Chapter 15
Researching and Developing Serious Games as Interactive Learning Instructions

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ABSTRACT

As serious games gain momentum in the academic arena, no doubt more educators and instructional technologists will begin considering the possibility of making their own games for instruction. As developers of instructional resources, instructional technologists need to steer clear of producing more 'video' games, and instead, developing more 'serious' games that incorporate both learning and assessment. The research community needs to learn from tested processes and best practices to avoid repeating old mistakes. The model for serious game making presented in this article has been used successfully for the creation of an award winning project, and will now be shared for the benefits of fellow researchers, educators, and instructional technologists.

INTRODUCTION

Games and education have had a long-standing partnership for a large part of the known human history. Botturi and Loh (2009) showed that the ancient Greek used only one word, *ludus*, to mean both *school* and *game*, as learning and playing games were once considered to be the same. School teachers of that time were referred to as *magister ludi* (literally, game masters) because they were experts who drew upon the principles of game playing for the training and instruction of their pupils. Based on this *game-is-education* perspective, the use of digital video games for serious learning can hardly be called revolutionary. Hence, when nearly all (99% of boys and 97%

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of girls) teenagers report playing video games regularly as a preferred pastime (Lenhart, Kahne, Middaugh, Macgill, Evans, & Vitak, 2008), many educators acknowledged this to be the key to the hearts and minds of the digital native generation (Miller, 2008).

The video game industry had always stayed on the cutting edge by pushing for advancement in digital (graphic) technology. When coupled with the passion among game developers to out-do one another, this has given rise to an industry that is relentless in its pursuit for products with ever-escalating production qualities. Compared to just a few years ago, not only are players able to perform a lot more actions within a game environment; the shelf-lives of commercial, off-the-shelf (COTS) games are constantly diminishing, being given over to newer games to fuel tomorrow's technology. This means that many well-known computer games (such as *The Oregon Trail*, *Math Blaster*, and *Reader Rabbit*) were not only outdated, but would cease to work on the newest computers. Even the abundant 2D-animation (Flash) games found on educational websites would pale in comparison to what the industry offers today.

Since the debut of 3rd generation game consoles (such as PS3 and Xbox 360), today's game engines can easily simulate real-world physical laws (such as gravity and inertia), and produce realistic lighting and water effects in games. As faster computer processors and online streaming technology continue to provide support for better game effects, immersive online play, and massive multiplayer virtual worlds; the knowledge gap between the gaming industry and outsiders to the industry (such as educators and researchers) will continue to widen. There was little reason to conclude non-professional game developers could ever create games at the industry production quality. Why then, should educators and instructional technologists care about making video games?

HISTORY OF GAME MODIFICATION (MODDING)

The watershed came in the form of a military training game, called *Marine Doom* (1998), created for the purpose of training soldiers in teamwork and decision making skills when live training time and opportunities were limited during peaceful times. Instead of creating the video game from scratch, the U.S. Marine (in-house) development team decided to modify (or, *mod*) a COTS game, *Doom* (1992), to take advantage of the game mechanics and resources already present in the game engine, as well as to reduce production cost and time. This game *mod*ification process—whereby a COTS game's own engine is re-used to create a "home-brew" (and very much playable) game—has come to be known as *modding* among the gamers. Since then, the U.S. Marine Corps have gone on to create other military game modules (or *mods*), including the highly successful *America's Army*, with over 26 versions released since its debut in 2002. Gamers have easy access to thousands of game *mods* (made from a plethora of COTS games) that were distributed through repositories and websites created just for mod enthusiasts—for example, the Vault Network (http://vault.ign.com), and the Game Mod Database (http://www.moddb.com).

Instead of producing a full-fledged video game, it would be far more likely for educators, researchers, and trainers to develop prototypic games for the demonstration of educational concepts, research frameworks/methodologies, or training procedures. As such, game modding would prove to be most appropriate and invaluable in reducing development cost and time while attaining industry production quality in the artifact produced. Because a game mod would be of a similar feel and quality to the original COTS game used to create it, learners would be motivated by the medium and willing to learn the new training tool. Similarly, research projects using mod of well-known COTS games could benefit from