

Enhancing Brain-Injury Rehabilitation through Virtual Assessment of Everyday Function

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Traditionally, cognitive and motor assessments and trainings are performed using standardized tools that assess individual domains separately. These tasks are often abstract, and both clinicians and clients have difficulty applying the results to real-world function. Virtual reality allows a person to put on a headset (similar to a pair of goggles) that blocks out the view of the real world and provides an opportunity to explore a virtual environment. Using hand-held controllers, a person can interact with objects in the virtual environment. Virtual reality has been used to support a range of clinical assessment and treatment programs. The recent availability of virtual reality as an affordable consumer technology supports the continued exploration and implementation of virtual reality tools into clinical practice.

In this project, a virtual reality cognitive assessment and training of everyday function (Sim:Kitchen) was assessed and extended through three phases of user-centered software development and testing.

- Phase 1 – user testing and feedback on the existing version of the Sim:Kitchen from a range of allied health professionals;
- Phase 2 - extend the existing virtual reality functional content for occupational therapy, neuropsychology and physiotherapy; and
- Phase 3 - evaluate the feasibility and initial validity of the Sim:Kitchen tasks by comparing the similarities and differences between completing a task in virtual reality and completing the same task in a real environment.



During Phase 1, 12 allied health professionals provided feedback on an existing version of the Sim:Kitchen virtual reality system. Participants were also interviewed about current best practices of functional assessment and training in neurorehabilitation. Phase 2 included the further development of the virtual reality simulation to address feedback of Phase 1 and create additional functional tasks to benefit the user's rehabilitation assessment and training. Phase 3 evaluated the final virtual reality simulation with 10 individuals with brain injury and 10 community participants without brain injury. All participants provided feedback on their technology use at home, at work and for their healthcare needs.

The findings of Phase 1 and Phase 3 revealed that clinician, community and brain injury participants had varying levels of experience with technology and there has been limited use of and support for the use of technologies in clinical care and during recovery following brain injury. The virtual reality simulation was perceived by participants to be of excellent usability with only a small number of short-term side effects for any participant group. The feedback received is highly encouraging for continued clinical use of the application and will drive future development and clinical evaluation.