Older Adults' Experiences with Technology: Learning from Their Voices

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Abstract. When developing technologies for older adults, it is important to have them involved in the design process to identify needs, expectations and requirements correctly and comprehensively. However, communication gaps often exist, which call for the need to have continuous relationships with the target segment. In this study, older adults who have previously participated in a home technology study are interviewed to comfortably talk about their thoughts and experiences. User comments on various technologies are analyzed in relation to various stages of technology use. This paper discusses design implications, as well as topics for future research. The study can be expected to contribute to setting strategic design goals.

Keywords: User-centered design, user experience, gerontechnology, assistive technology, technology adoption.

1   Introduction

When the target users of a technology are older adults, it is more difficult to identify needs and translate them into design than when products are targeted toward younger people. For example, it is hard to simply ask what they need due to communication barriers, as well as experiential, cultural and knowledge gaps between designers and older users [1-2]. Due to such difficulties, many technologies have been designed based on incomplete understanding that focus only on the physical and cognitive limitations. Also, many have relied on stereotypes for the design of features [3-4].

It has been claimed that building a strong, continuous relationship with older adults is essential to minimize possible communication gaps [2]. In this exploratory study, we use an in-depth interview method to investigate older adults' perceptions, experiences and behaviors around various technologies. To minimize potential gaps and to have a common context in which the older respondents can comfortably talk about their thoughts, participants of a previous long-term field study were interviewed.

This paper describes the study design, including the original study and the interview, and detailed results with voices from older adults. The results are discussed as general design properties that can be applied to a broad range of technologies.

2   Study Design

2.1   Original Field Study

In the original study, an integrated system was developed for medication management and remote communication. The system integrated a medication management component with an RFID reader and a precision scale, and a communication module with notes and video chat function, along with a PC for user interaction.

The system was evaluated in an eight-week field trial with potential users in their homes. More detailed descriptions can be found in [5] and [6]. Older adults taking at least one medication without any management services and living at least 25 miles apart from family were eligible for participation. Based on a questionnaire and an interview, four older adult and adult child pairs were selected. The age range of the older adults selected for the field study was from 65 to 76. The systems were kept on all day during the study, and were used as needed. Researchers visited each participant four times to collect data and to get feedback. The PCs used for the study were given to the participants after the study ended, with the software removed.

2.2   Follow-up Interview

The participants were contacted ten months after the original study for a follow-up interview. Out of the four older adults, three took part in the interview. At the time of the interview, they had aged a year since the original study. Each session lasted between 30 to 60 minutes. Interviews were done in participants' homes to have a comfortable setting, and to enable observation of the types of technologies being used.

The interview was designed to discuss their experiences with the original system, thoughts around various technologies, and behaviors around purchase and use of new technologies. Questions were prepared to investigate their perceptions about the original study and the study system, interactions with technologies they have experienced in the past, and thoughts around new technologies. In the semi-structured, open-ended interviews, questions with broader coverage, listed below, were asked first, and questions for probing details were asked later as necessary.

- In general, what were the impacts of having the system in your home?
- You were provided with the PC after study. How are you using it now?
- What suggestions do you have for improvement or extension of the system?
- Did your study experience have an impact on the way you think about technology?
- Have you bought or started using any new technologies recently? What and why?

3   Interview Results

3.1   Reflection on Field Study Experience

Retrospective comments were given around the system design. Since the system for the original study was a prototype, it was found to be sometimes "a little bit

frustrating" and "kind of aggravating" to operate the system. One older adult said that he had to "slow down" when using it. In terms of detailed physical design, they found the interface to be "real easy," but thought "it would be better if the printing was bigger."

Respondents agreed that they benefited the most from the communication features, as in the comment "it was good because I could get to see my grandkids a little bit more." They also talked about how the system gave them a sense of presence, as they liked "having the little thing beep at me" and thought it was "good to come home and see that light." It was found that communication was made more frequent and richer by sharing medication information, as in "more of a connection and a conversation… a little bit more about me." Medication information seemed to have triggered conversation, as in "that started interaction, which branched off and blossomed."

When they were asked about the PC they were given after the original study, their answers varied. One said that she "got rid of the computer," because "it was too much money" to "have an Internet thing." The other two said that they "installed Windows 7" instead of the XP that the PCs originally had. One of the two was planning to move it to a different room because "it will be a lot more useful in there."

Suggestions for the system were also collected. A concern was raised on the involvement of family as "if you don't have the right person on the other end, it's kind of a waste," and suggested "a company or service that would do it, so if you don't have family, you can pay somebody to do it." Ideas for additional features were included tools for managing nutrition, fitness, and medical appointments.

