

Participatory Design Process with Older Users

Michael Massimi

mikem@dgp.toronto.edu

Department of Computer Science
University of Toronto

Ronald Baecker

rmb@kmdi.toronto.edu

Knowledge Media Design Institute
University of Toronto

Abstract

This paper reflects on two months of conducting intensive participatory design with a team of five senior citizens, with the purpose of transforming an off-the-shelf mobile phone into a specially-designed memory aid. We discuss the activities we used to engage the seniors, and how we used a combination of sources to influence the needs analysis phase. We also reflect on three selected themes that emerged during the process.

Introduction

System designs often overlook the needs of older users. Ubiquitous computing promises computation will be embedded in artifacts that are more approachable and context-aware, but we must act now to prevent ubiquitous computing from becoming as senior-hostile as most current systems. Researchers have proposed several methods for including the concerns of seniors in system design; these range from traditional techniques like interviews and usability testing to novel experience sampling techniques. Participatory design methods in particular have been successful in eliciting requirements from users.

This study reports on an ongoing participatory design process. We began with the notion that context-aware devices could be used to support memory in older people. Using ubicomp techniques like context-awareness and capture/access to bolster human memory is not a new concept; systems like Forget-me-not and PEPYS demonstrated these concepts in middle-aged adults several years ago [2]. Likewise, geriatric psychologists have studied how older people create, structure, and manage their own memories by exploiting external aids and internal strategies. Some seniors create their own unique strategies and routines. Most use variations on common strategies like repetition, concentrating, and writing things down.

In other words, from the systems side we know it is technologically feasible to create electronic, context-aware memory aids. From the psychology side, we also know that seniors use external memory aids late into life in order to manage their activities of daily living. What our current study examines is how we can involve seniors in *designing their own* electronic memory aids.

Participatory Design Process

Recruitment and Team Composition

From the geriatric psychology literature and observations in a clinical setting, we noted that remembering names was the most commonly cited problem for seniors. Based on this need, we assembled a participatory design team. We first created a flyer that elicited participation from people who were (a) free from Mild Cognitive Impairment and

Alzheimer’s Disease, (b) over 50, and (c) particularly poor at remembering names. We recruited seniors by sending flyers to community associations and day centers. Interesting people then called us and we conducted a phone interview with each one. We collected a small amount of demographic data during these interviews and subsequently invited them to join us for a first session. In total, four participants came to the first session. Three weeks later, a fifth participant joined the team.

We were also able to recruit a geriatric psychologist to supervise the sessions and act as a facilitator. Due to time restraints, however, he could not attend meetings at the most convenient time for the seniors. In lieu of his presence at design meetings, he met with the author between sessions and influenced the design with his expertise in group work and memory in older adults. The final design team composition is presented in Table 1.

| <i>Member</i> | <i>Age</i> | <i>Role</i> | <i>Unique features</i> |
|---------------|------------|-------------|---|
| R1 | 23 | Researcher | Computer scientist, organizer |
| R2 | 60s | Researcher | Geriatric psychologist |
| P1 | 76 | Senior | Poor memory, very self-aware, journalism background |
| P2 | 71 | Senior | Hearing aid, secretarial background |
| P3 | 78 | Senior | Familial tremors, secretarial background |
| P4 | 55 | Senior | Fine arts background |
| P5 | 86 | Senior | Hearing aid, uses a cane |

Table 1: Participatory design team composition

Needs Analysis

In some participatory design studies with people who have special needs, the organizers left the actual system to be designed as an open question. Participants in these studies identified needs during the process, and subsequently one was selected to elaborate. We used a different approach. Stemming from our literature review, clinical observations, and a preliminary needs analysis, we entered the participatory design phase with the notion that we could use a context-aware mobile phone to help support name recall in seniors.

Upon the first group meeting, however, it became clear that the support of memory via context was not the only important issue at hand. As a design team, we conducted a second needs analysis to supplement the needs provided by the literature and observation. By conducting a second needs analysis, we allowed the design team to have more control over the entire phone, rather than only context-aware name recollection. We fused the PD team’s needs analysis with the literature’s needs analysis in order to yield our final requirements set. Many of the needs obtained from the PD session complimented the pre-established ones from the literature (e.g., the need for a calendar complimented the need for an address book). To elicit needs, we used participatory artifact analysis, scenarios, and open-ended discussion.

