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Recommendations on the Design of Serious Games for People with Dementia

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Abstract

Dementia is a progressive syndrome affecting cognition, motor abilities and behavior. Serious games are an emerging treatment alternative but benefits have not been found for people with dementia yet. One reason may be that serious games were not well adapted. The purpose of this article is to give informed recommendations on the design and implementation of serious games for people with dementia that future studies can apply and thus may find significant effects. The methodology applied was deriving information from existing literature in combination with experience from personal work in the field. Main findings are: implementation of well-contrasting icons; first-person game perspective; gesture control; personalized game content; combination of only one cognitive and one motor skill; implementation as supervised group activity. In conclusion, the recommendations are a novelty and represent a profound guidance in the design and implementation of serious games for people with dementia

Keywords: serious games, dementia, virtual reality, Alzheimer's disease, usability

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1. Introduction

Dementia is a chronic and progressive syndrome which affects cognition "beyond what might be expected from normal ageing" (1). Alzheimer's disease (AD) contributes to 60-70% of all cases (1). Executive functions are affected including comprehension, attention, information processing, decision-making and planning, together with memory, learning, orientation and language skills (2). Cognitive impairment is accompanied by the loss of motor functions, such as balance, gait, flexibility or strength (3). Further, behavioral disturbances commonly occur with dementia, e.g. verbal and physical aggression or sleep-wake disturbances (4). According to "The Global Deterioration Scale for Assessment of Primary Degenerative Dementia" by Reisberg et al. (1982), the course of dementia can be divided into two phases comprising seven stages: the pre-dementia phase (stages one through three) and the dementia phase (stages four through seven) (5). In the early pre-dementia phase, no cognitive decline is evident (5). This is followed by a very mild decline, which can be considered as "age associated memory impairment" merging into a "mild cognitive decline" where first deficits e.g. in finding words and names or becoming lost in unfamiliar places become evident (5). The first stage in the dementia phase is considered as "mild dementia" with a moderate cognitive decline and is characterized by e.g. forgetfulness, losing track of time, memory deficits and problems of handling finances (1,5). The second stage in the dementia phase is considered as "moderate dementia" with a moderately severe cognitive decline and is characterized by e.g. forgetting well-known phone numbers or addresses, requiring help with (instrumental) activities of daily living ((I)ADL) such as choosing proper clothing, or even facing balance problems (1,5). In the last two stages of the dementia phase (moderately severe dementia and severe dementia), cognitive decline is severe or even very severe