

The ELITE approach to designing IT for older people

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E. Lindh Waterworth, J.A. Waterworth, The ELITE approach to designing IT for older people. Gerontechnology 2006; 5(2):99-105. We introduce the MAMA (Mobile Augmented Memory Aid) project, during which we gradually evolved a design approach that we call ELITE. MAMA was focused on older people with some kind of memory and associated communication problems, living in residential homes. The overall goal of the project was to examine how information and communication technology can best be used to support and improve memory and communication capacity in senior users, and in the process provide an aid to sensory and social stimulation. We briefly describe the hardware and software prototypes that have resulted so far, during which process the ELITE approach was evolved. We then present the ELITE design principles developed during the project, as a general approach to designing technology for older users. Note that in this paper, the term ELITE refers only to these design principles and should not be confused with any other organisation or company with a similar name.

Keywords: ageing, memory, design guidelines

As in many developed countries, there is a growing population of older people in Sweden, both in relative and absolute terms, who often remain in good general health while experiencing some problems associated with modern lifestyles related to their mental condition¹. Examples of these problems include difficulties with using recently developed technology, such as mobile phones, cable TV and video recorder remote controls, and computer-based services such as e-mail. Other researchers have observed similar difficulties with recent technology².

THE MAMA PROJECT

MAMA (Mobile Augmented Memory Aid) is a project focused on older people with some kind of memory or communication problem, who live in residential homes. MAMA was a further development of previous research at our laborat-

ory³. The overall goal of the project was to examine how information and communication technology (ICT) can be used to support and improve memory and communication capacity in senior users with some degree of dementia, as well as to provide an aid to sensory and social stimulation. In this aim, the project resembles work by other researchers, including the CIRCA project⁴ and the UTOPIA project². Also, by strengthening the contact with their environment and improving their relations with nursing staff and relatives we hoped to enable conditions for better care and quality of life for this group of people.

One of the biggest challenges in this project was to adjust the design of the prototype to the intended users and their specific needs. Since the target group consisted of people with memory problems it was extremely important to



Figure 1. The book

design straightforward and cognitively undemanding interfaces that would place minimal demands on the user's memory, while at the same time providing enough interest to motivate their use. The MAMA project developed several prototypes: four applications and a hardware device in the form of an interaction and information navigation tool called The Book.

The hardware - The book

The Book consists of a Tablet PC that is hidden in what looks rather like a normal book. Although we tried other approaches, we found it necessary to find a way to make the technology at hand look and feel like something the users were acquainted with. Explaining something new worked with this group, but only for a short while.

Our initial approach used a normal tablet PC, set up to accept simple interactions to access information sources such as a collection of personal photo-

graphs. A recurring problem for older users was remembering how to move around in this information space. A design based on using paging buttons located on the touch screen was not as successful as we had expected.

We tried making the tablet PC look like an ordinary book (Figure 1), and this seemed to be more successful. Users liked the overall design, but were confused by our implementation of page turning, which was initially based on 'stroking' the touch screen pages. We then tried a more tangible approach, physically closer to a normal book, with flaps to the right and left controlling paging forward and backward. This design was much more successful with older users, who needed little or no instruction on this function and had no trouble remembering it. In contrast, when we showed the book to younger people none understood how to page through the information without our help, and most tried to do this initially by touching the screen.

When taking advantage of a metaphor in this way one has to consider that the user will make strong predictions about the functionality based on the appearance⁵⁻⁸.

Although we initially included extra-metaphorical functionality, such as using the touch screen to select and enlarge objects, we gradually pared down the design more and more to match the predictions of the metaphor.

On both sides of the Book there is what looks like a page edge that is used to turn 'pages', to navigate a linear sequence of screen images. But in order to implement several different applications on top of the Living Book there is a set of tabs, as in an indexed notebook, from where the user can choose which application to run.



Figure 2. Screen shots from 'The Book of My Life'

Software: the applications

During the project we have developed four main applications so far: The Book of My Life, The Song Book, The Book of Proverbs and Memories of Old Times.

The *Book of My Life* is a multimedia photo album where episodes from the person's life are presented (Figure 2). The idea behind the application is that it should be a support for the user to remember and talk about his or her life,

family and so on. In this way, the application is a communication aid aimed at supporting conversation between the user and relatives, other residents and nursing staff. It could also be used by the nursing staff to understand and learn about the person.

The *Song Book* is a game that could be played alone but is mostly used by a group as a social game (Figure 3). It starts by letting the user hear and read the first part of a well-known old song. These are songs that are no longer broadcast through the media, and which many younger people do not know. But in a residential home for older people they are familiar to almost all the residents. The task is to sing along and continue when the recording stops. The next song is selected by turning the page.

