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## CONFERENCE ABSTRACT

### **VirtuAAL: Technological Solution based on Virtual Reality computer games for cognitive training for the elderly**

ICIC20 Virtual Conference – September 2020

Begoña García-Zapirain

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VirtuAAL: Technological Solution based on Virtual Reality computer games for cognitive training for the elderly

This paper presents the project VirtuAAL that gives support to elderly people with cognitive impairment that is a main issue amongst many elderly citizens that suffer the consequences of cognitive deterioration is prone to fall in senile depression, as being conscious of decreasing capabilities is means a loss of autonomy, which is a defining factor for many people's mental stability. This deterioration may lead to physical issues including falls, digestive and hygiene derivative problems, etc. Societies across the planet pay the consequences of cognitive impairment in their elderly populations as well: healthcare costs and lack of understanding of the conditions in which these people live.

This project is aimed at getting the best out of the newest technologies and use them to motivate elderly citizens to diminish the impact of this sickness. The specific objective has been the creation of a platform of games for virtual and augmented reality whose topics are conceived around the idea of training autonomy in order to increase confidence in the performance of daily activities.

The description of the VirtuAAL technological solution includes three computer games in the case of Virtual reality. The first game is based in the kitchen of a regular house, where the user performs different actions around the process of frying an egg. The second game is about a bank, where the objective is to get money out of the cash machine. Finally, in a sitting room, gamers find a set of pieces of different shapes that they must transport to their destination. These three games have been designed in order to bring back memories from welcoming familiar spaces to elderly users.

The end-users have participated in an active way during the testing phase. The experiment design has consisted of a first phase of lab testing and a second phase of final trial. Both phases tested the reliability of the technology and its adaptability to elder users. MoCA, SUS, Tree Testing, Attention Based Testing and EQ 5D 5L tests have been used to carry out this task. The games, designed by Ideable have been tested with more than forty users in two end-user organizations in Denmark and Romania. During the trial phase, a lot of information has been received and it is being processed through data analysis in eVida, University of Deusto. The results of this analysis show that the technology has been well-received by most users, though, as expected, some reported a bit of dizziness, which is normal when adapting to virtual reality, specially amongst elderly people. The games were fairly popular, mostly the ones of the kitchen and the bank, and the HTC Vive technology was preferred over Oculus. The reason is that HTC Vive glasses, combined with Leap Motion for tracking the movement of the hands instead of using remote controls offer a very natural and immersive way

of playing. The cognitive impact of the technology and the games is key for the future of the treatment of this disease, and this international consortium is leading these innovations.