

## Chapter 47

# Technology Enhanced Learning and Education

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### ABSTRACT

*PC-games, video-games, serious-games, educational games, and on-line-games share learning technology that depends on a conceptual framework of experiential learning. These are forerunners of Technology-Enhanced Learning (TEL) we will exploit in the future in myriad ways. This article examines these phenomena along with their conceptual frameworks as compared with e-learning and other instructional designs. It also offers ideas on how we can prepare future developers to create more effective and meaningful learning tools by integrating playful experiential learning with inter-disciplinary practice. Finally, it briefly discusses the infrastructure needed to expedite such cross-disciplinary practice in research and educational communities to create tools for twenty-first century learning.*

### INTRODUCTION

In the closing years of the twentieth century, many foretold the impact of technology on education, but this hardly prepared us for the raging current of activity that is transforming the learning and educational environment at every level across the globe. In the shadow of the ever-growing Internet, the nexus of computer technology and high-speed animation has created a media / anima-

tion / simulation / gaming / edutainment industry that is 'taking over' classical media and cinema to control a significant part of world media. It is likely that such technology will have a major impact on our future in terms of culture, learning, and education.

This technical community also produces educational games to teach subjects, expand concepts, understand events or culture, or assist in learning a skill. Such tools may incorporate games and simulation for experiential learning, as the basis

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for *Serious Games* (SG). SGs are designed to solve a problem, or to train, investigate, or advertise, and they may sacrifice entertainment in order to make a serious point. Brown and Thomas (2007) describe the effects of SG in leadership training: “When role-playing gamers team up to undertake a quest... This process brings about a profound shift in how they perceive and react to the world around them. They become more flexible in their thinking and more sensitive to social cues.” (p. 1)

These outcomes show how adeptly developers can simulate real or imagined worlds with imagery and activities that incorporate extreme playability. Some PC-based synthetic learning environments simulate events at a fraction of the cost of large-scale virtual reality simulators. Soon we will see software that adapts to learners and context with personalization, intelligent feedback, and interactivity to support exploratory learning. (Technology-Enhanced Learning: 32 European Research Projects, 2008). Good games demand the integration of design and programming skills with artistic flair and sensitivity to human traits, as well as effective management that can handle a creative workforce in an efficient fashion with good engineering and quality assurance.

Affordable high-bandwidth infrastructure enables massively multi-player online games (MMOG) with experiential social aspects that let us build relationships and experience a sense of belonging. The impact of the Internet on communication is also leading to a seismic shift in how we interact and collaborate, and how we tell the stories we use to define ourselves. We are racing headlong into a world that brings computers, phones, tele-media, communications, and mobile platforms into technological and social convergence, so any system taxonomy based on delivery strategies can be ignored in the discourse. As bandwidth and delivery improve, products appear in a delivery-independent environment, so this chapter defines these tools based on the features, functions, and benefits delivered to the learner, rather than how they are delivered.

A term defining this confluence is Technology Enhanced Learning (TEL) which is the focus of this chapter. The challenge is how to educate the next generation who is responsible for creating and distributing such technology. Previously, games might be created by individuals or small groups, but now games require huge development teams and huge budgets. However, the design may still be the responsibility of programming gurus who may be poorly educated in instructional design, educational values, and learning techniques. Conversely, some instructional designers may be barren of the technical skills needed to create products or communicate well with programmers and engineers. Who will educate designers, developers, and managers? How can engineers that design and program new tools become facile with artistic, aesthetic, and affective domains that are essential to human and social values? How do developers find comfort with storytelling and narration as elements in development and learning? What conceptual framework is appropriate to plan the curriculum and courses they need?

Perhaps good answers can be found in a more holistic learning environment, with cross-disciplinary programs targeted to programmers, designers, artists, writers, educators, and managers. This chapter examines the conceptual framework of TEL compared with E-Learning and other educational methods and offers ideas on better learning tools by integrating playful experiential learning with narration, game orientation, and simulation. It calls on educators to pursue holistic practices in TEL-oriented learning, education, and research communities.

## **BACKGROUND**

### **A Conceptual Framework for TEL**

Instructional design takes much of its conceptual framework from constructivism, though E-Learning designs often borrow from Skinner’s

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