiered story from which students earned learning tasks that required them to engage in problem solving using word processors, spreadsheet programs, and Web tools as part of their solution rather than as the end objectives for the course (Warren & Dondlinger, 2007). Both of these worlds were designed in order to increase the amount of data flow between students, perhaps not to the simulation threatening degree to which Gibson alludes to, but instead in a manner that improves student communication, helps researchers understand the underlying functions and design elements necessary in video games that result in high levels of student engagement, and lead to higher levels of student satisfaction than are currently reported.

BACKGROUND

While the new frontier for learning technologies identified by theorists in the field has been