Using Smart Technology to Promote Aging in Place for Older Adults

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Americans live in an increasingly interconnected world and can benefit by using smart technology that supports their home choices, especially considering the increasing number of people with disabilities living at home and a rise in chronic illness among older adults (Orlov, 2017). *Smart technologies* are electronic devices with interactive elements and some autonomous functions. They include a wide range of tools, from accessibility settings on smartphones and tablets to environmental control units, self-monitoring appliances, and voice-activated devices. They are predicted to play a greater role in assisting older adults in areas not typically addressed by medical treatment and home care, such as social interaction, cognitive stimulation, and physical fitness (Liebmann, 2016). Improvement in all of these areas can help increase an older adult's level of comfort, stamina, and performance success while living alone (Nauha et al., 2015).

Role of Occupational Therapy in Device Identification

Home modifications reduce falls, increase independence, and support the ability of older adults to remain at home, especially when recommended by an occupational therapist (Gillespie et al., 2012). Occupational therapists are uniquely positioned to recommend smart technology because of their ability to use the occupational profile to determine clients' priorities and merge their abilities, past experiences, and interests to address current challenges (American Occupational Therapy Association [AOTA], 2014). These home modifications may include smart technology, which falls under the virtual context as outlined in the *Occupational Therapy Practice Framework, Domain and Process, 3rd Edition* (*Framework*; AOTA, 2014).

The *Framework* defines the *virtual context* as interactions, both real and simulated, that occur in the absence of physical proximity. Smartphones and the ability to use technology to remain in contact with the environment are specifically mentioned in the *Framework* as areas to evaluate and address. Occupational therapy's role in smart technology should expand from assessing accessibility to using it to support independence within the home.

In addition to determining the ability of a client to access technology as a support option, occupational therapists must also analyze the design and functions of devices to ensure an optimal person–environment–occupation fit. Smart technology should have customizable features to increase incorporation into the user's daily routines. As with any adaptive device, technology should be matched for its ease of use by the specific older adult, with attention to font sizes, glare, lighting, location and size of on/off mechanisms, intuitiveness of use, and the adult's overall comfort with technology. The client's tolerance for error and technical support should also be considered when deciding on specific technologies.

Case Example Using Occupational Therapy Process

Joanne was a 64-year-old woman who had been diagnosed with multiple sclerosis about 5 years earlier. She used a power wheelchair and had difficulty with fine motor tasks such as dialing a telephone and turning pages in a book. She was hospitalized as a result of an exacerbation of symptoms but was discharged home with home health occupational therapy services. Joanne wanted to live her life at home and was willing to make changes to her home environment.

Her occupational therapist evaluated her ability to complete her daily activities in her home environment and identified problems with controlling the environment (e.g., adjusting the thermostat, turning lights on and off), preparing meals (e.g., remembering to turn the oven on and off), and listening to music. Together with Joanne, the occupational therapist developed a plan for integrating smart technology into Joanne's daily life to make her more independent.

Many voice-activated virtual assistant options are available to help with daily activities, including Amazon (Alexa), Apple (Siri), Google (Google Home), Microsoft (Cortana), and Samsung (Bixby). Joanne decided to use Siri, since she already had an iPhone. Joanne and the occupational therapist practiced using Siri to assist with different activities through voice commands (e.g., setting an alarm for cooking, turning music on and off, calling family members, looking up recipes) and also worked to make sure the phone was accessible at Joanne's bedside or from her wheelchair, and that she was able to recharge it independently.

Although Joanne was able to complete many of the activities with her phone, she didn't always have her phone nearby. Joanne and the therapist decided a standalone speaker system (Amazon Alexa) could be a better option. The therapist also educated Joanne on Alexa's ability to work with other smart technology (e.g., Nest thermostat, smart lightbulbs), to address difficulties Joanne was experiencing with adjusting the thermostat and turning lights on and off. Joanne decided to purchase these smart technology items.

Family members installed the equipment, and then the occupational therapist and Joanne worked together to practice executing tasks (e.g., adjusting the thermostat and lighting) and made sure Joanne was comfortable using Alexa. They also tested the areas in her home where she could be heard and how loudly and clearly she needed to speak for Alexa to recognize her commands from different locations. In addition, the therapist educated Joanne on Alexa's ability to order food, coordinate rides, and eventually, should she desire, be linked with door locks.

Joanne still wanted more independence with cooking. Family members decided to pool their resources and purchase a smart oven for Joanne. Joanne could use voice activation on her iPhone to turn on the oven and range, and set timers. Joanne sometimes had trouble with her attention and concentration; the new stove could shut off automatically after sensing abnormal activity (i.e., leaving a pot on the stove for longer than usual). At their final visit, the occupational

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The Home & Community Health Special Interest Section (HCHSIS) provides resources and support for occupational therapists and occupational therapy assistants who provide services in the home and community. Examples include home health, adult day services, senior housing, wellness programs, community mental health centers, home modification, and accessibility consultation. The HCHSIS also includes the Home Modification Network.

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