The function and the usage of the *Book of Proverbs* is similar to the Song Book, but here the user, alone or in a group, tries to remember the endings of well-known (to this population) proverbs and sayings.

The application called *Memories of Old Times* is a presentation consisting of publicly available pictures, video, sound and music from the days when residents were young, designed in much the same way as the Book of My Life (Figure 2). As with the Song Book, these are mostly materials that are no longer available through the everyday channels of radio and TV.

The design team

The MAMA project team consisted of several different types of people: the intended user group, a designer, technicians and programmers, a researcher who acted as project leader, as well as nursing and care staff. These different partners each tend to use different kinds of work language which often cre-

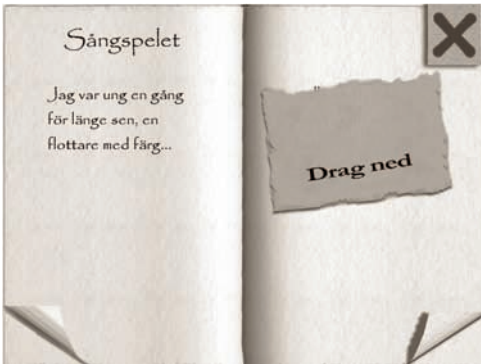


Figure 3. The Song Book

ates problems and misunderstandings. Differences in age are also potentially problematic, as the users are older people but the designers and programmers were much younger.

In order to achieve the aim of meeting the older people's needs, the communication has to be in terms that all can readily understand, in order to ensure that the users feel confident enough to participate in the work. It is also important to design the communication process to

minimise those areas where the users have weaknesses, for example, complex, abstract arguments that depend heavily on memory and logical inference to be understandable.

We explored the use of actual prototypes to facilitate communication between the partners in the project team. The prototype became the centre of the conversations, which were thus kept concrete and relatively simple (Figure 4). The prototype facilitated the conversation and reduced the likelihood of misunderstanding, as suggested by earlier work in HCI design for the general population⁹.

But for this to work, there must be a project leader who can facilitate the conversation by creating an atmosphere where everybody feels that they can verbalise their opinion.

THE ELITE APPROACH

During the different phases of the MAMA project, we gradually evolved a design approach we call ELITE (from ELders IT dEsign). From this a set of guidelines was developed, consisting of five principles underlying designing technology for older people. We do not claim that these are based on original insights, and other researchers have presented similar ideas. But we did arrive at the ELITE approach independently, and this set of principles has not, to the best of our knowledge, been presented in this way before. One of the biggest challenges, and particularly for the many older people who have some form and degree of dementia, is to make the design suitable for the intended users and to consider their particular needs. As this target group consists mainly of people with memory difficulties and very little or no computer literacy, this puts much higher demands on the design.

