

## Chapter 8

# Gamification in Dementia and Mild Cognitive Impairment

**Vitor Simões-Silva**

 <https://orcid.org/0000-0003-2831-9729>

*School of Health, Polytechnic of Porto, Portugal*

**Susana Alexandra Mendonça Gregório**

*School of Health, Polytechnic of Porto, Portugal*

**Tarcisio de Tarco Moura Luz**

*School of Health, Polytechnic of Porto, Portugal*

**Ana Francisca Casinhas Coutinho Lapa**

*School of Health, Polytechnic of Porto, Portugal*

**António Marques**

 <https://orcid.org/0000-0002-8656-5023>

*School of Health, Polytechnic of Porto, Portugal*

### ABSTRACT

*The following chapter will address the use of gamification (specifically serious games), as well as its results and conditions of use, as an assessment and intervention tool for people with mild cognitive impairment (MCI) and dementia diagnosis. These games are effective for cognitive skills, such as attention, memory, executive functions, and speed processing. Besides this, physical (related to motor coordination and movement), social, psychological, and emotional (related to motivation, anxiety, depression, and stress) skills can be improved by serious games. It will be considered the contexts of the use of different games, such as Episodix, Panoramix, and some other games that are applied as serious games, like exergames. Besides, it will be also referred the different platforms associated with these games, such as mobile applications, videogames, virtual reality, and augmented reality.*

DOI: 10.4018/978-1-7998-7472-0.ch008

The global aging of the population has become a major health challenge worldwide. The increase in life expectancy can lead to health problems related to cognitive decline, due to brain changes caused by aging (Vogel et al., 2016). Thus, some people when older will need help to perform one or more activities of daily living, such as bathing, dressing, or going to the bathroom (Kingston et al., 2018). It is predicted by the World Health Organization that in 2050 the world population above 60 years of age will almost double from 12% to 22%, exceeding the number of children under the age of five (World Health Organization, 2020). This problem can also increase age-related conditions, such as Neurocognitive Disorders (Tong et al., 2019).

Neurocognitive Disorders (NCDs) include various forms of cognitive conditions. NCDs can be divided into two types, Dementia, and Mild Cognitive Impairment. Concerning Dementia, it includes Alzheimer's, Vascular's dementia, and Parkinson's disease. Mild Cognitive Impairment (MCI), is a prodromal of dementia and an intermediate stage of cognitive change between normal aging and dementia (Oh & Lee, 2016).

Relatively to Dementia, it interferes with independence on the routine and the daily. However, this is the opposite of what happens in the case of the MCI, which does not interfere with the independence of daily life (American Psychiatric Association, 2014). Therefore, the difference between MCI and Dementia focuses on the severity of cognitive decline leading to functional impairment. Because of this functional impairment, these diseases increase the costs for the economy (Fratiglioni et al., 1999; Knopman & Petersen, 2014; Oh & Lee, 2016; Wimo et al., 2006).

It is important to notice that the lack of physical activity may deteriorate the health condition of the people living with the diagnose of dementia, in particular, the physical, cognitive, emotional, and social functions. However, the participation in the physical activities might be restricted because of some conditions that these patients might have, such as lack of spatial orientation and balance problems. Taking this into account, these type of conditions can originate lack of interest for this type of activities, so these people most likely will not participate in physical activities. Besides this, dementia also has functional symptoms that can affect the daily life of these patients (Van Santen et al., 2019).

According to the cognitive-enrichment hypothesis, it states that the type of activities that people engage during their lifespan has an important impact on the functioning level of the old age. This hypothesis also states that an enriched environment can stimulate cognition and physical activity while optimizing brain functioning. According to this, cognitive stimulation, physical activity, and social engagement is an essential intervention with people that have Dementia (Ben-Sadoun et al., 2016).

Taking into account pharmacological therapies, they are one of the many treatments available for many causes of dementia and besides this, many medications offer limited benefits and often cause sedation and loss of autonomy (Schwarz et al., 2012). Therefore, the importance of nonpharmacological therapies is growing, aiming to delay the decline of cognitive function in dementia and MCI (York Health Economics Consortium, 2017). Also as the volume of people with MCI and Dementia is increasing and the funding for health care becomes more scarce, it will become increasingly more difficult to deliver face-to-face therapies, which leads to a need for cost-effective, wide-scale solutions to be developed (Barr et al., 2014). Thus, it can be concluded, that it becomes important to invest and to join efforts in discovering and creating new forms of intervention that have into consideration all the different and multiple needs of the elderly population in particular.

It is to refer that the role of technology in healthcare is underexplored, even if it could be focused on the improvement of sensory impairments by facilitating activities of daily living and providing pleasure. In the case of people living with dementia, it can establish the links between behavioural disorders and

18 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/gamification-in-dementia-and-mild-cognitive-impairment/269857](http://www.igi-global.com/chapter/gamification-in-dementia-and-mild-cognitive-impairment/269857)

## Related Content

---

### Computer Gaming Scenarios for Product Development Teams

Andrew J. Wodehouse and William J. Ion (2010). *International Journal of Gaming and Computer-Mediated Simulations* (pp. 75-92).

[www.irma-international.org/article/computer-gaming-scenarios-product-development/47087](http://www.irma-international.org/article/computer-gaming-scenarios-product-development/47087)

### Assessment of Fluid Intelligence Utilizing a Computer Simulated Game

Charles Colby Buford and Brian J. O'Leary (2015). *International Journal of Gaming and Computer-Mediated Simulations* (pp. 1-17).

[www.irma-international.org/article/assessment-of-fluid-intelligence-utilizing-a-computer-simulated-game/136314](http://www.irma-international.org/article/assessment-of-fluid-intelligence-utilizing-a-computer-simulated-game/136314)

### Problematizing Epistemology in Computer Games Research

Adam Mechtley (2015). *International Journal of Gaming and Computer-Mediated Simulations* (pp. 68-81).

[www.irma-international.org/article/problematizing-epistemology-in-computer-games-research/133620](http://www.irma-international.org/article/problematizing-epistemology-in-computer-games-research/133620)

### Beyond the Technological Dimension of Edutainment: An Evaluation Framework with a Curricular Perspective

Carlos Rodríguez-Hoyos and Maria João Gomes (2012). *Handbook of Research on Serious Games as Educational, Business and Research Tools* (pp. 818-837).

[www.irma-international.org/chapter/beyond-technological-dimension-edutainment/64287](http://www.irma-international.org/chapter/beyond-technological-dimension-edutainment/64287)

### Playing with Biology: Making Medical Games that Appear Lifelike

Thomas B. Talbot (2013). *International Journal of Gaming and Computer-Mediated Simulations* (pp. 83-96).

[www.irma-international.org/article/playing-with-biology/93030](http://www.irma-international.org/article/playing-with-biology/93030)