How one telewellness project focused on helping older adults with mobility disabilities age in place

What we can learn from a conversation about three remote systems tested to enhance participation in specific health activities

by Tracy L. Mitzner, PhD, and Elena Remillard, MS

For many older adults, the ability to interact with others is an essential component of their quality of life, no matter where they are living. One of the most valued aspects of senior living communities, for example, is the wide range of opportunities for social engagement. As older adults are becoming the fastest-growing population worldwide, the criticality of social connectedness for both mental and physical health is becoming more and more apparent.[1] Social connection is important not only for feelings of well-being, but it has also been linked to health outcomes: Poor social relationships are associated with increased risk of coronary heart disease and stroke.[2] In addition, a meta-analysis of 148 studies (over 300,000 partici-

Continued on page 74

How one telewellness project focused on helping older adults with mobility disabilities age in place *Continued from page 72*

pants) revealed that people with stronger social relationships have a 50% increased likelihood of survival than those with weaker social relationships.[3]

The magnitude of importance of social connection for good health is comparable with quitting smoking, and it is greater than many well-known risk factors for mortality like obesity and physical inactivity. Yet not all older adults are mobile, nor do they all have family and social relationships, let alone health-sustaining activities, within daily reach.

With these limitations in mind, one promising solution to increasing social connectedness and access to health and wellness programs among older adults with disabilities—and by extension, also to those without disabilities—is tele-technology.

As a part of the Rehabilitation Engineering Research Center on Technologies to Support Aging-in-Place for People with Long-Term Disabilities (RERC TechSAge), we are exploring the potential of tele-technologies to enable people aging with mobility disabilities to participate in activities remotely, thus engaging social connection. In this specific project, we wanted to learn how older participants responded to the use of three specific telewellness systems for three purposes that studies have shown to be both the most promising—and the most problematic—areas for mobility-challenged older adults (see Table 1 on this page):

- contacting friends and family
- remotely attending an exercise class
- contacting a healthcare provider

We chose these three specific activities because they have been shown to influence the health and wellness of older adults with mobility challenges. Countless studies have shown that our relationships and connections with family and friends are critical to maintaining good physical, mental and emotional health, so these activities might be instrumental in developing telewellness technologies to bridge these distance gaps.

For example, in healthcare, we know that social interaction can also play an important role in shaping our wellness behaviors. It has been shown that patients who are satisfied with their provider's communication skills are more likely to adhere to their recommendations.[4] Similarly, exercising with others can promote engagement and help participants follow through with their health and fitness goals. Group exercise classes such as yoga and tai chi offer the added benefits of socialization and community. Individuals who perceive greater cohesiveness in an exercise group are more likely to continue going to the class.[5] Unfortunately, the benefits of group exercise classes are out of reach for older adults who cannot attend in person because of lack of transportation or distance to programs. Participation barriers are even greater for adults with disabilities, many of whom may encounter facilities that

Using tele-technologies for specific social, health and wellness activities: Examples of benefits and concerns

	Contacting family and friends	Remotely attending an exercise class	Contacting a healthcare provider
Benefits	"I think it would be good that you would be able to see people's expression and their voice, emotions and that type of thing."	"You could see what the other person is doing more and try to follow their lead. I take physical therapy one day a week locally here and that's proved to be useful, so this probably would [be] too."	"I think it would be useful when I have questions that don't necessitate me going to the office. If I had questions about medications or my symptoms or if I should even make an appointment or that type of thing."
Concerns	"You've gotta be kind of in a good place, you need to be dressed or at least presentable. You need to...limit distractions that are going on behind you....I wouldn't want to talk to them in the middle of Grand Central Station."	"The only thing that I would be concerned about is that I would be paying attention to the video and drop something or roll over something and fall out of my chair or be trying to do a move and watch the video and pull a muscle or have an accident."	"[The healthcare provider] could advise you on what he or she would want you to do as far as the illness is concerned, but as far as getting the diagnosis right you need to...have person- to-person contact."

Table 1. Examples of benefits and concerns of using tele-technologies for specific social, health and wellness activities.

are inaccessible to them (i.e., no ramps or elevator access for wheelchair users) or classes that do not offer appropriate modifications to accommodate sensory or mobility limitations.

Tele-technologies and aging in place

As an early step in this research project, we sought first to understand what this population thinks about these technologies:[6] If potential users do not perceive them to be useful and/or if they perceive them to be difficult to use, they would not be likely to buy and use them despite any theoretical benefits. Later in this article, we will discuss some concerns that were raised in our conversations with participants.

Tele-technologies use two-way audio and video to facilitate interactions between people who are remotely located through a device such as a computer, smartphone or tablet (e.g., via Skype or Facetime). Even more advanced telepresence systems and robots like Kubi, Beam and Double allow a person to navigate around a remote environment. Tele-technologies like these could be especially beneficial in helping older adults with mobility disabilities stay connected and participate in desired activities in the comfort of their home,

Beam® by Suitable Technologies® is a telepresence device that offers 'videoconferencing with mobility.' Image courtesy of Sustainable Technologies

Kubi telepresence robot features a stationary base and arms that hold a tablet computer. A remote user can tilt or pan the tablet using these arms to gain a different camera view. Image courtesy of Xandex, Inc.

thus enhancing wellness and reducing risk factors for worsening health due to social isolation and loneliness. **[Ed.** For more about the use of technology to promote connection and engagement, see the article "The tech connection: Alleviating loneliness as we age" on pages 44–51.]