3.2   Thoughts on Various Technologies

The effect of the field study experience on their perceptions toward technology in general was discussed. Positive effects were found, as one person said "it just opened up my eyes to different things that might be helpful," while another respondent said "I feel more confident (about using technology) now." One mentioned that she "would love to have the whole house computerized," and explained it as, "maybe that had come about from the study, because that's something that had not been in my life to have something beeping at you and helping you manage your medication and stuff."

Similar to their thoughts on the system used for the original study, emotional values seemed to be important for technology in general. For example, while they had different opinions about using Facebook, they all based their thoughts on emotional gains and losses. One who liked Facebook said "I'm more on Facebook just to know what my kids are doing… I just look at their page and I know what's going on. I don't have to worry," but another older adult who didn't like using Facebook said "I'd rather talk to your face here like this. I think it's taking away from a lot of things."

As they talked about getting new technologies and choosing what to buy, several factors were found to be important. When they were first introduced to the existence and key functions of a new technology, social connections played a big role. For example, one respondent said that her grand-sons put her on Facebook, and another older adult started using computer tutorials after her boss told her about it.

When choosing what to get after they become aware of a new technology, they based their decisions on the fit with their lifestyle. For example, one recently replaced his old air conditioner with a new one because "the management (of his residence)

gave me a hard time". Another said that she recently bought a coffee machine and chose the particular model because "it was small… I have a small kitchen." Another key criterion was the related costs. High cost was described as "the stopping factor," because "when you're retired, you look at cutting costs not adding costs." They, however, said that they evaluate costs in relation to potential benefits, as in "(it's) a matter of the service you get as to whether it makes sense financially." Also at this stage of use, accessibility, visibility and past experiences were important as they just "went to the store" to see what's available and wanted to "stick with" brands they have used.

Technical support was found to be important through long-term use, as well as at the initial learning stage. For example, one older adult "bought an extended warranty" and was happy about the "help line." On the other hand, one older adult wasn't using her Kindle because she "hasn't figured it out yet." One expressed frustration with computer training programs because "they really don't tell me what I want to know."

During continued use, older adults said they often decided if they liked or disliked a technology based on its usability. For example, one complained about his mobile phone because "I get arthritis in the thumbs. The buttons are way too small. You can't see enough on the screen. I have to wear glasses for reading and stuff. When you go to a website, it's like next to impossible to read it."

Older adults complained about the lack of interoperability in the technologies that they are using. For example, one described his data back-up process as "every-thing goes into this machine, and then I duplicate it onto this computer and I put it onto my netbook, and I have external hard drives… time-consuming and not automatic."

Problems were also discussed on conceptual compatibility. For example, they were confused with the use of the word "friend" on Facebook. One older adult didn't get that her daughter-in-law's friend could add her as a "friend" on Facebook, and another said "I posted it (a picture) on Facebook and so my grandson got it, because he happens to be listed as a friend, not family. Why, I don't know." Frustrations related to service structures were also expressed. For example, they had problems with communication services because they "get a lot of dropped calls," experienced "the services has all gone down," and "don't trust when you do it out in the cloud or online."

4   Discussion and Conclusion

In this study, results from a set of interviews with older adults, who participated in a previous study, are described. Because they were familiar with the research setting, they comfortably shared perceptions and experiences in detail. In the interviews, they shared retrospective thoughts about the system they used during the original study, experiences with technologies in general, and perceptions toward new technologies.

User comments collected from the interview can be interpreted as design properties that address broader issues. Particularly, past experiences, practical value, emotional benefits, ease of use, social support and technical assistance, are consistent with findings from existing studies on older adults' technology adoption factors [7-8, 9].

However, results also suggested that there may be important factors that were not identified by previous studies. These factors include making systems reliable and trustable, and designing for compatibility with other systems, life-styles, and

conceptual models. While these have rarely been discussed for older adults, other areas of study, including ergonomics and engineering systems, have already described them as important system properties [10-11]. Such gaps in research address the need for a more comprehensive understanding of older adults' thoughts, behaviors and values.

While the interviews were conducted in depth with probing questions, the study is limited in that it is based on a small sample. For a better representation, the process can be replicated to see how results converge. While this study took a more exploratory approach, future studies can also make use of quantitative methods for description or explanation of related topics, such as the effect of the design factors identified on user satisfaction. In addition, the mapping between the design properties and product lifecycle can be discussed in future studies, as respondents talked about various design properties at various stages of use.

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