Mobile technology keeping people with dementia independent and socially active

Abstract

A main issue of people with dementia and older people in general is the feeling of being dependent on others and being lonely at the same time. Based on a preventive approach of supporting these people in their independent living and social interaction, two design concepts for mobile technology for this support have been developed and are introduced in this paper: The Shared diary helps carrying out everyday tasks by sharing daily task-lists. Meet me is a collaborative tool for managing meetings.

Keywords

Inclusive design, dementia, information and communication technology, interface design, collaborative tools

 ACM Classification Keywords


General Terms

Design, Human Factors
Introduction

One implication of our ageing population is the need for an increased investigation of dementia and its resulting potential for the support of the people concerned. Dementia is a condition in which the way the brain functions is gradually lost. People with dementia have increased needs for support when carrying out everyday tasks. Even mild forms of dementia are associated with a diminished quality of life, poor self-esteem, anxiety, and social isolation [3]. Whereas in the past, technology research has largely focused on ensuring safety and security of dementia patients, the focus is increasingly on positively enhancing the quality of life of dementia patients living at home. More recent work therefore has adopted a needs-led approach to ensure that interactive devices are more usable and relevant to dementia patients [2]. In line with this, aim of an interview study [1] was to identify the needs of users and their carers as a basis for developing design concepts for technology supporting people with dementia in their independent living. Eight people with dementia in an early to moderate state, regularly visiting a day centre, and two of their carers were interviewed. The results of the interview analysis show the strong need for both independence and social interaction as the main concern of the people with dementia. A main issue of the interviewees is the feeling of being dependent on others and being lonely at the same time. From the carers’ point of view, technology for supporting social interaction is also seen as a major domain that technology development should focus on [1]. Another result from the interview study is that for people with dementia, the use of technology is very much reduced to only single button presses, and most technology use is delegated to other people. Also, the progression of dementia makes it less likely to introduce new functions and devices [1]. In line with previous research [2] this shows the need for technology very simple to use and very obvious in its cause [1].

The final conclusion of the interview study was to follow a new and preventive approach, namely developing technology for older adults before the onset of dementia. This has two advantages. First, technology is introduced and learned while learning is still possible. Second, until the onset of dementia, devices have become familiar and their use automated. Based on that approach, first design scenarios for new technology helping people staying in contact with others and supporting independent living were developed. These scenarios are described in [1].

In the following, first design concepts for information and communication technology we developed based on the interview study and the resulting scenarios are introduced.

Design Concepts

Following the preventive approach described earlier, we developed first design concepts for technology for older adults or people in a very early state of dementia that should help them in:

- Keeping their independent living at home
- Staying in contact with others (e.g., close family members and friends)
- Establishing new relationships, and
- Continuing and carrying out routines and daily schedules.

The focus here shall be on older adults who still live self-determined in private homes but are regularly visited by caregivers. Two design concepts are introduced in the following: Shared diary and Meet me.
Two – partly contradictory – assumptions were leading us regarding the two concepts: 1. Digital tools are easier to adopt when being integrated into users running practices regarding analogue techniques. 2. Digital tools do not need analogue reference points if the design considers basic user needs. Our research aim includes contributing to a better understanding of the relation of both.

**Shared diary**

*Shared Diary* is a digital calendar, which allows two (or more) collaborators to share daily task-lists. It combines a regular diary with a digital display, allowing two associated users to manually add and edit entries on paper and translate these into visible items on the other user’s display.

In the images shown in the figures 1-3, a standard use-case is illustrated. An older woman (Dora) and her daughter (Jane) are sharing a task list for an exchange about daily activities. The tool allows Jane to follow her mother’s lists so that she can check if Dora manages to fulfill it. If needed, she can add comments or tasks that will be added to her mother’s device and the other way around. The display on the front cover of the book shows a list of all current entries and tasks (see figure 3). Entries can be easily allocated to both authors by a distinct use of color and profile images. When a task is declared finished, both users will get a feedback about the changed status. Touch interactions on the display are limited to declaring a task finished or switching between pages in the task list in order to keep the tool as simple to use as possible.

The underlying idea of the concept is to make digital task management accessible for people who have no experience with the use of computers and who are not willing or able to learn how to use it.

The application builds on existing digital-pen technology that allows capturing handwritten text and to transform it into digital information (as offered e.g. by Anoto [www.anoto.com]). To align the date of an entry with the current page, the final solution is supposed to track the actual page the user is facing (see figure 1). Pen and book are connected via bluetooth. The synchronization of the books’ content is established via internet.

![Figure 1. Entry in the Shared diary with a digital pen.](image-url)
Meet me is a collaborative tool for setting up meetings, receiving feedback from invited participants, and prompting others before an event starts. The underlying idea is to make shared calendars accessible for people who have no experience with the use of computers and who are not willing or able to learn how to use it.

The application is designed for integration into a tablet PC (e.g. an iPad).

Several design principles have been considered to ensure the ease of use for inexperienced users:

- Build on very few interaction principles and repeat them once introduced
- Focus on single functionalities and avoid options that occur in parallel
- Make functions available only when needed
- Maintain visual links to the main layer when changing between views (e.g. main page and single view).
- Create visual orientation by providing profile images instead of abstract representations
- Base all functions on single-touch interactions.

The main page of Meet me shows a number of interactive elements representing all upcoming appointments associated with the user (see figure 4). Level of saturation and size of the bubbles indicate the temporal proximity of all upcoming events. Each of the event-items is labeled by date and a short title. It is surrounded by a ring of three circle segments. These visually indicate the attached number of attendants, invitations to attendants still awaiting reply and invitees who will not attend a meeting.
Active event-items will switch into single view. The circle segments here will unfold into onion-skins that contain images of all attendants. In the headline of the page date, extended title and location of the event is shown prominently (see figure 5).

Adding a »new event« will guide the user through a three step wizard, asking him to define title and time, and to add contacts from his address book. Eventually an invitation to all selected attendants is sent (see figure 6).

A person who is connected to a Meet me group will receive status messages (see figure 7).
Outlook

Working prototypes of our design concepts are currently being implemented. Substantial evaluation of usability and user acceptance will be an essential part of the implementation process. We therefore started a collaboration with a Senior group in Berlin that organize classes focused on ICT use in advanced age (»Senior-Computer-Club«). The group participates in the testing of paper prototypes and will eventually introduce running prototypes to community members. In addition we will enforce our collaboration with health professionals to verify our assumptions on possible preventive effects of both applications regarding people with dementia.

Acknowledgements
We would like to thank Andrew Lintott, Ben Cox, Patrick Langdon, and the Tresham Day Centre, London, UK for their valuable help in the present study.

References