Requirements Engineering

To settle on a set of features for the mobile phone, we used the scenarios as a starting point. We divided the participants into teams, and each team created their own set of scenarios. Each set contained one “best case,” “average case,” and “worst case”

scenario. The team then generated a list of features that a phone must have in order to support them in these various scenarios. The major requirements from this process could be grouped into four main categories: calendar, address book, communications, and games.

Paper Prototyping

We then created screen designs for the calendar and address book using the PICTIVE technique [3]. In general, seniors had trouble engaging with the paper prototyping activity. In interviews, they stated this was for various reasons – some seemed to be a lack of confidence, while others simply did not understand the task. P1 said “How can I draw that? I’m not a spatial person, I don’t even know, I can barely express in words how I am going to draw that.” Once participants were engaged, however, they became very adamant and interested. P3 said “At first I was very resistant to play that game [PICTIVE], and later it was fun.” Some serious conversations and dissenting viewpoints emerged about the design, with the researcher sometimes having to step in to resolve conflicts about particular points (e.g. the ordering of items on a menu).

Validation

With paper designs for the calendar and address book complete, the researchers translated the paper designs into digital ones. These digital designs were mockups done in PowerPoint. These mockups were then presented to the design team for their approval at a final session. The team then pointed out where adjustments ought to be made, and what design elements were particularly interesting.

Individual Sessions

At this point in time, the team opted to move to individual sessions for the summer. This was prompted by two occurrences. First, the seniors were beginning to have some group breakdowns. P5, with hearing problems, could not hear people seated across the table from her during the meetings. She was also interested in taking the project in a direction different from the rest of the team. Second, the seniors were commuting into downtown Toronto each week for the meetings and the summertime heat became a problem.

For the duration of the summertime, the participants are meeting the researcher in one-on-one interviews every few weeks to continue designing and validation. At the time of this writing, one round of interviews has been completed. During these interviews the researcher brought the chosen hardware to the participants and had them use it for an hour in order to acquaint themselves with it. Further, they offered suggestions on how to adjust the built-in Microsoft Windows Mobile 5 operating system to meet their needs. The team will begin to meet again in September for purposes of continuing evaluation.

Emergent Themes

Participatory design is a reflective practice, and thus far, several themes have emerged from the time spent in meetings.

First, participatory design meetings were social events for the seniors. As Ellis and Kurniawan noted, it was important to build trust and friendship between the members

of the design team in order to work effectively as a group [1]. Because our team of seniors did not know one another before the start of this process, new friendships were forged. The team opted to stop for tea and a snack halfway through the meeting each week; during this time, they discussed many matters unrelated to the process at hand, such as health of family and friends, shared past experiences, and so on. In fact, one of the participants has begun to tutor another on how to use the computer and the internet as a result of their meeting in the design sessions.

Second, the seniors saw participation in this project as a means for understanding another generation. For them, the computer and mobile phone are seen as emblematic of the culture of younger people. By learning about these artifacts and working alongside a younger computer scientist, they could, in a sense, understand and connect with a different generation.

Finally, there was a breakdown in communication when context-awareness was introduced to the seniors. By indicating to them that location sensing could be used to assist their memories, they immediately were put on the defensive. One participant imagined we would track her because we thought she had dementia. Another thought that if she needed a phone to tell her where she was, then she should be locked away already. It is interesting to note that the participants were very good at critiquing designs, mediocre at screen designing, and very poor at imagining next-generation technology. These relative strengths may be used to create better participatory design activities in the future.

Conclusion

We have described the process that occurred in a recent participatory design with senior citizens. While they were customizing a mobile phone and an associated context-aware application, it is important to note that the process itself is a particularly enlightening. By meeting with the seniors continuously over time and engaging them in different activities, they were able to articulate their needs more clearly and the resultant design benefited from their involvement.

References

- [1] R. D. Ellis and S. H. Kurniawan. Increasing the usability of online information for older users: A case study in participatory design. *International Journal of Human-Computer Interaction*, 12(2):263–276, 2000.
- [2] M. Lamming, P. Brown, K. Carter, M. Eldridge, M. Flynn, G. Louie, P. Robinson, and A. Sellen. The design of a human memory prosthesis. *The Computer Journal*, 37(3):153–163, 1994.
- [3] M. J. Muller. Retrospective on a year of participatory design using the PICTIVE technique. *Proceedings of CHI '92*, 455–462. ACM, May 3-7, 1992.