

# Usability of Technology for Older Adults: Where Are We and Where Do We Need to Be

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## Introduction

We are witnessing two dramatic demographic and social trends: one in population aging and the other is the explosion in technology across most domains of living. Over the next several decades, most countries in the world will experience a substantial increase in the size of the older population. In 2012, people age 65 and older numbered about 562 million or 8% of the global population, by 2015 this number reached 617 million, and by 2050 will be about 1.6 billion, representing 16% of the world's population. Furthermore, people aged 85 and older and the number of centenarians are expected to increase tenfold by 2050 (United Nations, 2015). In the United States, current estimates suggest that by 2030 people over the age of 65 will represent more than 20% of the U.S. population and those over 85 will grow to almost 9 million people. Older women outnumber older men especially in the older cohorts. The number of centenarians (people who are 100 years old and over) will also continue to grow (Administration on Aging, 2016). The older population is also becoming more ethnically diverse.

We are also witnessing an explosion in technology with increases in network usage, rapid developments and deployment of new interfaces, and an increase in search engine usage. Technology has become an integral component of work, education, communication, and entertainment. Technology is also increasingly being used within the health care arena for a myriad of activities including telemedicine applications, in-home monitoring of patients, interactive communication, transfer of health information, and peer support.



Much has been written about the potential of information and communication technologies (ICTs) to enhance the quality of life and independence of older adults. Overall, the literature that has explored this issue is still somewhat in its infancy and offers mixed findings regarding the benefits of technology for older adults. We have explored this issue for the past two decades in our Center for Research and Education on Aging and Technology Enhancement (CREATE). In this paper I examine the adoption and uptake of ICTs among older adults, the potential benefits of ICT use, and issues regarding usability of technology. I begin by providing a brief overview of CREATE.

### **The Center for Research and Education on Aging and Technology Enhancement (CREATE)**

CREATE is a multisite center that is funded by the U.S. National Institutes of Health and National Institute on Aging. The center involves a team of researchers from four universities: Weill Cornell Medicine (Sara Czaja), Florida State University (Walter Boot and Neil Charness), the University of Illinois at Urbana-Champaign (Wendy Rogers), and the University of Miami (Joseph Sharit). The focus of CREATE is on the interactions of older adults with technology systems. We have examined a broad range of technologies across a variety of domains and have focused on issues of technology uptake, attitudes towards technology, training, usability, and technology design. Our overarching goals are to ensure that technology is useful to and usable by diverse populations of older adults and that older people realize the benefits of technology. Our research has evolved over the years. In our first phase, CREATE I, we explored more micro issues related to technology design such as training/instructional support, the design of input devices and interfaces, and the design of support aids. In CREATE II, our focus was on how older adults interact with health care applications, how technology affects their work/employment, and the use of technology within the home. We also explored how older adults are trained to use technology and their perceptions of privacy and trust. In CREATE III and IV, our focus has been on applications of technology within living, work, and health care settings. We have also recently explored how technology can be applied to help alleviate problems with loneliness and social isolation among older adults (Czaja, Boot, Charness, Rogers, & Sharit, 2018). In the following sections I identify the ways in which technology can be beneficial to older people and provide recent data regarding technology uptake and adoption.

### **The Potential Benefits of ICTs for Older People**

There are numerous ways in which technology can be beneficial to older adults and much has been written on this topic. Technology applications can improve access to care and support, information, safety, and social connectivity, as well as provide venues for productive engagement. For example, telemedicine and home monitoring systems can facilitate the ability of healthcare providers to conduct status checks or to remind patients of home healthcare regimes. ICT applications allow providers, patients, and caregivers to continuously track and transmit health information outside of clinical and home settings. Health websites can provide guidance on topics such as exercise and nutrition, and wearable devices (such as activity trackers) and can foster engagement in healthy behaviors. In a small study, we (Czaja, Lee, Arana, Nair, & Sharit, 2014) evaluated the feasibility of a home telehealth system that monitored blood pressure and weight for use with older patients with hypertension. The results indicated that the older adults had positive perceptions of the system, as did their healthcare providers.