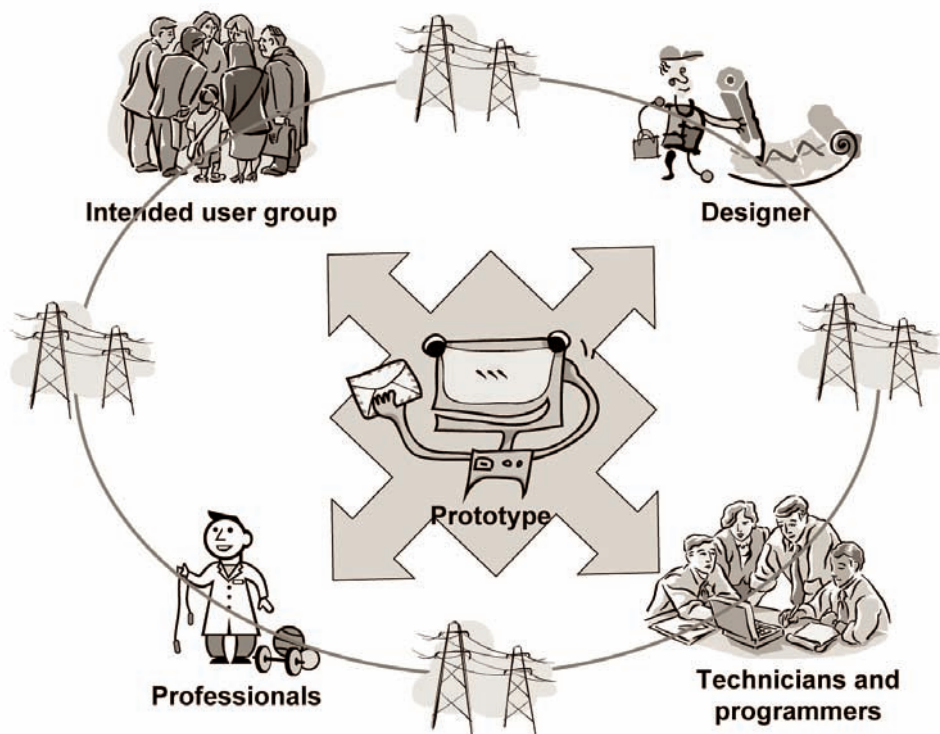


Figure 4. Design Team Communication

In total five ELITE guidelines have been formulated: (i) Become an anthropologist, (ii) Base the design on familiar (earlier) artefacts, (iii) Hide the technology, (iv) Provide both motivation and challenge, and (v) Create a coherent package of hardware and software.

Become an anthropologist

As a designer it is very hard to understand how older people think, how they do things and what obstacles they experience. As a result of this it is very important to work with suitable ethnographic methods, for example by spending time participating and observing the behaviour and language of the intended end-users in a real setting. A good deal of work has been carried out using ethnographic methods to inform ICT design¹⁰⁻¹², but most has addressed specific environments and activities rather than user groups.

During the project we spent time observing two groups: one at a residential home and another at a day care centre. We participated in all their activities in order to learn and understand their situation. The development of the different prototypes was conducted with an evolutionary approach. Throughout the development we tested different mock-ups and prototypes with the same groups of people in order to get feedback for the development process. Nursing staff also participated with comments and explanations about our object of study.

Base the design on familiar (earlier) artefacts

A pre-study of the MAMA project showed that many of the older people had problems to learn how to handle new technology and also to remember that knowledge. An effective approach is to base any interface metaphors on a well-known artifact, some thing or activ-

ity that they have used or done since they were younger², capitalising on what has been called technology generation^{13,14}. Our impressions in this process were not that problems of understanding came from complexity *per se*, but rather from unfamiliarity (although the two tend to go together with this group of users). And in this, it was not how familiar the user was with the device recently, but rather whether the users were familiar with the device (or a very similar one) in their younger years. We found that older users could understand and use complex devices, but could not remember how to do so. It is not sufficient to give the visual appearance of a long familiar physical object, as attempted by IBM with their RealThings designs¹⁵. It is important to tap into the long-standing physical motor programs with realistic tangibility, too.

In the MAMA project we based the interaction and navigation around the metaphor of a book. The next guideline follows from this one.

Hide the technology

Our target population was not computer literate, nor were they familiar with recent technical devices such as mobile phones, DVD players, or even cable TV selection boxes. In fact, they generally appeared intimidated by new technology.

We decided that we had to hide the technology and this led to the idea of a book-like device that is used in more or less the same way as a normal book, by turning pages, etc.. The pilot test of the prototype showed that it was a successful concept and that *the users did not view it as a computer*.

Provide both motivation and challenge

It is very important that an application is motivating to use and that there is a story or something similar that drives the use of the application. Even so, it is

also important that the application does not provide everything. The application must be at least somewhat challenging for the user in order to create a feeling of achievement and so to encourage continued use of the application. This is a difficult balance, since some challenge must be present but not enough to intimidate the user.

With the book prototypes we experimented with different features before deciding that the challenge, which creates the motivation to learn to use and to continue using the device, should reside in the content, not the form. Hence, the games with materials that required completion by the user were developed.

Create a coherent package of hardware and software

With the aim of achieving a natural and intuitive use of the design it is very important that the hardware and the software complement each other, and fit together seamlessly. The aim is to create an interaction and navigation style that is natural to the kind of task that is supposed to be performed with the application on the particular device on which it runs.

In the MAMA project we packaged the applications naturally as sections of the book. The different applications became different 'chapters' of the book and within a 'chapter' the user stepped forward or back linearly, by turning 'pages'.

CONCLUSIONS

To understand any group of users, the design team needs to get to know them. Spending time with older people, especially observing and participating in their normal social activities, provides many clues on which to base design decisions. Older people with memory problems often cannot learn new skills, or at least cannot retain them. However, long-

standing knowledge remains. For this reason, a design based around an interaction metaphor from much earlier technology can prove effective. For similar reasons, the computer-based nature of the technology is best hidden for this group of users, within a coherent package of software and hardware. But motivation to use is also important, and for this some degree of challenge is also needed. However, the challenge should not be in how to use the technology, but in what one can do with it.

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