Domesticating technology.
In-home requirements gathering with frail older people

A Dickinson,[1] J Goodman,[2] A Syme,[1] R Eisma,[1] L Tiwari,[3] O Mival[4] & A Newell[1]

1: Applied Computing, University of Dundee, Dundee
2: Department of Computing Science, University of Glasgow, Glasgow
3: IC CAVE, University of Abertay Dundee, Dundee
4: HCI group, Department of Computing, Napier University, Edinburgh

Abstract

As technology becomes increasingly important as a means of supporting older people at home, the dangers of distress caused by the introduction of inappropriate technology become greater. This paper discusses the argument for 'in-home' research with the frail elderly and describes some of the issues that the UTOPIA project has encountered in carrying out such research.

1 Introduction

As the population ages there is an increasing recognition of the various roles that technology can play in supporting older people at home (e.g. Alm, Gregor & Newell, 2002; Wootton et al, 1998). The UK government foresight taskforce notes that "ICT can play a significant part in providing a home environment readily adaptable to the consequences of the ageing process" (Foresight 5 p.12) and recommend that 'industry standard' IT connections should be installed in every home (Foresight Healthcare and Ageing p.9). Technology will thus become a significant part of older people's domestic environments, whether as assistive technology, or in efforts to enable those at risk of social isolation to communicate more effectively or to access healthcare services (Arnaert & Delesie, 2001; Billipp, 2001).

UTOPIA (Usable Technology for Older People: Inclusive and Appropriate) is a consortium project established by the University of Dundee in partnership with the universities of Glasgow, Abertay and Napier in order to publicise and enable the extension of the benefits of technology to older people.

'Older people' are a diverse group (Gregor & Newell 2001), and technologies and research methodologies may vary widely depending upon the specific nature of the user group. Technology use among people 55+ varies considerably; as people age they are progressively less likely to use technology (Goodman et al, 2003). Frail older people are more vulnerable to the negative effects of unsuitable technology as well as to potential discomfort in taking part in certain forms of requirements gathering exercise. Recognising the existence of such a vulnerable group, and the vital importance of accurate requirements gathering to ensure that any technology provided is appropriate, how is it possible to elicit high quality requirements information?

In this paper we discuss the ways in which the UTOPIA project is developing methodologies to elicit requirements from the frail elderly, specifically focusing on research in the homes of the participants.

2 Older People and Technology

Older people may find new technology systems harder to learn because of two inter-related factors: age-related cognitive change and "technology generation" (Rama, de Ridder & Bouma, 2001, p.27). While short term memory impairment and lower 'fluid intelligence' levels make new systems harder to learn, users' interaction with modern technologies is arguably also complicated by their experience of earlier, more mechanised technology with consistent interfaces. In addition, Rama argues, because ICT did not effect older people's "formative years", they are initially less likely to feel relaxed and confident while using it and also, in contrast to younger age groups, many older people do not feel comfortable "learning while doing" in unsupported environments.

Older people responding to questionnaires and interviews carried out by UTOPIA emphasised the need for training and support; this was especially important because help files and instruction manuals were perceived as incomprehensible and irrelevant. One respondent summed up the general feeling, reporting "I find it difficult to get answers to specific problems at the moment I want them. "Help" sections are almost always totally irrelevant." From a short questionnaire used to determine priority computing tasks, almost 40% of the respondents who included an additional comment stated that they wanted access to tuition and training. Clearly most support came from family members, but this risks disempowering the older computer user, with comments like " My son is fed up with me phoning for help, so I try not to bother him." Part of the reason for this lack of confidence is environmental, older people are more likely to lack the networks of technology support that others can access within the office or educational environment, thus computing events that are minor problems in a well-supported environment may take on considerable significance when support is unavailable, whereas serious problems can be catastrophic.

It is both incorrect and prejudiced to assume that everyone over 80 is necessarily frail or disabled, however it is more likely that people in this age group will have a disability. In the USA 35% of people over 80 needed assistance as the result of a disability (Administration on Aging, 2001). In the UK in the 75+ age group 14% of men and 21% of women report problems with self care (National Statistics, 2000, p.120). It is also likely that those over 80 will spend more time at home than younger age groups; as people age they become less likely to have a driver's license (Age Concern). Therefore as people enter their 80s, there are increased dangers of isolation and illness, and dependence on care from family members or social services. Complicating these problems is the vulnerability of the frail elderly to outside intervention (e.g. Aronson, 2002) and, in some cases, their lack of control over decisions made about their lives (Jokinen, 2002).

This group, for whom suitable and usable home-based technologies may be of tremendous use, are also more vulnerable to potential negative effects from the introduction of inappropriate technologies. Since many people are increasingly isolated as they age, and tend to spend more time in the home than younger age groups, the stability of the home environment is of particular importance. The introduction of inappropriate technology into their home can dramatically alter the life of a vulnerable older person, especially if the installation is time-consuming and disruptive (Reed, 2002). Monk and Baxter have suggested the concept of "seriously bad outcomes" (SBOs), like loneliness or discrimination in this context (Monk and Baxter, 2002).

