OLDER PEOPLE, MOBILE DEVICES AND NAVIGATION

Joy Goodman, Stephen Brewster and Philip Gray
Glasgow Interactive Systems Group
Department of Computing Science
University of Glasgow
Glasgow G12 8QQ, UK
joy, stephen, pdg@dcs.gla.ac.uk
http://www.dcs.gla.ac.uk/utopia

ABSTRACT

As people age, they need a greater degree of support in a wide variety of situations, mobile as well as stationary. This paper considers how mobile devices, such as handheld computers, can provide support in these situations. We examine a particular example, navigation, showing that older people can benefit from the use of mobile devices and highlighting the need to learn more about how to design them for this user population.

Keywords

Older people, mobile devices, navigation.

1. INTRODUCTION

As people age, they experience declines in a wide variety of abilities that impact on various aspects of their everyday lives. As a result, they often need a greater degree of support in carrying out tasks and activities. What is more, as the proportion of older people increases, the possibility of relying on human carers to provide this support decreases. There is a growing need to support older people in new and innovative ways, such as through the development and use of technology.

Although there is an increasing awareness of this, much of the work in this area has focused on indoor and stationary applications [4]. Older people, however, need support not just inside their homes but also in mobile situations, because mobility is a key part of maintaining one's independence. Older people often struggle with mobility, partly because of physical frailties but also due to decreasing abilities to cope with the demands of outside and mobile environments.

In addition, a variety of everyday tasks are commonly performed while on the move, such as shopping, socialising and searching for phone numbers and addresses. If support for such tasks is only available in the home, then its usefulness will be limited.

In this paper, we discuss how mobile devices, such as handheld computers, can help to provide this type of support. We consider the main barriers to this support and how they can be overcome. In Section 3, we then present a case study in developing and evaluating a mobile device for older people and consider what we can learn from it more generally.

2. MOBILE DEVICES

The usefulness of increasingly common mobile devices, such as mobile telephones, handheld computers and digital cameras, stems largely from their portability and constant accessibility, allowing users to access facilities while on the move and in locations where no other access to technology is possible.

Furthermore, recent advances in processing power, connectivity and positioning technology increase the scope and potential of these devices. They can provide information tailored to the user's location and access information more efficiently and in locations that were not possible in the past.

This makes them ideal for providing support in a variety of mobile activities, helping with navigation, providing information about public transport, prompting memory in appropriate places and at appropriate times and enhancing communication and security. Some such facilities are already available and others can be developed using current technology.

2.1 Barriers

However, there are various barriers restricting the potential of mobile technology to provide support to older people.

Firstly, in general, these devices have not been designed with older people in mind and are often difficult for them to use. In order to be mobile, most are small and have small buttons and screens that are hard to see and operate. They often use deep menu structures that place heavy demands on memory. They also often rely on knowledge of metaphors and interaction techniques taken from desktop computers – techniques that are unfamiliar to, and confusing for, computer novices, such as much of the older population. While there has been some recent work on

interface design for older people on desktop computers, there has been little looking at mobile interfaces.

Other barriers arise from social issues. Older people often have a greater resistance to new methods of doing things. The benefits of new technology must be clear if it is going to be adopted by the older population as a whole. Too often a new device is perceived as a "gimmick" or a "toy" rather than a practical tool.

3. A CASE STUDY - NAVIGATION

To help to overcome these barriers and investigate whether mobile devices can really help older people on the move, we carried out a case study – the design and evaluation of a pedestrian navigation aid for active older adults. More information on this case study can be found in [1].

Navigation, or way-finding, is a key component of mobility. However, many older people experience increasing difficulties with navigation due to declines in their perceptual, cognitive and motor abilities [3].

3.1 The Device

We therefore designed and evaluated a navigation aid that uses a sequence of displayed intermediate landmarks to guide the user to his or her destination. A sample screen from the aid is shown in Figure 1.

Figure 1. An example screen from the navigation aid.

The interface was designed with guidelines for desktop interface design for older adults in mind (e.g., [2]), but it was sometimes necessary to modify these to take account of the limited screen space and different interaction methods available on a handheld computer.

3.2 Evaluation

The navigation aid was evaluated against a paper map using a set of field experiments with 32 able-bodied users; 16 aged between 63 and 77 and 16 between 19 and 34.

Among other results, we found that the older group took significantly less time when using the device ($p<0.001$, t-test). This was not true for the younger user group, as shown in Figure 2.

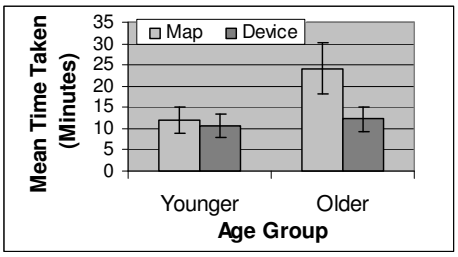

Figure 2. Mean time taken to navigate test routes (error bars show standard deviation).

4. CONCLUSIONS

The results from the case study demonstrate that a mobile device, if carefully designed, can be used effectively by older people. More importantly, the system provided an advantage for older users that was not enjoyed by younger ones. This suggests at the very least that design choices that are appropriate for a younger population may prove unacceptable for older users.

The more general finding of our case study is that generally available design guidelines, often based on studies of younger users, may well not transfer to applications intended for older people. Similarly, those guidelines that are designed for older users tend to focus on the desktop domain and do not always transfer well to mobile applications.

In the context of mobile systems in particular, we feel that further work is needed to (i) design guidelines that apply to older users and (ii) investigate how to overcome social barriers to system use.

5. ACKNOWLEDGEMENTS

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6. REFERENCES

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