Social Inclusion through Digital Engagement

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Abstract. With the current explosion of digitally available products and services, a societal transformation has occurred in which social inclusion demands ability to use current devices and digital media. Those unable to use such products and services are disadvantaged in this new landscape. This paper examines key areas in which technological advances have benefited disabled users and older members of society: language, mobility, life skills, and technology access. Continuing efforts to address these topics are considered from the perspective of a new UK research center that addresses social inclusion.

Keywords: social inclusion, older adults, disability, digital economy, engagement.

1 Introduction

Poor health, lack of education, poverty, old age, and disability are among the factors that can affect social inclusion. In today's technology-rich society, inability to use devices that promote digital engagement also affect social inclusion. While associated with many of the other factors in this complex equation, digital access, arguably, can serve as its own form of entry to or exclusion from mainstream society. Of interest in the present context are the issues of disability and age in relation to digital engagement.

This paper will examine technologies that address inclusion and will describe a new research center in the UK that aims to transform lives by the creation of innovative and sustained efforts on technologies for social inclusion.

2 Background

The explosion of digital media in the past years [1] has given rise to a digital economy in which there is an emphasis on digital services and network technologies. While having the potential to provide improved and lower-cost services and products, digital interactions require ability to use current devices and systems, a prerequisite that is difficult for a large number of people. Large-scale efforts to promote digital

inclusion have largely focused on provision of network and broadband (see, for example, [2, 3, 4]). While progress has been made in this respect, broadband availability is only one aspect of what will be needed to get everyone connected. Attention must also be paid to the role that technology serves and could *potentially* serve in people's lives [5, 6].

In many cases, older adults and people with disabilities use mainstream devices, often with adaptations for particular needs [7]; in other cases specialized devices are used. Traditionally, technology design considers the able-bodied community, often targeting the technology-savvy segment of this market. The proliferation of mobile devices with every-increasing functionality is an example of this. Inclusive design aims to make mainstream products usable by the largest number of people possible. Specialized devices and software, however, are still needed in many cases. The specialized offerings fill crucial gaps when technologies are not usable by disabled people; they also address needs of disabled people that are not met by mainstream technologies. Such solutions have often provided the type of disruptive technology that has significant impact on society. The telephone, typewriter, and punch cards are a few of the examples of technological innovations created to meet a disability need that have transformed society. The impact that these would have on society was not envisioned at the time of their invention.

3 Inclusion and Disability

It is important to consider the potential role of technology for those at risk in terms of social inclusion. This paper looks at four areas that accessibility research addresses: language and communication, mobility, life skills, and technology access.

3.1 Communication

Communication is fundamental to being human. We use language for everyday conversations with friends, family, and casual conversations; for professional activities; for entertainment; learning and remembering; for buying products and services; for obtaining information. People who have a hearing loss, aphasia, cerebral palsy, autism or dyslexia are among those who experience some level of communication difficulty. This difficulty can be global in terms of language processing or might be situation specific, such as difficulty with phone conversations, lectures, reading, writing, or understanding speech in noisy environments. Language difficulties can be isolating and can adversely affect a person's quality of life.

There is a long history of technology use to support communication. Among the many solutions have been means of applying text-to-speech and speech recognition to aid in situations such as using speech input to facilitate typing for people who cannot use a keyboard [8], speaking for those unable to speak, and assistance with providing text versions of lectures, live broadcasts, and online videos. Other recent topics include systems to provide sign language support [9] and graphically-rich mobile applications for communication.

3.2 Mobility

The ability to move about in the world is important for everyone. Disability, however, can make this mobility difficult. Visual impairments, for example, create difficulties with independent navigation, both safely walking in new environments and with wayfinding. Cognitive disabilities can affect ability to remember activities and navigate new environments. Most obviously, perhaps, are people who have a physical disability that affects walking.

Like communication, issues of mobility have a long history of technology solutions. Such solutions have assisted people in wheelchairs with elevator access by providing signaling systems for elevator arrival. Independence for people who have cognitive disability or dementia has been supported by reminder and GPS systems. Systems for wayfinding have been used to support navigation [7] and technological advances have continued to provide new means for people in wheelchairs to navigate and control the environment.

3.3 Life Skills

Technology is becoming increasingly important in providing supports for daily living. This can take the form of prompts for activities of daily living, support for learning disabilities, or sensor monitoring as used in Smart Homes. With ubiquitous computing, the applications to support such tasks seem limitless. Technology has been applied to support memory in cases of brain injury or developmental delay, facilitate social interactions for people with aphasia or dementia, provide alternative forms of educational materials for those with learning disabilities, or monitor safety for older adults living independently. With increasing ability to provide such pervasive monitoring, issues of privacy and the trade-offs between privacy and independence are coming under scrutiny [10].

3.4 Technology Access

Despite a large number of efforts to make technology serve the needs of disabled people, there is still a gap between what is available to non-disabled users and what is available to disabled users [11, 12]. Standards and guidelines exist for accessible development, but technology advances outpace accessible solutions. For people with vision loss, the mainstream technologies often prove problematic and methods to provide access are required either in the form of alternative presentation (typically auditory) or changes to the visual presentation (such as magnification or changes of color). Less obvious, however, are the changes that are needed to facilitate access for older adults who can find learning of new technologies difficult [13, 14, 15].

4 Social Inclusion through the Digital Economy

As part of its Digital Economy Programme, the UK Research Councils have created a research hub to establish a center of excellence for social inclusion. This hub, Social

Inclusion through the Digital Economy (SiDE¹), looks at issues such as those described above from a multidisciplinary perspective. A partnership between Newcastle University in England and the University of Dundee in Scotland, the goal of SiDE is to understand the problems of, and opportunities for, inclusion from technological, social and economic perspectives. The multi-disciplinary team works together to address these challenges, with expertise ranging across technology, accessibility, business, society, homecare, transport and the creative arts.

User engagement is at the heart of all SiDE investigations. SiDE engages with, and is driven by, end users of these services, as well as those traditionally involved in delivering technologies and services. The work is user-centered and user-driven with a key component of the hub being a large user pool of volunteers. This user pool includes people from a range of age groups and with a variety of disabilities. User panels from the pool are designed to contribute to the formulation of the research strategy and research participants from the pool are involved in evaluating the software and devices developed.

The rapid development of new technology enables business innovations that can have transformational influences on society. A key objective of the work of SiDE is to identify and explore affordable and sustainable business models to best support social inclusion.

Acknowledgments. The writing of this paper was supported by a Royal Society Wolfson Merit Award to the author and by RCUK grant EP/G066019/1 “RCUK Hub: Inclusion in the Digital Economy”.

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¹ <http://www.side.ac.uk/>

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