Statements about the benefits of computer use for older people have to be treated with caution; although Arnaert and Delesie state that information and communications technologies "allow elderly people to maintain their autonomy by strengthening their emotional, relational and social abilities" (p.311) the research by Billipp used to support this assertion in fact paints a more ambiguous picture of technology in the lives of the "older old". Billipp found that computer use reduced depression and increased self-esteem in a group of "vulnerable elderly" only when a

trainer spent weekly sessions with the individual, suggesting that the mood improvement may have been due to regular human interaction as much as to computer use (Billipp, 2001).

2.1 Older People and Requirements Gathering in Technology Projects

While the potential for SBOs and the vulnerability of this group make accurate requirements gathering vital, it is considerably more difficult to successfully elicit requirements from groups of older people than it is from others (Eisma et al 2003).

Traditionally structured focus groups, for example, present challenges when the group contains members with sensory or cognitive impairments. Practical issues including travel, unfamiliar environments and the social event of meeting a group of unfamiliar people may tire participants unusually quickly. These problems, especially the social element, seem to result in difficulty keeping such focus groups focussed (Lines and Hone 2002).

Other traditional requirements-gathering methods are also problematic when used with older people. In questionnaires, older people are more likely to use 'don't know' options, and need a higher 'threshold of certainty' before they will select options useful to the researcher (Park and Schwarz, 2000). Part of this reluctance to offer opinions may be confidence, older people are anyway less likely to contribute confident opinions about technology and this may be aggravated by unfamiliar language or settings. The difficulty of discussing technology without using technical terminology can be pronounced. Words that technology specialists use everyday, like "monitor" or "functionality", are at best confusing and do not allow the older person to contribute properly to the conversation, and at worst are distressingly unfamiliar, emphasizing for the potential user how alien the technology is.

3 Taking It All Back Home

The UTOPIA team uses in-home interviews and observations to overcome some of the problems with 'traditional' requirements gathering. This technique has enabled us to gather qualitative data that we would have been unlikely to gain with a different approach.

One advantage of in-home research is that the participant is in a familiar and safe environment (Jokinen et al p.167); being in someone's home as a guest increases the host's authority and may contribute to their confidence in discussing the research questions. In addition, as Aronson notes, participants "still have around them the material props to biography and identity that are associated with home." (p.402). Being in someone's home allows the researcher to observe the way in which technologies are integrated into the environment, for example, in a number of homes we visited, people covered their computers or televisions with cloths when they unused, perhaps suggesting that the technology was not seen as part of everyday life or worthy of display.

Familiar items, as well as supporting the user's sense of identity, can act as visual cues triggering memories about the problems users encounter. For example, when we asked one participant about her video, she indicated it and said, "The thing is, you see, I can't get down… because it's right down there and I've an awful job to get down there and do things" and when asked about the remote control she said, "Um, yeah, but .. it's over there." By comparison in a visit to the home of an older lady who had mobility difficulties, the researchers noticed that all her remote controls were arranged around her armchair, in a 'hub' which controlled the electronic objects in the room.

Talking to older people when they have the technology close to hand also allows them to demonstrate their use of devices to the researcher, this is easier than trying to use words. One participant used a special box to separate out her medicines, but found it hard to explain without demonstrating it. Another interviewee dropped her mobile phone and retrieved it with her walking

stick, hitting the phone several times as she did so. This was clearly a normal event for her and she would probably never have thought to mention that a phone would need to be sturdy enough to survive such treatment.

Thus in-home observation allows the researcher to note things that are not mentioned, either because someone would not think of it as unusual or for other reasons. The lack of authority that many of the frail elderly experience does not inevitably lead to unquestioning obedience to the instructions of carers or family members. To borrow a concept from social history, those whose daily lives are controlled by others, and who do not have the overt power to refuse to obey, will 'resist' by small acts of disobedience, evading the control of those who seek to dominate them (Scott, 1990). While anxious children may give their ageing mother an alarm to wear in case of a fall, the awkwardness of wearing such an alarm and its perceived ugliness means that many older people resist wearing them. Sensitive research and observation in context discovers this whereas it is less likely that focus group or lab research would, since one of the defining features about covert resistance is that it is not admitted to in conversation.

The ways in which people have information continually visible around them, rather than in a notebook or manual, may suggest more effective ways to present such supporting information. For example, while administering a questionnaire to a lady in her late 80s, the researcher noticed that she had notes attached to the computer next to the screen. When asked about these, she said that they were reminders of how to start up some computer applications.

Information like this is vital to understanding the strategies that individuals use to utilize, disguise or 'resist' the technology in their lives, and because these behaviours are often based on unspoken assumptions (for example about the intrusiveness or attractiveness of technological objects) or upon reactions that the older person may hesitate to express to a researcher associated with technology (the uselessness or complexity of an application or object), it is unlikely that in a different context these points would be discovered.

