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Letter to the Editor

The Role of Digital Games in Cognitive Rehabilitation for the Elderly: An Alternative to Traditional Treatment

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Dear Editor-in-Chief

Digital games are computer or smart device applications that people can use for entertainment, learning or rehabilitation. Because they are interactive and engaging, these games are regarded as excellent tools for helping the elderly improve their mental abilities (1). They boost mental abilities such as being able to remember, concentrate for long periods, and solve problems by providing specific mental activities. Therefore, for example, Lumosity, a game focused on neuroplasticity, provides various tasks that help people enhance their mind and reduce the risk of cognitive decline. They are both fun and motivate seniors to continue, as they receive instant results and personal coaching (2).

The playing digital games helps with cognitive rehabilitation in seniors. Solat and Firouzi's study found that playing video games can help seniors improve their memory and executive function by stimulating their senses and mind (3). Digital games could be used with or instead of traditional rehabilitation methods. Table 1 lists some well-known digital games and the outcomes they bring in this field.

Incorporating AI and VR technologies has paved the way for new approaches in cognitive rehabilitation through digital games. For example, VR-based interventions can motivate older adults to actively self-perform cognitive alongside motor tasks through the use of simulated environments (8). The efficiency of these interventions is further enhanced by AI with personalized, tailored work to individual needs. Furthermore, social isolation and the mental well-being of older adults can be improved through the use of digital games. Online multiplayer games or programs that are meant for social interaction can help in alleviating the feeling of loneliness and depression. Digital games help older adults improve their self-esteem and emotional stability, which in return enhances their quality of life. This became especially important during the COVID-19 pandemic when older adults faced a higher risk of isolation (9).

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Table 1: A summary of digital games and their results in cognitive rehabilitation of the elderly

Name of game	Description	Results
Lumosity (2)	Lumosity is a computer game for enhancing and improving the memory and brain efficiency of the elderly.	The game was effective in improving working memory, visual memory, and executive functions in elderly participants.
Brainastic computerized cognitive training (CCT) (4)	Brainastic is an online application for cognitive training through video games and is performed on a tablet with each game targeting one of the five domains including 17 minigames.	Significant improvements in frailty status, learning ability, and verbal memory were observed in intervention groups combining CCT with physical exercise compared to controls. Multi-domain CCT did not show superior effects on frailty or cognitive function compared to two-domain CCT.
Brain Age (5)	Puzzles and minigames to strengthen the player's memory and concentration skills	Playing the game for 4 weeks led to significant enhancements in executive functions and processing speed in older adults.
Computerized cognitive rehabilitation training (Captain's Log) (6)	It is one of the well-known computer software in the field of cognitive science, the main purpose of which is to improve cognitive deficits and performance, such as memory, executive function, social understanding, concentration, and attention.	Computer-assisted learning with this program effectively improved attention, concentration, and mental effort in elderly participants.
Super Mario 64 (7)	A 3D video game that requires motor and cognitive skills such as spatial memory and executive function.	After 6 months of training, significant increases in gray matter volume were observed in the hippocampus and cerebellum of older adults (aged 55–75), with no effect on the dorsolateral prefrontal cortex.

Nevertheless, there still remain several issues that need to be addressed in this field. Some works, like the VR review from 2016, lack evidence on the effectiveness of these technologies due to a lack of extensive research in the area (10). Furthermore, the inability to adopt this technology includes inadequate access to digital devices for older adults, a lack of proper teaching, and fears of experiencing cyber-sickness (such as nauseating feelings associated with VR). Developing

games that feature straightforward, intuitive, and age-appropriate interfaces could alleviate these problems to some degree.

This area is not widely studied in aging research, although it has great potential. The majority of the existing research concentrates on children or particular patient cohorts, neglecting older adults in more holistic studies. Primary barriers include deficient technological infrastructure, scant funding for research, and a low level of awareness among the general public of the potential benefits of digital games. In summary, digital games hold considerable promise as non-pharmacological interventions for elevating cognition, mental wellness, and the overall quality of life in elderly populations. Both domestic and international studies, including more recent ones, have acknowledged the impact of these tools, although more work remains, particularly in the realm of enduring impacts and the creation of culturally relevant games. The intersection of technology within geriatric care invites essential focus for upcoming investigations. Thus, along with other areas of exploration, it is clear that utilizing digital games for cognitive rehabilitation transforms the approach to active aging, promoting wellbeing alongside health in older adults.

Conflict of interest

The authors declare that there is no conflict of interests.

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