

Effective requirements gathering for older adults

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Introduction

Eliciting appropriate requirements from users is an important part of the software design process. However, increasing evidence suggests that for many groups of older people lacking the experience and familiarity with many aspects of new technology, this can be a particularly difficult issue to address. Further, this issue is critical in regards to novel and emerging applications that break away from the 'traditional' desktop/workplace interface domain, and reside more in the domestic/entertainment/leisure domain. Thus the challenge is to address user-requirements before they are implemented, and in doing so create more meaningful dialogue with potential older users about applications and devices that do not actually exist yet.

Research challenges

Research suggests there is an increasing need for more appropriate methods in the design of technology for older people (e.g. [2]). Despite this, little literature is currently available on how to gather appropriate requirements from older population groups, particularly for novel applications. As a result, significant challenges remain in exploring and developing methodologies that can truly allow older people to understand, visualise and articulate genuine 'user-centred ideas' based upon very limited (prior) experiences of digital technology.

Part of the problem of knowing how to design for older people stems from the realisation that traditional user-centred methods do not provide adequate or appropriate insights into how to do this. Focus groups, for example, are typically still fraught with the problem of assuming users know what they want. This is clearly problematic for those older people who do not have the same conceptual framework to articulate ideas about new technology.

Other problems relate to the stereotypical assumptions that older people are generally technophobic and otherwise homogenous by nature. This is simply not the case. Increasingly, studies have identified that older adults are often willing and able to use technology if they can see the potential benefits and can properly understand how to use it. Linked to this issue is often the failure of mainstream designers to account for the huge diversity within older populations on a wide range of different dimensions (e.g. cognitive/physical abilities, lifestyles, etc.).

In relation to this, while increasingly, at least within the multidisciplinary area of Human Computer Interaction it is recognised that functions in sensory, physical and cognitive abilities typically decline within ageing adults, it is important to stress that these age-related changes relate to the population as a whole and are accompanied by an equivalent expansion in diversity between the 'most' and the 'least' able. Therefore, many people experience only modest reductions in their abilities as they get older, remaining healthy and active into old age, while others will become very frail and incapacitated. Thus, developing suitable technologies for 'older people' is far from being a straight forward process.

While some attention is occasionally paid to accommodating age-related declines in interface design, much less emphasis has been focused on the impact of generational differences on the relationship people have with technology. Studies by Docampo Rama [1] have recognised the importance of older people, who have grown up learning from distinctly different mechanical models associated, for example, with push button and rotary dial interfaces - characteristics that have typically disappeared in the design of contemporary software interfaces.

Consequently, for those people without the working knowledge of modern interactive systems, it is unsurprising to find ideas for new applications drawn from experiences in using telephones, typewriters, or work situations which may have pre-dated the use of the personal computer and its associated 'desktop' metaphor. Significantly, it is this accumulation of a lifetime of knowledge and skills in using electromechanical systems that mainstream designers often fail to consider.

Also, within older population groups, variability between and within people's current and recent technology experience must be considered. Although this is far from a clear-cut issue, differences in attitudes towards, and perceived utility and uses of new technology by older people unfamiliar with computer systems, can be far more challenging. Particularly, in comparison to those people confident enough to draw from 'first hand' experiences and/or working mental-models of using similar systems they understand.

Research at Dundee

Research within the School of Computing, at the University of Dundee covers a number of projects involving groups of older people to strive for more creative, novel, and ultimately more suitable methods of eliciting requirements in the early stages of the design of user interfaces for older adults. These include:

- Drama-based scenarios performed through Forum Theatre, established as a means to encourage and support open dialogue between researchers, designers and older users. This typically comprises of various stakeholder groups, including older audiences, professional actors, an experienced facilitator, and a scriptwriter (see Figure 1). In essence, Forum Theatre has been found to be a successful way of encouraging older people with little or no technical knowledge to partake in realistic discussions concerning solutions and issues with technology usage in their day-to-day lives [4].



Figure 1. Examples of the Forum Theatre in practice; (left), Actors, facilitator and technical staff within the theatre setting; (right), Audience members engaged with the performances.

