

## Chapter 31

# Serious Games and Gamified Tools for Psychological Intervention: A Review

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### ABSTRACT

*Mobile technologies and technological advances in behavioral assessment have found their way in common healthcare practices. However, there are still few studies about videogame-based interventions to support concrete psychological treatments. While the market for self-help mobile apps is continuously increasing, in most cases, they are a mere digitalization of texts contained in self-help books and do not take advantage of the interactive and playful potential of devices on which they are offered. Nevertheless, a number of health games have been developed for children and adults for a variety of therapeutic purposes. The current chapter provides an overview of the state-of-the-art serious games currently available as psychological interventions across popular delivery formats (virtual reality environments, online and PC videogames). Where available, evidence about their efficacy is reported. These serious games have the potential to complement traditional psychological interventions and improve psychological wellbeing for people of all ages.*

### INTRODUCTION

Humans play games in all cultures with different goals: to learn new skills, to feel a sense of achievement, to interact with friends and family, etc. (Krebs, 2013). In this sense, digital games are just a new expression of this old method of social interaction and a subset of digital games is the serious games genre, which can make the player experience different levels of *presence* and *immersion* (two concepts we will revisit in this chapter) within the game environment.

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In recent years, serious games, or videogames for purposes other than mere entertainment, have received increased attention and dissemination, mainly due to their proved impact in the areas of military training (Yildirim, 2010), education, and stroke and physical rehabilitation. In 2010, synergies between videogame industry and other sectors such as education, defense, medicine, health, work security, activism, culture, or inclusion generated a profit of 1.5 million Euros (IDATE, 2010), with an expected annual increase of 47% until 2015.

In a recent literature review, Rahmani and Boren (2012) analyzed electronic databases published between January 2000 and April 2012 searching for Randomized Control Trials (RCTs) examining the potential of videogames on health outcomes. Their analysis found that most of the studies showed promising results using videogames in healthcare, with potential uses for pain management, diagnostics, education, physical rehabilitation, cognitive loss prevention, and so forth.

‘Serious Games,’ or ‘Game-Based Learning,’ are terms used interchangeably for digital play experiences developed for the broader purpose of training and behavior change (Connolly, Boyle, MacArthur et al., 2012). In society today, we find serious games in just about any setting—from corporate, healthcare, and government to non-governmental organizations, non-profits, and education. Moreover, games, once regarded as mere stimuli or something to be blamed for increasing aggressive behaviors (Nap & Díaz-Orueta, 2014), are now known to be persuasive and motivating digital tools capable of positively affecting training, learning, and skill acquisition. For example, Shin, Heard, Suo, and Chow (2012) studied the brains of people playing the game *Counter-Strike* (CS) (Valve Software, Bellevue, WA) using an EEG alpha asymmetry index and found that overall results were consistent with the hypothesis that predominantly positive emotional reactions were elicited from playing the CS game and concurred with positive subjective ratings of happiness. Even the *TETRIS* puzzle game can be used as a non-invasive cognitive resource for crisis intervention after traumatic events; more specifically, it produced a significant reduction in flashback frequency over one week, and these results were in agreement with a clinical measure of Post-Traumatic Stress Disorder (PTSD) symptomatology (Holmes, James, Coode-Bate & Deeprose, 2009). In summary, serious games are defined as games with a purpose beyond mere entertainment that are designed specifically for the goal of training and behavior change in different domains (either education, healthcare or others as stated above). Among those, we may find specific games targeting behavioral change in the context of a psychological intervention or treatment (such as treatment for mood disorders such as depression or anxiety, anger management, identification and prevention of bullying behaviors, etc.)

Regarding psychological interventions, there are many features in game structure and mechanics that can be used successfully when planning a therapeutic treatment. Most existing game worlds easily can be adapted by changing the scenery, complexity, avatar, controls, etc., with a patient or therapist using these variables to easily personalize the game and make it compatible with the clients’ abilities and needs. As Nap and Díaz-Orueta (2014) stated referring to rehabilitation gaming (but the same could be applied to psychological treatment), not only can the patient or therapist adapt the game, but also the game itself can automatically adapt to the clients’ progress. Therefore, the whole virtual environment, including the characters, scenery, and even the storyline, can be adapted to the player’s specific needs and abilities.

This chapter will focus on the existing serious games for psychological intervention, an area that has not received as much attention as physical or stroke rehabilitation by serious game developers. This is possibly because physiological or medical signs of progress and efficacy are easier to be measured than psychological changes (a problem that will be constant in any type of psychological intervention when compared to other types of health, medical, or rehabilitative interventions). The current review provides

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