

## Chapter 8.5

# Mobile Design for Older Adults

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### ABSTRACT

The global population of older people is steadily growing and challenging researchers in the human computer interaction community to design technologies to help them remain independent and preserve their quality of life. Researchers are addressing this challenge by creating assistive technology solutions using information appliances, such as personal digital assistants and mobile phones. Some have questioned whether older people can use information appliances because of age related problems. This chapter discusses work related to designing, implementing, and evaluating mobile applications for the aging. A discussion about what researchers should consider during the design process for information appliances shows the unique challenges posed by this population.

### INTRODUCTION

Our world population is aging. The United States National Institute of Health estimates that the global older adult<sup>1</sup> population grows by 795,000 each month. They project that by 2030, the global older population will grow by 847,000 per month (Kinsella & Velkoff, 2001). In response to this increase, researchers in human computer interaction, social sciences, and ubiquitous computing communities are developing applications to help older people live independent and productive lives. Researchers use *information appliances* (Norman, 1999), such as personal digital assistants (PDAs) (Carmien, DePaula, Gorman, & Kintsch, 2004; Coroama & Rothenbacher, 2003) and mobile phones (Helal, Giraldo, Kaddoura, & Lee, 2003), to create *assistive technologies* for older people.

We contend that older adults can use information appliances if the physical and virtual interfaces are designed to meet their varying needs. Some may argue that older adults do not use information appliances and thus, researchers do not have to adjust designs for this population. However, a recent report in the United Kingdom revealed that 49% of older adults own a mobile phone and of that group, 82% make one or more calls per week (Office of Communications [OfCom], 2006). Thus, older adults are using information appliances, but they do encounter numerous problems, such as font and icon readability and interface complexity issues, discussed in greater detail in the background section.

Other people argue that since younger adults use information appliances now, they will not have a problem using similar technology in the future. Indeed, 82% of all United Kingdom residents own a mobile phone, whereas only 36% of people over 75 years old own a mobile phone (Office of Communications [OfCom], 2006). However, we know that (1) as people age their physical and cognitive abilities do not remain constant and (2) the *digital divide* is still present; factors such as age, socioeconomic status, and disabilities affect individuals' access to technology. Although *walk-up-and-use* systems are becoming more prevalent in our everyday lives, we cannot assume that by giving older people new technology, they will be able to easily interact with the device and application. We must work together now to create a set of guidelines to help inform the design and development of future technologies for older people to avoid problems associated with *technology determinism* (Warschauer, 2003).

In this chapter, we discuss issues that must be addressed when designing information appliance interfaces for older adults. We begin by highlighting design related work with older people and technology - traditional computers and information appliances. We then discuss best practices for conducting user studies with older populations and design issues to consider

when developing applications and devices. We conclude the chapter with ideas for future work and challenges to the design, interaction, and technical communities.

## BACKGROUND

We discuss how older people interact with traditional computers and information appliances in this section. The related work delves into design and interaction studies because interactions, physical and cognitive, have a major influence on design. Researchers have looked at how older populations interact with traditional desktop computers. Researchers are just beginning to look at how older populations interact with information appliances.

There has been a proliferation of information appliances designed for the general public, including PDAs, mobile phones, remote controls, digital cameras, digital music players, and game playing devices. The interfaces to these vary considerably, suggesting there may be variable age-related performance effects. Hence, when creating applications for older populations, designers must consider age-related abilities such as vision, dexterity, coordination, and cognition. Researchers have discovered that within older populations, there are noticeable differences in abilities, and that different design methodologies, such as universal design (Abascal & Civit, 2001) and user sensitive inclusive design (Newell & Gregor, 2001) should be used. Here we discuss some of the research that has been done to better understand older populations' interaction with technology.

### Older People and Traditional Computers

Bernard, Liao, and Mills (2001) found that older people could read faster with a larger, more legible 14-point sans serif font on websites. Researchers at

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