MOBILE PHONES AS MEMORY AID VEHICLES FOR SENIORS

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ABSTRACT

Cavanaugh, Grady, and Perlmutter [1] report that in approximately 72% of real-life memory failures, seniors rely upon external memory aids such as lists, notes, or prepared items. This high usage rate suggests that seniors may be receptive to new varieties of memory aids. To determine desired properties of new memory aids, we conducted observations and participatory design meetings. We observed a clinical population of individuals with Mild Cognitive Impairment (MCI) participating in a memory intervention session for a period of six weeks. We then conducted a series of participatory design activities with five normally aging seniors who were concerned about memory loss. Based on these two activities, we contribute evidence that mobile PDA phones contain many of the properties that seniors desire in an external aid, but these phones need software, hardware, and social adaptations before adoption by seniors becomes feasible.

INTRODUCTION

Mobiles phones have become popular with younger generations, and senior citizens have begun to purchase mobiles phones as well. In the United Kingdom, one study found that over 60% of men and women ages 60-64 own mobile phones [4]. This percentage decreases for older age brackets; about 30% of men aged 80 or older own mobile phones, while less than 20% of women do. Numbers for North American populations are likely to be lower due to slower adoption rates and larger geographic areas for providers to cover.

Even if seniors do own mobile phones, we must make a distinction between mobile phone ownership and usage. Simply because a senior purchases a phone does not mean that he or she will use it in the same ways that a younger person does. For instance, a senior might leave the phone in the car for use in emergencies, while a younger person might carry the phone with them. Carrying the phone makes it a viable medium for serving as a memory aid. We often see young professionals using popular phone/organizer hybrids such as the Palm Treo [3] for this purpose.

As Cavanaugh, Grady, and Perlmutter note [1], seniors also make good use of external memory aids such as calendars, address books, and to-do lists. Their usage, however, seems limited to either paper-based aids or stationary desktop computer applications. We are interested in how seniors view mobile phones for fulfilling similar purposes. How do seniors who own mobile phones use them for memory-related purposes? Do they see them primarily as communication devices instead of fully-fledged platforms for personal organization? What are the benefits and barriers associated with using mobile phones to provide memory support? What advantages and disadvantages do phones have over paper-based memory aids? In this paper, we focus on memory-related properties of phones rather than examining all parts of phone design (e.g., [2]).

METHOD

To answer our research questions, we conducted clinical observations and focus groups. The clinical observations took place in a geriatric hospital and research center, where a psychologist

held weekly two hour long intervention meetings with a group of older people diagnosed with Mild Cognitive Impairment (MCI) and likely to further decline in memory functioning. The purpose of these five sessions was to teach seniors internal memory strategies in an effort to keep them autonomous for longer periods during subsequent memory decline. As part of the program, the psychologist asked the seniors to keep a paper organizer with them at all times. As the seniors began to use their new organizers, we were able to note their subjective feelings about the process of adopting a new external memory aid by listening to group discussion during the weekly meetings. We kept written logs of each meeting, but did not interact directly with the participants.

Following the completion of the MCI intervention group, we convened a focus group with normally aging seniors who reported trouble remembering names. We met as a group or one-on-one periodically for over six months. We offered seniors the opportunity to try a mobile phone PDA (iMate K-JAM model) for a month following the focus groups. During the meetings, the seniors directed much of the discussion and our primary role was to offer expertise on mobile phone technology and moderate the sessions.

PARTICIPANTS

There were six older people involved in the MCI intervention group. Specific ages were not provided, but all were over 60. The group consisted of 3 males and 3 females. Of the six participants, one actively used a mobile phone (Palm Treo) to organize and remember. One used a weekly paper planner, which she carried in her purse. Of the remainder, some kept wall calendars at home, while others used nothing at all.

In the focus group, five older women ranging from 55 to 86 years of age participated. Two of them owned mobile phones. One carried her phone in her purse, but never used it unless she needed to call someone in case of an emergency. One kept her mobile phone in the glove compartment of her car in case of emergencies. The remaining three did not own mobile phones of any kind. All five owned home desktop computers.

THE CASE FOR MOBILE PHONES

In our studies, a number of statements indicated that mobile phones have potential for use as a memory aid for seniors. We present each of the properties of mobile phones that make them especially promising as a next-generation platform for memory support for seniors.

Portability. The seniors in both groups wanted access to their personal information at all times. The geriatric psychologist in the MCI group further stressed the importance of portability of any aid. Unlike some memory aids like wall calendars, mobile phones provide portability to support memory anywhere.

Easy backups. Mobile phones can provide fast and reliable synchronization with home computers. One participant noted that she fears losing her paper notebook because "it would be tragic… my whole life is in here." However, making backups of her notebook is time and labor intensive.

Flexibility and revisions. Seniors felt frustrated with paper when they made mistakes and had to erase or cross out errors. Phones, on the other hand, allow easy revision of information.

Proactive alarms. One recurring problem with current memory aids is that the seniors often forget to check them, and therefore lose any benefit of the aid. One woman noted, "I have no need to look at my book. It's not fun." For forgetful or reluctant seniors, mobile phones can initiate a review session by ringing or displaying an alarm. All seniors saw the value of these alarms, and suggested the phone could "help me remember to take my medication" or "remind me to call someone later in the afternoon."

