

## Chapter 23

# Affective Gaming in Education, Training and Therapy: Motivation, Requirements, Techniques

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### **ABSTRACT**

*Games are being increasingly used for educational and training purposes, because of their unique ability to engage students, and to provide customized learning and training protocols. In addition, games are being developed for health-related education and training, for cognitive and motor rehabilitation, and, more recently, for psychotherapy. Emotion plays a central role in learning, in the training of new cognitive and affective skills, and in the acquisition of new behaviors and motor skills, as well as in the eliminations of undesirable behaviors (e.g., addictions). This chapter discusses how the emerging discipline of affective gaming contributes to the design of more engaging and effective educational and training games, by explicitly integrating emotion into the gameplay. It focuses on the contributions from affective computing, and emphasizes the important role of emotion modeling. Emotion modeling is relevant both for modeling emotions in game characters, to enhance their believability and effectiveness, and for the development of affective user models, to enable real-time gameplay adaptation to the player's changing affective state. The chapter introduces the notion of affect-centered games: games whose central objective is to train affective or social skills. It also discusses several concepts facilitating the design and evaluation of affect-centered games: affective player profile, affective gameplay profile and ideal affective player envelope. The chapter discusses approaches to modeling emotion in game characters, and concludes with a discussion of a tool that would facilitate the development of affect-centered games: an affective game engine.*

DOI: 10.4018/978-1-60960-495-0.ch023

## INTRODUCTION

Games are being increasingly used for educational and training purposes, for a variety of specific topics and domains (language, biology, mathematics, motor skills, cognitive skills, healthcare and medical training, military training). Games have a unique ability to engage students, and to provide customized learning and training protocols. This makes serious educational and training games a powerful tool for teaching and training. In addition, games are being developed for health-related education, training and cognitive and motor rehabilitation. Examples include games for education about healthy diet and exercise (e.g., *Escape from Diab* (archimage.com), *Squire's Quest* (<http://www.squiresquest.com>); and games for motor rehabilitation following stroke or brain trauma (e.g., (Burke, McNeill et al., 2009).

More recently, use of games has been suggested for psychotherapy (Brezinka and Hovestadt, 2007), and psychoeducation, for a variety of disorders, conditions and life-skills; e.g., stress reduction, smoking cessation, obesity prevention. Within the past few years, games have begun to emerge that directly address psychotherapy; e.g., a game designed to support cognitive-behavioral treatment in children (*Treasure Hunt* (Brezinka, 2008)); a game for children experiencing divorce, based on family therapy (*Earthquake in Zipland* ([www.ziplandinteractive.com](http://www.ziplandinteractive.com))); and a game designed to motivate adolescents for solution-focused therapy ("Personal Motivator" (Coyle, Matthews et al., 2005).

Emotion plays a central role in learning, in the training of new cognitive and affective skills, and in the acquisition of new motor skills. Emotion is also critical for the acquisition of new behavioral skills, as well as for the elimination of undesirable behaviors (e.g., addictions).

The emerging area of *affective gaming* (Sykes, 2004; Gilleade, Dix et al., 2005) is therefore directly relevant to the development of educational, training, and therapeutic games. Affective gam-

ing focuses on the integration of emotion into game design and development, and includes the following areas: recognition of player emotions, adaptations of the gameplay to the players' affective states, and modeling and expression of emotions by non-playing characters

This chapter discusses how the emerging discipline of affective gaming contributes to the design of more engaging and effective educational, training and therapeutic games, by explicitly integrating emotion into the gameplay. The chapter focuses on the contributions from affective computing, and emphasizes the important role of emotion modeling. Emotion modeling is relevant both for modeling emotions in game characters, to enhance their believability and effectiveness, and for the development of affective user models, to enable real-time gameplay adaptation to the player's changing affective state.

The chapter focuses in particular on *affect-sensitive games*, which are capable of recognizing and adapting to the player's emotional state. It introduces the notion of *affect-centered games*, which are games where emotions play a central role, and whose explicit purpose is to train affective and social skills, or to aid in psychotherapy. The chapter also discusses several concepts that facilitate the design and development of educational, training, and therapeutic games, including the notions of *affective player profile*, *affective gameplay profile*, and the *optimal affective envelope* of the player. The chapter concludes with a discussion of an *affective game engine* (Hudlicka, 2009): a tool that would facilitate the development of affect-centered games, by providing the necessary embedded representational and knowledge primitives, and algorithms, to support more systematic affect-focused game design.

This chapter is organized as follows. *First*, the importance and role of emotion in learning and training is briefly discussed the next section. The affect-related constructs outlined above are then defined, and their relevance for the design of educational and training games in general, and

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