LiveWell RERC: Information and Communication Technology to Promote Safety and Independence

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Mission and Purpose
• To promote information and communication technology (ICT) access for all people regardless of ability
• To develop / validate ICT applications to improve the capacity for independent living and community participation
• Smart Home Stress Assist, Speak Up: An SPL Meter, and the Gaitbox to be presented
• Talk to the authors about collaborations

Smart Home Stress Assist
Background
• Military service members with traumatic brain injury (TBI) and post-traumatic stress disorder (PTSD) use evidence-based grounding strategies as an intervention to post-traumatic stress (PTS)
• Grounding: strategies designed to immediately connect a person with the present moment to avoid re-experiencing past trauma and pain. Often designed to redirect focus to environmental features, i.e. sound, lighting, smells, temp
• Individuals have trouble initiating strategies and setting up complex grounding interventions at time of stress

Solution
• Developed tool to facilitate grounding using Amazon Echo and smart home devices that:
  • Changes physical environment (lights, music, sounds, temperature)
  • Plays personalized recordings (e.g. favorite song or soothing family member)
  • Prompts deep breathing exercises
  • Contacts family/provider by text
  • Future: Log data for future analysis and symptom management

Speak Up: An SPL Meter
Background
• Some children and adults with cognitive or sensory impairment have a hard time monitoring and moderating their speaking volume
• Speech pathologists use sound pressure level (SPL) meters as a tool to facilitate therapy
• Many children are uninterested in standard SPL meters and other apps are not designed for therapy and offer no ‘kid-friendly’ features

Solution
• Developed an Android app that monitors sound with device’s built-in microphone & converts sounds into decibels to control an interactive image
• Speaking louder moves image upwards and speaking lower moves image down

Goal: to keep the image within the green color zone
• Zones set from configuration screen and are customizable
• App has bouncing ball image to make applicable to both children and adults

Walking Speed Monitor: the Gaitbox
Background
• Gait or walking speed is a strong predictor of functional status and survival amongst older adults
• Current measurement methods require either expensive equipment or a trained technician with a measuring tape
• Manual measurement techniques are prone to error between timers and trials

Solution
• Low cost device that uses LIDAR sensor and a microcontroller to measure and display walking speed
• Speed is automatically displayed on an LCD screen and measuring distances are adjustable

Validation Testing
• 2 prospective validation studies comparing Gaitbox, stopwatch with human timer, and Sprint System (IR break beam) used simultaneously to measure gait speed – subjects completed 4 timed trials and were instructed to walk at a comfortable pace
  1) 30 healthy older adults completing 4 m walk test
  2) 44 SCI, MS, and otherwise healthy population completing 10 m walk test

Results
1) 0.980 & 2) 0.988 correlation between Gaitbox and Sprint system

The Rehabilitation Engineering Research Center for Information and Communication Technology Access (LiveWell RERC) is funded by the National Institute on Disability, Independent Living and Rehabilitation Research, U.S. Department of Health & Human Services (grant number 90RE5023). The opinions are those of the LiveWell RERC and do not necessarily reflect those of the U.S. Department of Health and Human Services or NIDILRR. The Claude D. Pepper Older Americans Independence Center is supported by the National Institute on Aging at the National Institutes of Health (grant number P30AG028716).

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