

# Chapter 11

## Measuring Student Perceptions: Designing an Evidenced Centered Activity Model for a Serious Educational Game Development Software

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### ABSTRACT

*As educational games become more pervasive, the evolution of game design software is inevitable. This study looked at student perceptions of teacher created Serious Educational Games as part of a project striving to create a game development software where teachers and students create games as part of educational activities. The objective was to use evidence from student perceptions to inform further development of the software. A mixed method design ascertained data from 181 male and 178 females from 33 teacher created games. Results indicate that the software is relatively effective by the supporting documentation and training lacked in several areas. This information led to the creation of a commercial game development software set for release in 2010.*

### INTRODUCTION

Creating and infusing video games into school curricula has potential to motivate students to explore

content once viewed as boring or undesirable. Current research suggests that because today's students have grown up in the digital age, they will spend as many if not more hours engaging in online games than in formal face-to-face instruction (Foreman, 2003; Neal, 2003; Prensky, 2001;

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Rejeski, 2002). The fascination with *Pong*<sup>TM</sup> in the 1970's is today paralleled by the popularity of video games where players can compete against one another or together to reach a common goal.

As a result, some believe that video game technology will inevitably replace a significant amount of traditional instruction—lectures, tests, and note taking (Neal, 2003). The *2008 Project Tomorrow* survey, a national nonprofit organization committed to supporting and promoting the effective use of science, math, and technology resources in K-12 education, reported that online video gaming is one of the technologies that students use most frequently—and that educational gaming is one of the emerging technologies that students would most like to see implemented in their schools. However, only 10% of teachers reported adopted gaming as an instructional tool (eSchool News, 2008).

Serious Educational Games (author) are not only deeply engaging, but provide a natural forum for technology integration with dynamic visual representations of the natural world. Video gamesmanship represents conscious, deliberate mental and physical activity and promotes active learning by shifting players into the participant role (Bowman, 1982). Dickey (2000) and Duffy and Cunningham (1996) agree that a major goal of constructivist learning environments is to find activities that support *dialogical interchange and reflexivity*. When well-designed, gaming has the properties of the most effective instructional situations: experiential, inquiry-based, and providing continuous user feedback, while promoting self-efficacy, goal-setting, and team learning (Bransford, Brown, & Cocking, 1999). Virtual reality research suggests participation in a 3D environment supports the constructivist instructional paradigm and may bridge the gap between experiential learning and information representation (Bricken & Byrne, 1994; Dede, 1995).

When students create games with support by teachers in terms of content accuracy, time allowed, and recognition of the work involved

and this technology becomes part of the school culture—students become more engaged in the content as well as proficient producers in the digital world. They are thereby simultaneously introduced to modeling and design through immersion in the virtual space.

## Purpose of the Study

This study was couched in an evidenced centered design proof of concept project based on activity theory where a software package was developed to allow for easy Serious Educational Game creation by teachers and students. The software development platform was developed as a mod of the popular Half-Life 2 game engine where games could be easily created for instructional purposes. Elite teachers (Kenan Fellows-to be explained more in-depth later) were participants in the study. After two years of professional development and testing of the software, students played the games created by these teachers. The goal of the study was to solicit student feedback to inform the next phase of the software design and the professional development model using an innovative technology. The research question thus became: What characteristics from student perceptions and attitudes after game play influence future game software design?

## RATIONALE

### Activity Theory

The oldest tradition of activity theory has its roots in the classical German philosophy of Kant and Hegel, which emphasized both developmental and historical ideas and the active and constructive roles of humans. Later on, the more contemporary philosophy of Marx and Engels elaborated the concept of activity further. Until the 1920s and 1930s, it was actually brought up by the Russian psychologists Vygotsky and Leont'ev, and Luria

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