

Chapter 9

Playing to Improve Memory: How Serious Games and Gamification Have Contributed to the Neurocognitive Rehabilitation of the Elderly


Maria Luiza Tertuliano

ESS, Polytechnic of Porto, Portugal

Inês Ferreira Lopes

ESS, Polytechnic of Porto, Portugal

Tiago Coelho

 <https://orcid.org/0000-0001-7847-2401>

CIR, ESS, Polytechnic of Porto, Portugal

Ângela Fernandes

CIR, ESS, Polytechnic of Porto, Portugal

ABSTRACT

The phenomenon of global population aging incites a change in the thinking and practice of health professionals, who are increasingly looking for effective techniques aimed at this age group. Among the various biological, social, and psychological changes that occur in the aging process, changes in cognitive processes are one of the most prevalent manifestations. Thus, motivating and effective proposals should be implemented to train and rehabilitate these functions. Among these proposals, health-centered gamification has become a major trend and is increasingly studied. The authors propose in this chapter to discuss gamification in the rehabilitation of cognitive functions, especially memory in the elderly population, presenting the advantages and potentialities of serious games and gamification against the current scenario of cognitive stimulation, which requires innovative solutions to increase motivation and involvement of the elderly in the process.

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INTRODUCTION

It is a fact that society is undergoing a worldwide phenomenon of population aging. Such a finding induces a reconsideration in the areas of competence of health professionals, who should increasingly specialize and search for effective techniques aimed at this age group and its specific complaints (Lam et al., 2020).

Aging is a natural and irreversible process, in which a series of changes occur throughout the human body, such as atrophy of the gray and white matter, and reduction of neuronal connections. These impairments are linked with the deficit of higher cognitive functions, especially memory (Cochar-Soares et al., 2021; Garbaccio et al., 2018).

Since the world population is living longer and cognitive functions deteriorate with aging and neurodegeneration, it will be increasingly common the appearance of cases of deficits and disturbances in memory and other brain functions. Therefore, motivating and effective proposals must be implemented to train and rehabilitate these functions.

In recent years, gamification has become a major trend in technology, and promising results of its effectiveness are being increasingly reported. The benefits of gamification in healthcare, particularly for cognitive skills, have drawn attention from researchers (Huotari & Hamari, 2017; Koivisto & Malik, 2021).

It is known that most of the studies on gamification have been conducted with young adults and child audiences (Koivisto & Malik, 2021). Based on the scenario already presented of increased life expectancy and consequent cognitive losses due to aging, together with the exponential growth of the use of digital technologies in health, the authors propose in this chapter to discuss gamification, specifically the contribution of serious digital games, in the rehabilitation of cognitive functions, particularly memory in the elderly population, since we cannot forget that this audience is increasingly attentive and connected to digital technologies and represents a growing group of users interested in being part of the technological world.

The authors also intend to present the advantages and potentialities of serious games and gamification concerning the current scenario of cognitive stimulation, which requires innovative solutions to increase the motivation and involvement of the elderly in the process, to make cognitive training more meaningful and enjoyable, as well as to help therapists overcome difficulties such as the lack of material and human resources.

POPULATION AGING

Society is experiencing a worldwide phenomenon of population aging. According to studies on population trends, the number of elderly people aged 60 years and older worldwide approached 1 billion in 2017 and is expected to double by the year 2050 (Gall et al., 2015; Lam et al., 2020). This phenomenon is due, among other reasons, to the fact that the elderly are increasingly educated and present increasingly healthy lives, which consequently leads to longer life expectancy and causes a change in the demographic and epidemiological profile of the population (Cochar-Soares et al., 2021).

It is possible to think of the study of aging in two major blocks: human aging and population aging. From the perspective of human aging, it is possible to say that it is individual, it is the sum of changes in the body as a whole, and it can be subdivided into three dimensions: biological, psychological, and social. Such process will be different for each individual, being based on their lived experiences and how they interpret them (Cochar-Soares et al., 2021; Rogers et al., 2013; Toledano-González et al.,

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