

Co-Designing Persuasive Virtual Reality Supermarkets for Practicing Activities of Daily Living – Extended Abstract

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Virtual reality, VR, Persuasive VR, Rehabilitation, User Study



Figure 1: Virtual Reality Supermarket

Acquired brain injury (ABI) is the broad term given to the injury of the brain after birth. These brain injuries affect the functional ability, physical integrity and or metabolic activity of the brain's nerve cells. ABI is a common cause of disability, affecting approximately 1 in 45 Australians. These types of chronic health conditions require careful monitoring and intervention by professionals. Despite the many studies undertaken, there are still many of which that fail to show efficacy due to the heterogeneity of brain injuries. One method of treatment that is relatively new but shows significant potential is that of virtual reality and its use in rehabilitation.

Virtual reality experiences often enhance user engagement and motivation and thus are engaging and enjoyable. Using a persuasive VR supermarket for rehabilitation can offer several benefits, particularly in the context of persuasive therapy: Realistic Environment Simulation, Functional Task Training, Cognitive Rehabilitation, individualised Difficulty Levels, Reduced Anxiety, Continuous Monitoring and Feedback, Increased Motivation, Remote Rehabilitation, and Cost reduction. The persuasive design elements we used in the VR supermarket included: immersive environment, task list for users, positive reinforcement and interactive feedback. We believe the persuasive design further contributes to a positive user experience, which can significantly contribute to the effectiveness of rehabilitation programs.

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Our study brings a novel approach to virtual reality environments in clinical settings, as it was co-designed with a physiotherapist and speech pathologist with expertise in clinical rehabilitation. Understanding the clinical context and user requirements within a rehabilitation environment guided the iterative supermarket design process. Their feedback was leveraged through feedback sessions where the environment was demonstrated. This was done in two main iterations discussing plans for the environment at the start and a major demonstration after significant progress in development. The initial supermarket environment was then tested in a non-clinical setting to examine usability and inform modifications that would need to be undertaken prior to considering the tool for use with patients within a clinical rehabilitation setting ($n=19$). The study was approved by the Human Ethics Committee at the University of Queensland.

We used System Usability Scale, NASA Task Load Index, Slater-Usch-Steed Questionnaire as well as collecting subjective feedback. The usability assessment indicated an overall usability score of 82.5 or "A" rating. The level of immersion assessment resulted in a high average score for the group of 72.56 but with mixed responses. Lastly participants were recorded finishing the tasks assigned in an average time of 7 minutes 50 seconds. The participants enjoyed the experience and made some suggestions for further improving the user experience. Overall, the study showed significant potential for using a co-designed VR environment for rehabilitation in a clinical setting.