The actually environment in which someone lives is also a vital component of their ability to use technology. UTOPIA is working with members of residential homes to provide them with access to computers. After in-home visits it was clear that participants' private space was too limited to permit PCs to be kept in bedrooms; this necessitated negotiations with the home management. Previous attempts to introduce computers into residential homes have foundered on contextual problems rather than on the interest and commitment of the residents: staff suspicion of technology, lack of space for its use, and prejudicial ideas even among staff members that residents will be unable to use computers are all problems that have to be resolved in order to successfully enable access to computers for people in residential care.

There are also practical considerations to carrying out this sort of research. It is important to be conscious of the expectations that an older person may have of a guest entering their home. The ritual of hospitality is often integral to a sense of self, particularly if the host is usually powerless or isolated. Apparently insignificant actions like refusing a cup of tea can make a tremendous difference to the comfort of your host. Creating a comfortable social atmosphere is vital to successfully encouraging your host to discuss technology use, or to make asides that are not perhaps directly relevant to a specific question but may contain important information that your questions do not cover. It is important not to stay for longer than your host is comfortable with your presence, and to remember how tiring interaction can be. It is also vital to have a clear definition of your role as a researcher explained clearly to the participant, ensuring that they understand what you are offering and how they will benefit. There are ethical issues in ensuring that you do not cause unrealistic or inaccurate expectations which will be disappointed.

In conclusion, the information gained from observation and discussion in the home is a useful tool for the early stages of requirements gathering, providing a wealth of qualitative data which is particularly useful as a basis for formulating further research questions. In home observation is used by UTOPIA in parallel with other methods, such as questionnaires and workshops, to generate effective requirements for the development of technology for older people.

References

Administration on Aging, U.S. Department of Health and Human Services (2001). A Profile of Older Americans. 11-12.

Alm, N., Gregor, P. and Newell, A.F. (2002). Older People and Information Technology are Ideal Partners. *International Conference for Universal Design*, Japan 2002.

Arnaert, A. and Delesie, L. (2001). Telenursing for the elderly. The case for care via video-telephony. *Journal of Telemedicine and Telecare*, 7, 311-316.

Aronson, Jane (2002). Elderly people's account of home care rationing: missing voices in long-term care policy debates. *Ageing and Society,* 22, 399-418.

Billip, S.H. (2001). The Psychosocial Impact of Interactive Computer Use Within a Vulnerable Elderly Population: A Report on a Randomized Prospective Trial in a Home Health Care Setting. *Public Health Nursing*, 18, 138-145.

Eisma, R., Dickinson, A., Goodman, J., Mival, O., Syme, A., Tiwari, L. (2003). Mutual inspiration in the development of new technology for older people. *Include 2003* (forthcoming).

Goodman, J., Syme, A., Eisma, R. (2003). *Age-old Question(naire)s*. *Include 2003* (forthcoming).

Gregor P. and Newell A.F. (2001). Designing for dynamic diversity - making accessible interfaces for older people. In WUAUC'01 (2001 EC/NSF Workshop on Universal Accessibility of Ubiquitous Computing: Providing for the Elderly, 22-25 May, Portugal, 2001) (ed. A.C.M. J. Jorge, R. Heller and R. Guedj), 90-92

Jokinen, P., Lappalainen, M., Meriläinen, P. and Pelkonon, M. (2002). Ethical issues in ethnographic nursing research with children and elderly people. *Scandinavian Journal of Caring Sciences*, 16, 165-170.

Lines L and Hone KS (2002). Research Methods for Older Adults. In Brewster, S. and Zaijicek, M. *A New Research Agenda for Older Adults*. British HCI, London, UK.

Monk, A. and Baxter, G. (2002). Would you trust a computer to run your home? Dependability issues in smart homes for older adults. In Brewster, S. and Zaijicek, M. *A New Research Agenda for Older Adults*. British HCI, London, UK.

National Statistics (2000). *Social Trends*, 30.

Park D and Schwarz N (ed.) (2000). Cognitive Aging: A Primer. Psychology Press, Taylor & Francis Group, Hove

Rama, M.D., de Ridder, H. and Bouma, H. (2001). Technology generation and Age in using layered user interfaces. *Gerontechnology*, 1, 25-40.

Reed, D. (2002). Towards dependability of technology assessment in the delivery of care to the elderly: a case study. In Brewster, S. and Zaijicek, M. *A New Research Agenda for Older Adults*. British HCI, London, UK.

Scott, J.C. (1990). Domination and the Arts of Resistance. Yale University Press, New Haven and London.

Wootton, R., Loane, M., Mair, F., Moutray, M., Harrisson, S., Sivananthan, S., Allen, A., Doolittle, G. and McLernan, A. (1998). The potential for telemedicine in home nursing. *Journal of Telemedicine and Telecare*, 4, 214-218.