Here we present findings from an interview study with 14 adults who are aging with mobility disabilities. We asked about their perceptions and attitudes toward tele-technologies and using them to participate remotely in social, health and wellness activities.

We surveyed participants about three different types of tele-technologies, all of which allow two-way audio and video calling:

- **Skype**, developed by Microsoft, is a software application that can be used on computers, tablets or smartphones.
- **Kubi**, developed by Revolve Robotics and now available from Xandex, Inc., has a stationary base and arms that can be remotely controlled. The arms hold a tablet and allow a remote user to pan/tilt the tablet to change the camera view. The Kubi software application that controls the base can be used on a computer, tablet or smartphone.
- **Beam** is a telepresence system developed by Suitable Technologies. Beam's hardware is composed of a monitor and computer attached to a wheeled mobile base that allows the user to drive the system around the environment (sometimes referred to as "videoconferencing on wheels"). Beam's software application that drives the system can be used on a computer, tablet or smartphone.

In our study, participants watched brief videos demonstrating the capabilities of each technology. Afterward, we asked about their perceptions of each device in terms of usefulness and ease of use. Participants were also asked to share any benefits and concerns they perceived about each device in general, and also specifically for the three different activities.

Benefits and concerns

Overall, participants were very positive about both usefulness and ease of use of the three tele-technologies—Skype, Kubi and Beam—and they did not think they would be too difficult to use. Their perceptions were quite similar for all three scenarios; examples of common benefits and concerns are pictured in Figure 1.

The most frequently mentioned benefit across all three technologies was visualization, or being able to see the other person or something in their environ-

Continued on page 76

How one telewellness project focused on helping older adults with mobility disabilities age in place *Continued from page 75*

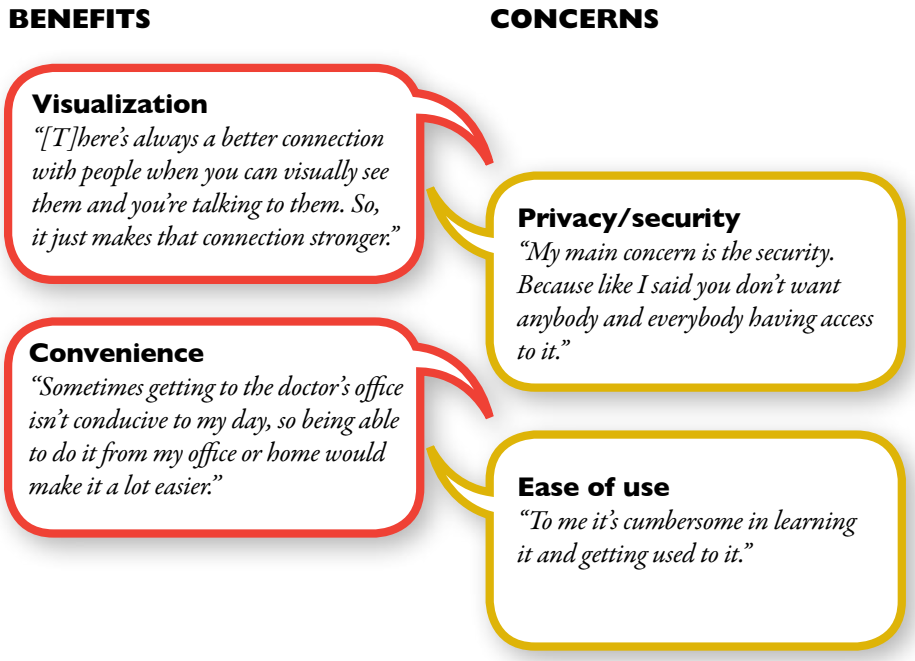

Figure 1. Examples of benefits and concerns about using tele-technologies. Source: RERC TechSAge at Georgia Institute of Technology.

ment, or feeling a sense of presence with the other person. Participants also liked the convenience, in that the technologies could help save time and effort.

Several concerns about using these tele-technologies also emerged. Across all three technologies, the most frequently reported concerns were privacy, security and ease of use (mostly understanding how to use the technologies). Privacy and security concerns were related to the potential exposure of one's personal information or to a computer virus through a breach or intentional attack. The ease-of-use concerns focused on the challenges that participants thought they might encounter when interacting with the technologies, such as learning to use them.

There were also concerns unique to the individual tele-technologies. For example, participants expressed doubts about remotely controlling the movement of the Kubi and Beam. Some felt the technology moving around could be distracting to the people interacting with it. There were also concerns about the devices potentially getting damaged or causing damage to the surrounding environment.

