Older people, technology and design A socio-technical approach

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P. Bagnall, V. Onditi, M. Rouncefield, I. Sommerville, Older People, Technology and Design - a Socio-technical Approach. Gerontechnology 2006; 5(1):46-50. This paper presents some empirical data on the design of a technology intended to enrich the lives of older people through facilitating various forms of formal and informal communication and interaction. The application is intended to support aspects of social computing - supporting and encouraging social activities such as games playing and chat - providing a means to continue and develop activities that have been important parts of their lives. The driving characteristic of this interdisciplinary work is the adoption of a socio-technical approach where we thoroughly examine, through a range of techniques, the social circumstances and conditions of the setting where technologies are to be deployed and consequently think carefully about how to design for that setting. We believe such an approach is critical in order to develop a better understanding of the requirements for social computing. We use our studies to point to some important changes in how we might think about, and understand the changing lives of older people and the relationship between technology and social change.

Keywords: ageing in place, person-centred design, software development

While younger people have an increasing array of technologies at their disposal for keeping in contact with one another these are often not designed appropriately for an older audience. For example, mobile phones are too small, and complex, and computer based tools require a computer experience which many older people do not have. Our group at the Computing Department at Lancaster University, UK, has been designing a communications tool for older people with the aim of increasing their opportunities and ability to communicate with their friends and families. The design has been guided by background research into the communication needs of older people, and by repeated testing with the older people participating in the project. The focus has been to enable more informal contact and to avoid the complexities associated with traditional computer platforms.

Discovering the needs of older people

For over three years we have undertaken ethnographic field studies with older people to first understand their needs for domestic technology. This has led us to consider what types of communication they might benefit from, especially styles of communication they have not previously used, and then to assess the emerging solutions. Participants were mostly living alone, either in their own homes or in warden controlled flats. About 30 have contributed to helping to define the problem, with nine taking an active role, to date, in providing feedback on the design.

Early studies were exploratory in nature, and used a range of techniques. We adapted cultural probes, which provided a way of obtaining an understanding of the range of lifestyles and activity patterns that a device would have to fit into[1-5]. A key feature of many participants' lives was the amount of time they spent on their own. From the probes, and later from informal interviews, which helped to answer questions raised by the probes, it emerged that visiting other people who lived in the same locality was often seen as intruding, as the participants felt they did not want to bother their friends unless the visit was a planned event, and even having visitors required a great deal of preparation, making sure they looked their best, in some cases even when receiving family. Face to face communication therefore carries a high overhead, wherever it takes place, which computer-mediated communication could alleviate, while retaining some of the benefits of social contact, and social interaction.

Further, there were times of day when communication didn't happen. Our study group were disinclined to contact their peers in the evenings, for fear of disturbing them, which lead to a self-imposed curfew, when any sort of communication ceased. Many also reported periods of difficulty sleeping, but they would never consider contacting people, despite the fact that others were frequently also awake. A system that would enable older people to communicate during these times, without fear of being an unwelcome intrusion was one goal of the design.

In later informal qualitative interviews a wide range of possible types of hardware were presented. These ranged from web-cameras to PDAs and laptops. Web cameras presented some of the same problems as face-to-face communication; being seen required preparation, and was therefore not embraced by the participants, even for communicating with close friends and family. Traditional computers were also found to be inappropriate as these were static and could not be moved to other rooms. The participants demonstrated that something that could be used in bed, in the bathroom or anywhere in their home would be ideal. Few participants had keyboard skills; fewer still were comfortable with a mouse. The space needed to set up a computer was also a serious issue, with many limited in the amount of space they had, especially those who were living in sheltered accommodation. PDA screens are too small to be comfortable to read, and laptops suffer from the same issues of keyboard and pointing device as desktop machines, only more severely. Tablet PCs, however, by using stylus input, can avoid all these problems, and when participants were given some Tablets to try their response was much more positive. Stylus input was less awkward since it is similar to using a pen. While the shape of the stylus is less than ideal, it proved to be usable by all the participants who tried it. Many participants tried to press on-screen buttons with their fingers though, until they were told the stylus had to be used. Unfortunately hardware that supports both touch and stylus input, and can tell them apart, does not exist, but if it did it could be an advantage.