Consolidated information. One participant noted he has trouble remembering everything he must take with him when he leaves the house: "I have to remember my keys, my wallet, my memory book, and my phone." By combining the functions of paper organizers with the phone, which some seniors already carry, the number of

items that seniors must carry (and potential to forget them) decreases. Further, keeping several kinds of information in one place (i.e., combining a calendar with an address book on the phone) offers seniors a much-needed "go-to place" for the information they require.

Interactivity. Computationally enhanced memory aids serve as rich grounds for unique applications beyond the traditional personal information management. For instance, seniors liked the idea of creating games to assist with their memories and keep them sharp. Many cited Nintendo's Brain Age and "use it or lose it" articles they read in the newspaper. In addition, computation allows seniors flexibility in attempting to recall information. One woman said "If I was going to a wedding, I would want to go to the phone and say 'wedding'…and then the computer would give me a list of all the people there." The ability to search offers a profound benefit over paper aids. Using keyword search as a retrieval mechanism (rather than, for example, the date of the wedding) further allows complex relationships between concepts to exist.

Ease of carrying. The men in the MCI intervention group often failed to carry their paper organizers with them. When they were asked why they did not carry them, they reported that they have no place to put them. Unlike the women in the group, the men did not carry purses and felt foolish carrying the organizer everywhere. One man who used a Palm Treo, however, kept the phone on a belt clip and was able to access it any time without feeling foolish. Mobile phones are lightweight and commonplace, and permit people to carry them without additional baggage.

Routine promotion. Using a mobile phone promotes the establishment and execution of a routine of use. Members of the MCI group felt it was not only important to *have* information (such as a phone number), but also to know where to *find* information (such as in an address book). Mobile phone software allows seniors to establish a pre-set place to find information and a routine place to enter new information.

Communication functions. Several seniors noted that they relied on their spouses, neighbours, children, and grandchildren to help them remember. One woman often left notes on the refrigerator that were intended as memory aids for her granddaughter (e.g., "Pick up milk"). Mobile phones provide more advanced methods of administering such "communicative reminders" including text messaging, phone calls, and voicemail.

THE CASE AGAINST MOBILE PHONES

While mobile phones offer many benefits over paper-based aids, designers must still overcome several challenges in order to make phones more readily adopted by seniors.

Poor conceptual design. Participants were confused by the conceptual designs of software that exists on phones. Rather than thinking in terms of objects or data structures, the seniors thought in terms of complex relationships between people, times, places, activities, and responsibilities. For instance, one senior felt that to-do lists should be stored in a notepad application on the phone. Another, however, felt that it made more sense to write to-do lists on the calendar, which more accurately reflected her current practice. One participant said she would only use a mobile phone if it was "absolutely no harder than a television." Current mass-market phones have yet to create standards that promote transfer between phones, which complicates the problem as well.

Inaccessible hardware. Seniors had trouble with both input and output aspects of mobile phones. In some user tests we performed with the seniors in the focus group, they commonly pushed additional buttons by mistake as they were holding the phone. For example, while trying to push a key on the front of the phone, one participant pushed a key on the side of the phone with her thumb, causing a different application to launch and losing her place.

Two different participants who wore hearing aids noted that they cannot use the phone without first putting their hearing aids on, and

then adjusting the volume settings. Poor hearing also prompted seniors to suggest very loud ringtones and speaker volumes. Unlike young people with keen eyesight, the seniors had to prepare to use the phone – finding their glasses, adjusting the screen distance, etc.

We asked the seniors in the focus group to name the top three hardware problems they foresaw with mobile phones. The most important was button size – they all felt anxious about having to push small keys in a precise order. The second item was screen size – seniors felt they would have trouble reading small text. Third, they worried about maintaining a firm grip on the phone itself. They wanted a more rugged model that could withstand drops and provided more finger traction.

Radiation and health concerns. One senior had a fear of using a mobile phone due to reports that the radiation from the phone could cause brain damage or cancer. This was especially important for her because her friend recently died of too much radiation due to chemotherapy.

Fear of becoming reliant. One woman in the MCI group felt her brain would become "lazy" if she used a personal organizer. A similar concern arose from the focus group; one participant worried that she would be utterly lost if she were to lose her notebook. Some younger people today rely heavily upon their phones, and the seniors are hesitant to invest so much of their knowledge in a device that they do not entirely trust.

Fear of breaking the phone. Participants worried they might break the phone somehow. One participant thought that all phones and computers should come with a built-in message indicating that if there was ever an error, it was *not* the user's fault. The seniors felt it was important to rely upon instructions as well; rather than confidently exploring a phone, they wanted "concise, step-by-step instructions written by a native English speaker, and in large print."

Impersonal nature of technology. The memory aids that the seniors currently use are all highly customized. One woman noted that it took her a long time to "find just the right notebook for me." Many people created their own organizational schemes using folders or notes because they could not find a pre-existing memory aid that seemed to mesh with the way that they thought. This inability to customize is exacerbated by mobile phones. With paper, seniors can often rip, paste over, or edit some of the pages. With software, however, this is nearly impossible. Software applications that allow seniors to customize how their personal information is entered and retrieved have yet to be realized.

CONCLUSION

Based on clinical observations and a subsequent focus group, we highlighted promising aspects of mobile phones as memory aids. We have also shown some drawbacks of phones. However, the problems we listed can be solved through better design and assurances. Phones have the functional and utilitarian properties necessary to be successful aids, but currently lack the interactive and personal properties to be successful.

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