Participants were most enthusiastic about software-based tele-technologies—applications like Skype and Facetime. Given the growing number of older adults and especially Boomers who are adopting smartphones and tablets, these applications might be appealing because many are free and only require downloading an app (i.e., you do not need to purchase another device as well). We are currently working on a project to implement an evidence-based tai chi program for people aging with mobility disabilities using a video chat technology called OneClick.chat. From that project we will develop support materials to help others implement wellness programs through tele-technology.

Using tele-technologies in your community

To set up tele-technology for successful use, it would help for your organization to provide education and training about how to optimize privacy and security, and to clarify any misconceptions. It would also be useful to demonstrate how users can turn their video and microphone on and off, so they understand how to share only what they want to share.

Other beneficial applications to consider for bringing tele-technologies into your community or field of service might be:

- to check in on someone who is ill and does not want to answer her door
- to set up the opportunity for individuals to remotely join clubs (book clubs, knitting groups, Bible study) or classes (exercise, meditation)
- to help residents stay in touch with children and grandchildren who live long distance, in other parts of the country or the world

Resources

Georgia Institute of Technology: Rehabilitation Engineering Research Center on Technologies to Support Aging-in-Place for People with Long-Term Disabilities (RERC TechSAge)
http://s2.techsage.gatech.edu

Microsoft Skype
https://www.skype.com/en

Kubi by Xandex, Inc.
https://www.kubiconnect.com/index.html

Suitable Technologies' Beam
https://suitabletech.com/products/beam

The ability to enhance one's social and physical wellness may be the foundation of quality of life as we age, especially when it allows a person to remain independent and connected to others. Emerging tele-technologies show great promise in allowing older adults with mobility or sensory impairments to age in place and to remain vital members of senior living communities. For success, it is important that potential users of a technology can envision employing it to serve a meaningful purpose in their lives. Altogether, our findings from this specific project suggest that there is great potential for emerging tele-technologies to support older adults' social engagement, wellness and health.

Study participants were most enthusiastic about software-based tele-technologies, such as Microsoft Skype. Access to video calls and chat via Skype can help individuals keep in touch with friends and family

Tracy Mitzner, PhD, is a senior research scientist and codirector of the Rehabilitation Engineering Research Center on Technologies to Support Aging-in-Place for People with Long-Term Disabilities (RERC TechSAge) at the Georgia Institute of Technology. Mitzner is an investigator on the National Institutes of Health-funded Center for Research and Education on Aging and Technology Enhancement (CREATE). Her research focuses on understanding age-related changes and the potential of technology to support older adults with and without disability, including human-computer interaction, robot-human interaction and technology acceptance. Mitzner earned her doctorate in cognitive/experimental psychology at the University of Kansas.

Elena Remillard, MS, is a research scientist in the College of Design at Georgia Institute of Technology. She is the project coordinator for RERC TechSAge, contributing her expertise in gerontology and working knowledge of research and development projects to manage marketing, communication, participant recruitment and outreach for the center. Her specific research interests include design and technology for aging in place, technology acceptance among older adults and technology for aging with disability. Remillard has a master's degree in gerontology from the University of Southern California.

Acknowledgement

The contents of this article were developed under a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant number 90RE5016-01-00) under the auspices of the Rehabilitation and Engineering Research Center on Technologies to Support Successful Aging with Disability (TechSAge; www.techsage.gatech.edu). NIDILRR is a Center within the Administration for Community Living (ACL), United States Department of Health and Human Services (HHS). The contents of this article do not necessarily represent the policy of NIDILRR, ACL or HHS, and you should not assume endorsement by the federal government. We would like to thank OneClick.chat for the use of their software.

References

1. Beer, J. M., Mitzner, T. L., Stuck, R. E., & Rogers, W. A. (2015). Design considerations for technology interventions to support social and physical wellness for older adults with disability. *International Journal of Automation and Smart Technology (AUSMT), 5*(4), 249–264. doi: 10.5875/ausmt.v5i4.959

2. Valtorta, N. K., Kanaan, M., Gilbody, S., et al. (2016). Loneliness and social isolation as risk factors for coronary heart disease and stroke: systematic review and meta-analysis of longitudinal observational studies. *Heart, 102,* 1009–1016.

3. Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine, 7*(7), e1000316. doi: 10.1371/journal.pmed.1000316

4. Ong, L. M., de Haes, J. C., Hoos, A. M., & Lammes, F. B. (1995). Doctor–patient communication: A review of the literature. *Social Science and Medicine, 40,* 903–918. Retrieved on June 20, 2019, from https://www.ncbi.nlm.nih.gov/pubmed/7792630.

5. Spink, K. S., & Carron, A. V. (1994). Group cohesion effects in exercise classes. *Small Group Research, 25*(1), 26–42. doi: 10.1177/1046496494251003

6. Mitzner, T. L., Stuck R., Hartley, J. Q., et al. (2017). Acceptance of televideo technology by adults aging with a mobility impairment for health and wellness interventions. *Journal of Rehabilitation and Assistive Technologies Engineering, 4,* 1–12. doi: 10.1177/2055668317692755