A major concern however remained with regard to the complexity of the system[6]. Many participants expressed a concern that they would not be able to use any system unless it was very simple, since many of them had no computer knowledge and were technophobic. They were also not sure of the benefits that any system would provide. To design a system that would be effective then it is important to offer compelling capabilities while reducing barriers to entry[7].

Partly this came down to education. Many participants had heard of the technology but were unaware of its capabilities. Several were surprised to hear that email could be used internationally just as easily as locally. As the participants learnt more about what could be achieved this helped build their enthusiasm, but at the same time exacerbated concerns that the system would be too complex for them.

Various methods of introducing technology to the older people were tried. Group sessions were found to be too rushed and didn't allow for one-to-one tuition that the participants felt they required. The best method was to demonstrate prototypes in the person's own home, and to leave detailed, step-by-step instructions for them to refer back to. The written instructions were vital in building confidence.

One serious issue was the time between initial investigation and delivery of a prototype. Many did not realise the time that development would take, and so became frustrated giving feedback on prototypes without seeing a final version.

Initial Designs

Concerns about intruding on others led us to the idea of advertising personal availability, as an informal way of inviting contact. This presence awareness became a central part of the design, inspired in part by Instant Messenger systems. When people have their tablet switched on their name is highlighted on the tablet, indicating that they are available. One feature of Instant Messaging, which seemed to be very appropriate, was a way to indicate status, but in most systems this is awkward to change. The user interface for the older users simply allows them to write a few words by hand as a way of showing their availability. Friends would then be able to see their status and decide whether to contact them or not.

Having determined the presence of a friend or contact the system offers a small number of activities. A number of buttons show the user's options, at the moment 'Chat' and 'Games'. The Chat tool provides a place where friends can have a written conversation. This is intended to be used in a manner similar to instant messenger, but to avoid some of the issues with more traditional designs. One problem, which increases the effort needed to have a conversation, is the out of order utterances (or threading problem). It is common amongst younger users to find two parallel conversations emerge[8]. Our design avoids this by taking advantage of the stylus input and offering something more akin to a shared whiteboard. Users can write anywhere on the screen, but replies can be placed using the spatial arrangement to indicate replies. Protocols to manage conversations appear to emerge naturally without the need for instruction, although more work is needed to confirm this. Instead of scrolling, a paging system is provided which ensures that both participants in the conversation move to a new page together, and so do not end up writing in different places, unaware of the other half of the conversation.

Another difference from typical instant messaging systems is the invitation phase; rather than simply allowing a conversation to be started immediately, the person who wishes to start a conversation first writes an invitation to the other users they wish to chat with. This provides an easier way for someone to decline a conversation without having to worry about being rude, and also avoids times when the remote computer is unattended. Unlike the tele-

phone or instant messaging this means the level of intrusion is reduced since it is easier to decline contact.

Games as a vehicle for sociability

For adults a major function of games is to provide an excuse for sociability[9]. By providing games it may be possible therefore to potentially increase communication between older people. The aim with the games was to follow the philosophy laid down by the Chat activity, of providing flexible interaction with minimal complexity. The computer does not need to provide opponents for a game, since the aim is socialisation, but this also means that there is no need for the computer to even be aware of the rules of the game. Again, this is a deviation from most computer-based games, where the computer acts as a referee, and enforces its notion of the rules. By not enforcing any rules, the range of games it is possible to play increases without any change in the actual interactions with the system. Instead the players decide amongst themselves what to play, what the game is to be and what the rules are, and how to enforce those rules (or not) as they see fit. To be able to discuss the game conveniently, and to allow for socialisation while the game is played we are adding an audio conference facility using Skype (*www.skype.com*). Through only providing audio communication the players are able to discuss the game as well as anything else they choose. Our observations of older people playing games determined that a considerable time is spent in social conversation, unrelated to the game.

Conclusion

Our experience in designing for older people demonstrates clearly the value of gaining an understanding of their social lives. While the original intent was to find assistive technologies that older people would benefit from, the result was that they needed more appropriate ways of communicating. Many older people have specific needs from communications, which depend on their lifestyles and infirmities. Simply providing standard computer mediated communications fails to meet their needs, since it is too complex to be accepted, and partly because it fails to fit well into an older person's life. To design something that will be effective not only requires that the necessary functions are supported but also that the non-functional requirements, such as need for non-intrusiveness are acknowledged and respected.

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