There are also a number of ICT applications that can be integrated within living environments to enhance the independence and quality of life of older adults and provide access to information and community resources. Online applications can be used to facilitate the performance of tasks, such as with banking and shopping, and to access government services. ICT applications can also be used to expand educational, recreational, and communication opportunities for older adults. For example, the Internet and social networking applications can make it easier for older adults to maintain contact and connect with friends and family members, meet new people, and provide support for engagement in social activities. In a recent study (Czaja, Boot, Charness, Rogers, & Sharit, 2018), we found that the use of a computer software application designed specifically for older people (called the Personal Reminder Information and Social Management System or PRISM) reduced feelings of loneliness and increased the perception of social support

and well-being among a diverse sample of older adults. The older adults who took part in the study lived alone and were at risk for social isolation. These examples present a sample of how technology can benefit older people. In following section, the extent to which these benefits are realized are discussed.

### **What Have We Learned?**

Despite the increased use of technology among older adults, use of computers, the Internet, and other forms of technology are still lower among older people as compared to younger people. Currently, only 42% of people age 65+ own a smartphone and 32% own a computer tablet (Anderson & Perrin, 2017). Furthermore, about 67% of adults aged 65+ go online as compared to 96% of those aged 30–49 years and 87% of those aged 50–64 years. There are also significant differences in use of the ICTs among subpopulations of older adults. Older adults age 75+ and those who have lower levels of education, lower household incomes, or who have a disability, use the Internet less and may have less broadband access than younger older adults (aged 65–74). Overall, there are still large numbers of older people who have limited access to or do not use technology.

The reasons for non-use are complex but include factors such as cost, lack of confidence in the ability to learn to use the technology, physical challenges, and a reliance on others for training and technical support (Anderson & Perrin, 2017). This last factor is particularly problematic for older people who may be alone, have mobility restrictions, or live in rural locations. Our data (Czaja et al., 2006) showed that comfort with computers and self-efficacy are important to technology adoption. Recently, we found that, despite some increases in an adoption of ICTs among older people, there were still age disparities in attitudes; older adults reported less comfort with and less self-efficacy about using computers than younger people (Lee et al., 2018).

We also have found that usability issues still abound, and that older adults are often overlooked in the design of ICTs and not considered as active users of technology systems. For example, in a study of the ability of older adults' receptivity and ability to use patient portals of electronic medical records (Taha, Czaja, Sharit, & Morrow, 2013), we found that although older adults perceived these systems as valuable and were willing to use these systems, usability problems such as highly technical language, navigational difficulties, and presentation of information made use of these systems difficult. There are also misperceptions that older adults are technophobic and unable to learn to use technology. Our work and that of others has shown that older adults are receptive to using technology and that they are able to learn to use new systems; however, it may take them longer to learn, and they may need more training and instructional support.

### **Next Steps**

How do we make the potential benefits of technology realized for older populations? The first step is to recognize that, in fact, older people are willing to use technology, can learn to interact with technology systems, need to interact with technology to function independently, and are an important user group. Second, is the understanding of the implications of age-related changes in sensory/perceptual, cognitive, and motor ability for the design and implementation of technology. It is also important to consider the needs and preferences of older people with respect to technology. Current models of technology adoption and our work underscore that the perceived value of technology is an important predictor of technology adoption. Also essential is adherence to a user-centered design approach and involving diverse representative samples of older people in the design and evaluation of new and emerging technologies. Strategies must also be in place to help ensure that older people have access to technology and adequate training and technical support. In this regard, there are tools to help designers meet these challenges such as those developed by CREATE (Czaja, Boot, Charness, & Rogers, in press). Unless we consider older adults as an important user group of ICTs, digital disparities will continue and older people will remain on the other side of the digital divide that will, in the long run, negatively impact their ability to live and function independently.

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## About the Author



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