- A variation on this is dramatised stories portrayed through video which have also been developed to inform, and alter, the mind sets of designers concerning the needs of older people, in order to counteract the tendency for designers to effectively 'design for themselves'. The UTOPIA Trilogy (<http://www.computing.dundee.ac.uk/projects/UTOPIA/utopiavideo.asp>) portrays scenarios representing the common aspects of 'hi-tech' interfaces that do not take older adults abilities into account. Such video stories have also been used to investigate the applicability of an intelligent vision system to monitor the well being of older people within their homes, and was used to indicate some of the potential human impacts of such a system, and to act as a support for further discussion of related issues with potential users and other stakeholders [3].

Other projects at the School of Computing focusing on aspects of technology for older adults, currently include:

Digital interactive television for older people

Several strands of research are currently being driven by the switchover in the UK and accessibility/usability problems of current digital television systems. This research includes an exploration of more novel application areas to support social interaction for older people, such as communicating with family and friends. Methodologies (such as Forum Theatre) and new interaction approaches relating to the implementation of future TV systems have been investigated. Research within digital television also includes the implementation of a memory prompting and schedule maintenance system for people affected by the early stages of Alzheimer's, as well as other mild cognitive impairments.

Work is also ongoing in the area of identifying the relationship between particular cognitive abilities known to affect interface usability (that tend to decline with age), and the ability to use (simulated) digital television applications. This has the aim of providing more useful ability data to designers which captures the diversity of the population and which should help to move away from the current concept of design for the elderly which helps perpetuate the erroneous view that older adults are an homogenous population.

Interactive communication systems for people with dementia

In conjunction with the University of St Andrews, the school is developing hypermedia communication systems usable by carers and patients with dementia. Two related projects include CIRCA (Computer Interactive Reminiscence and Communication Aid), a multimedia touch screen system designed to deliver reminiscence material, to stimulate conversational prompts and support for people with dementia (<http://www.computing.dundee.ac.uk/projects/circa>) and LIM (Living in the Moment) an interactive system designed to be used by dementia patients without support from a carer, as a form of entertainment and stimulation.

Advanced home care systems to support independent living

This includes investigating the uses of advanced technologies (such as ubiquitous and mobile computing) in support of older and disabled people with long-term illnesses, physical and mental impairments (<http://www.match-project.org.uk/main/main.html>). In conjunction with a variety of project partners, researchers at Dundee have primarily been exploring data visualization and mining techniques from sensor data to define daily patterns in home living, in addition to the development of activity modeling techniques to identify changes in progressive diseases such as Parkinsons.

Computer vision and assistive technology

This research is concerned with the use of computer vision and artificial intelligence to non-invasively assist persons with dementia to undertake daily activities. Recent work has included

the development of a real-time system that helps a person with dementia to wash their hands, providing audio-visual prompts when necessary (<http://www.computing.dundee.ac.uk/staff/jessehoey/coach/index.html>).

Augmentative and alternative communication

Although this work is not directly related to ageing research, the school is currently developing systems that support the pragmatic development of language and interactive communication of children with complex communication needs.

Summary

Faced with the realisation of ever more advanced and superior forms of computing, there is an increasing danger that those people who remain at the fringes of information and communication technology will be pushed further way. Critical challenges remain in the elicitation of information from those people who may assume they have no 'expertise' to generate ideas about new interactive systems. Avoiding the potential to patronise and treat all older people the same, more creative and user-centred methodologies are required throughout the software design process. This is necessary if we are to better understand what older people want, need and comprehend from emerging technologies.

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About the authors:



Mark Rice has four years experience in disability and ageing research, and is currently a Research Assistant at the Queen Mother Research Centre, University of Dundee. With a multidisciplinary background in Art and Design, Communication Studies and Computer Science, his research interests span areas of Human-Computer Interaction, Software Engineering and Information Visualisation. Mark is currently working on the development of a TV-based prompting and reminder system to support people with Alzheimer's, in addition to completing his PhD on the design characteristics of a communication system for older people via digital interactive television.



Following a BA in Psychology (specialising in cognition) at the University of Newcastle upon Tyne, Alex Carmichael started his research at the Age and Cognitive Performance Research Centre, University of Manchester. This research examined the cognitive human factors of older people using an audio description of television service (AUDETEL) and formed the basis of his PhD. This and other projects examining interactive services for older people resulted in a Research Fellowship from the ITC (Independent Television Commission) in 1997. Alex recently moved to the University of Dundee where he now contributes to several projects involving older people's relationship with technology.