Mobile Phones as Assistive and Accessible Technology for People with Disabilities

John T. Morris
Shepherd Center, USA

James L. Mueller
Shepherd Center, USA

Michael L. Jones
Shepherd Center, USA

INTRODUCTION

Usefulness and usability of mobile wireless technologies are as important to people with disabilities as to their non-disabled peers. Referring to them simply as "phones" is an increasingly obsolete practice. As these technologies become ever-more powerful, they become even more important to users with disabilities, incorporating features and functions previously provided only through specialized "assistive technology." Notably, many of these features and functions have been adopted by users without disabilities as well.

This article addresses how wireless technology has profoundly affected, and been affected by, the population of people with disabilities. Understanding these affects requires an understanding first of the key concepts of disability, assistive technology, accessible technology, and universal design. Defining these concepts requires a review of social and legislative changes over the past five decades.

What Is Disability?

The definition of "disability" might seem straightforward, but the operative meaning of this term can vary with the context of relevant laws or programs (U.S. Department of Labor; Cornell University). U.S. laws intended to prevent discrimination and promote accessibility use the most general definition, established in the Americans with Disabilities Act (ADA) of 1990. The ADA defines disability as: "with respect to an individual:

1. A physical or mental impairment that substantially limits one or more major life activities of such individual;
2. A record of such an impairment; or
3. Being regarded as having such an impairment.

Major life activities include, but are not limited to, caring for oneself, performing manual tasks, seeing, hearing, eating, sleeping, walking, standing, lifting, bending, speaking, breathing, learning, reading, concentrating, thinking, communicating, and working" (U.S. Department of Justice).

Research on disability in the United States often relies on definitions of disability used by the U.S. Census bureau, or disease or injury diagnoses, both of which focus on functional loss by the individual. The American Community Survey conducted by the U.S. Census Bureau relies on six categories of difficulties: seeing; hearing; walking, climbing stairs, reaching, lifting, or carrying; learning, remembering, concentrating, or making decisions; self-care (taking care of one's own personal needs, such as bathing, dressing, or getting around inside the home); independent living (basic activities outside the home alone)

(Ruggles, et al. 2010). The U.S. Census Bureau's estimate of the U.S. population with disabilities in 2010 was 56,672,000 (U.S. Census Bureau).

Internationally, the United Nations adopted a broad definition of disability in the Convention on Rights of Persons with Disabilities (CRPD), which became effective in May 2008. The CRPD defines persons with disabilities as including "those who have long-term physical, mental, intellectual or sensory impairments which *in interaction with various barriers* [emphasis added] may hinder their full and effective participation in society on an equal basis with others" (United Nations. Convention on the Rights of Persons with Disabilities). The World Health Organization estimates that about 1 billion people, or 15% of the world's population, have disabilities under similar definition (World Health Organization).

This social view of disability – in contrast to an individual or medical model (Anastasiou and Kauffman 2011) – informed the barrier free movement of the 1960s and 1970s in the United States, and subsequently the development of principles of Universal Design (Hamraie 2013, see below), both of which view disability in part as a result of the design of the built environment, including consumer products, as well as buildings and public spaces.

Assistive Technology and Accessible Technology

The concepts of assistive technology and accessible technology have roots in post WWII America. Demographic changes, improved healthcare, longer life spans, and tens of thousands of war veterans contributed to the rapid growth of the U.S. population with disabilities and access needs (Center for Universal Design). An early expression of these trends was the "barrier-free" movement of the 1950s and 1960s, which sought to remove architectural barriers and promote accessible design. Ultimately, definitions of the two terms were established in U.S. statutory law and administrative rules.

The two terms are not mutually exclusive. Some overlap and ambiguity exists, particularly in the context of mobile information and communication technology (ICT). The Center for Accessible Technology makes the following distinction: "Assistive Technology creates access for people with disabilities by *adding access features* [emphasis added] to a device through specialized additions (either software or hardware). Accessible technology includes any mainstream technology that is *already usable* [emphasis added] by people with disabilities, and also encompasses assistive technology solutions" (Center for Accessible Technology).

In the United States, the term "assistive technology" entered into official use with the passage of Technology-Related Assistance for Individuals with Disabilities Act of 1998 (short title: Tech Act of 1998; full text at General Services Administration):

As technology has come to play an increasingly important role in the lives of all persons in the United States, in the conduct of business, in the functioning of government, in the fostering of communication, in the conduct of commerce, and in the provision of education, its impact upon the lives of the more than 50,000,000 individuals with disabilities in the United States has been comparable to its impact upon the remainder of the citizens of the United States. Any development in mainstream technology will have profound implications for individuals with disabilities in the United States (Amended Tech Act of 2004; full text at U.S. Government Printing Office).

The Tech Act defines "assistive technology device" as "any item, piece of equipment or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of individuals with disabilities." Types of assistive technology include, but are not limited, to the following (National Dissemination Center for Children with Disabilities):

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