Chapter 11
Serious Games for the Classroom:
A Case Study of Designing and Developing a Massive Multiplayer Online Game

Scott Wilson
University of Oklahoma, USA

Leslie Williams
University of Oklahoma, USA

ABSTRACT

The University of Oklahoma's K20 Center shares the process of developing a massive multiplayer online game. This chapter identifies the process used to meet the challenge for the design, prototype, development, and beta test of a digital game-based learning environment. The project's goal was to develop a self-regulated constructivist learning environment where students work in groups to solve a series of complex, ill-structured problems. The multiuser game provides an interactive learning experience which allows students to experience authentic intellectual work in a virtual representation of a real-world context. Students are challenged through their participation in an interdisciplinary environment that leverages a real-world problem to utilize the different perspectives of the four major disciplines. The authors provide a description of the project's efforts to develop a shared learning space that creates scaffolding of social support of other students and a gaming environment that emulates successful elements of commercial video games to ensure an engaging learning experience for all students.

INTRODUCTION

The K20 Center at the University of Oklahoma entered the world of serious games through the award of a 3-year Star Schools research grant from the U.S. Department of Education (DoE). The DoE's request for proposals specified learning games on a mobile platform. The K20 Center's proposal, developed in 2004, promised to develop interactive learning applets on high-end handheld devices (e.g., Palm, Dell Axiom, etc.). After receiving the award and early in the process of working with focus groups of students and teachers, it was determined that a short-lived platform had been selected and the students in our focus group had developed higher expectations for interactive learning. These students

quickly urged us to explore the realm of a massive multiplayer online game (MMOG) as a learning environment. One option was to deliver what had been promised and risk quickly becoming irrelevant as the platform was forced into extinction by the convergence cell phone. The other option advocated by students in our focus groups was to enter a project that was fraught with unknowns— an unknown platform with unknown technical capabilities that was to be designed by a group of university students majoring in computer science, who were unaccustomed to working within a team environment on a large programming project. The K20 Center chose the latter.

In electing to take this path, the K20 Center encountered several problems that, if not mitigated, promised to derail the entire development process. These problems included (1) developing for a platform that was not currently commercially available, as opposed to developing for a platform, like the personal digital assistant (PDA), which looked as if it was to be replaced by convergence phones; (2) students' expectations of games based on their almost daily immersion in commercial off-the-shelf (COTS) games; (3) teachers' hesitation to give up direct instruction for unproven innovative learning practices; (4) developing the capacity to use university students as the development team; (5) developing a serious game, with a focus on instructional design guided by state and national standards; and (6) managing the technical challenges encountered in implementing an MMOG in schools with a diverse range of network capabilities.

Early in the development process, even before the shift from the PDA as a platform, there seemed to be a disconnect between the game design consultant, who had considerable expertise in the area of learning games, and the central philosophy of the K20 Center—engaging students with authentic learning scenarios. The Center found itself in the same dilemma that other serious game efforts have encountered: a large gulf separates game study academicians and educators who serve as gatekeepers on what type of innovation will be placed in front of the students in their classroom. So the question Holland, Jenkins, and Squire asked in 2003 still begs to be answered—"how to help these two worlds, that of gaming and that of education, to work together" (p. 29). An equally expansive separation exists between the academic area of game studies and the commercial game industry. Fernández-Vara, Grigsby, Glinert, Tan, and Jenkins (2009) cited a Microsoft researcher as challenging university scholars "to come down from the ivory tower and demonstrate the value of their theories through the building of actual games" (p. 256). The K20 Center's response to this dilemma was to develop a serious game development model that leveraged both the philosophical base of the Center and the management techniques used in the software industry for highly complex projects with a large number of factors and/or solutions unknown or unfamiliar to the development team.

In this chapter, we present a case study of the development and management of a multiplayer game engine and game: *McLarin's Adventures* (or *McLarin*). The game is cross-curricular, aligned with state standards, and designed for 8th- and 9th-grade students. It is our hope that the model that emerged from this collaborative process will help address the problems facing serious game developers today. In this chapter we will (1) highlight the theoretical framework used as a foundation for the project, (2) elaborate on the design process that maximized the end-user's voice in the development of *McLarin*, and (3) describe the project management methodology that allowed the initiative to flourish in a complex environment.

THEORETICAL FRAMEWORK FOR AUTHENTIC LEARNING

An educational game that is designed for classroom use must reflect current research-based

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