# Chapter LXII
# Designing Games-Based Embedded Authentic Learning[1] Experiences

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## ABSTRACT

*This chapter presents the embedded authentic serious game-based learning experiences (EASLE) architecture which has been developed to assist in the definition of games-based applications. The motivation behind the design of EASLE is to keep game specifications as simple and focused as possible for educators attempting to create serious games as current available game design methodologies and templates are complex and extensive. Furthermore, it is argued that games created with EASLE reduce the amount of game development work to be done by the educator allowing for deeper collaboration between students. Toward the end of this chapter a game developed with EASLE which took two weeks to complete is presented.*

## INTRODUCTION

Computer games can support a suite of pedagogical experiences that are unique within current e-learning technologies. The worlds created in this immersive medium are distinctively structured. These environments create a synthetic experience that captures the essence of being in a particular world or context, and replaces the traditional computer interface which sits between a learner and their computer-based educational material (Winn, 1993). This immersion enables learners to negotiate meaning based on their own personal cognitive, affective, and kinaesthetic experiences rather than on the descriptions of others' experiences. It assumes learners will construct knowledge through non-symbolic, non-reflective, first-person psychological activity that occurs when they interact directly with worlds. Choices embedded within the worlds allow the learning

focus to shift away from isolated pre-designed interactions, to a situation that encourages the learner to control, manage, and direct their own learning. Once immersed within a world, learners can communicate, investigate, and experiment either individually or in the company of other learners, to transcend geographical and temporal boundaries. Such conversations can be synchronous or asynchronous, anonymous or identified, and are believed to provide community support as well as social learning opportunities and relationships. It is reported in other types of education games that the presence of a low risk non-threatening environments encourages participation and risk taking (Dickey, 2005).

Thus, the pedagogical power of games are in their ability to immerse the learners themselves in a synthetic, purpose built virtual environment where they can act or collaborate as either themselves or as a proxy persona (avatar). The learner can participate with other learners in discussion (synchronous or asynchronous), investigation, or experimentation while involved in a range of other learning activities including simulations, role playing, problem solving, formal instruction, self-assessment, and peer assessment (McArdle, Monahan, & Bertolotto, 2006).

The long history of technology use in education shows an inclination to use it in the same traditional manner as old technologies (Cuban, 1986; Means & Olson, 1994) even with new media (Galarneau, 2004). This methodology neither produces change nor improves education. It is imperative that old pedagogies and curricula are updated and modified to take the best advantage of the new technology. Furthermore, implementation of new technologies in universities has its inherent problems and even more so the execution of games, simulations, and virtual realities which have traditionally been the domain of technical experts (de Byl & Taylor, 2007). What is clear from previous research is that for a successful paradigm shift towards enhancing e-learning with new technology teachers need to be shown how to access the required resources, make the use of these resources and resulting applications convenient and providing rewards and recognitions for its use (Rogers, 2000).

Current understanding of quality in games is largely grounded in specific games. As such, the majority of serious games available reuse game engines designed for combat simulations, for example, America's Army (a tactical multi-player first person shooter deployed the United States Army as a global public relations initiative) and STRATA (a Synthetic Teammates for Real-time Anywhere Training and Assessment game for close air support used by DARPA).

Good games are not easy to design and educational games are even more difficult because of the lack of content and pedagogy knowledge on behalf of the games companies and the lack of technical ability in educators to create such application. In addition there is little incentive for a games developer to embrace an educator with an educational game idea when their potential audience is not in the millions, but in the tens or hundreds.

Although games engines exist which assist educators in creating their own games, there are no existing pedagogy guidelines for translating their content into a playable game. Educators cannot simply transmit their knowledge into their students. Rather, they must arrange semi-structured learning environments to support educative exploration by students. Through exploration, experimentation, and discovery, students can build their own understandings. Computer games are the ideal medium in which to create such environments that not only immerse and engage the students but allow them to practice problem solving over and over again.

This chapter will define an architecture which will assist educators in the implementation of customised games to deliver course content. However, first some key issues to consider before starting a game development project are presented to assist in the projects success.