
The Message Center: Enhancing Elder Communication

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Abstract

The Message Center is a home-based communication solution specifically designed for elders. Our research indicates that insufficient communication amongst elders causes several challenges in their daily activities such as loneliness, social isolation, and decreased appetite. The biggest cause of these challenges is that elders are increasingly removed from communication technology including email, text messaging, and mobile phones due to cognitive and physical difficulties. To overcome this problem, we incorporate a familiar pen and paper based interaction that allows instantaneous messaging via digital network. By designing the Message Center, we strive to create an easier venue for more active cross-generational communication between elders and younger family members who are often the caregivers. This paper demonstrates a User Sensitive Inclusive Design process from the generation of user needs to the evaluation of prototypes. A key theme of the Message Center project is to show how usable and emotional design derived from a user inclusive design process can encourage elders to adopt new communication technology.

Keywords

Elder communication, communication technology, user inclusive design, home communication and aging

ACM Classification Keywords

H5.2. Information interfaces and presentation (e.g., HCI): User Interfaces.

Introduction

Demographic data from the World Health Organization (WHO) [8] and the U.S. Census Bureau [3] shows positive trends among elders such as increasing population, longer life expectancy and increased income. By the year 2030, 20% of the US population will be at least 65 years old [3]. Also, elders have shown a 13% increase in high income and 15% decrease in poverty from 1974 to 1998 [3]. Thus, there is a growing interest in promoting elders' quality of life by addressing the needs of this expanding population as well as proposing new solutions to address these needs. While often associated with an individual's physical and cognitive well-being, a person's quality of life and how well they function is determined by their ability to perform essential and instrumental activities of daily living [1]. The ability to communicate can have a significant impact on an elder's quality of life, which here we define as enjoying physiological, psychological, ideological and social pleasures [5]. These pleasures are identified as the four types of pleasure people experience in life [5]. Magnusson states that communication technology can benefit elders by providing a "sense of well-being and reduced social isolation as a result of increased social networks and closer intergenerational ties" [6]. In designing a technology solution for elders, there exists a concern that elders are not receptive toward technology. However, literature shows [6] that this negative attitude is primarily due to the challenging experience of learning and using the technology, not the technology itself. To overcome this issue in

designing the Message Center, we applied a User Sensitive Inclusive Design (USID) paradigm [7]. This approach helped us propose solutions unique to our users by actively engaging them in every major step of development including user research, design ideation, and design evaluation. In the Message Center project, we try to achieve two primary goals. First, we explore a USID process to create an innovative yet appropriate design solution. Secondly, we observe users to determine if user-friendly design can improve elders' reception of novel technology.

Methodology

USID is a design paradigm that adopts a user-centered design (UCD) approach exclusively for people with disabilities. USID is distinguished from UCD or universal design in two ways. First, USID prioritizes the context sensitivity of the user group, especially focusing on limitations such as range of functionality. Also, USID leads to a design that is inclusive for the target users rather than making it universally accessible [7]. Our target users are people who are at least 65 years old and live independently without personal assistance in performing daily activities.

User research

To address elder communication needs, we conducted two focus groups with elders and caregivers. The focus groups represent the elder user group (n=3) and the caregiver user group (n=7). The goal of these focus groups was to understand the challenges elders and caregivers face on a daily basis and how both groups are currently attempting to overcome these challenges. Discussing broad topics in the focus groups such as challenges faced during each part of the day or in each room of the house helped us gain a holistic

understanding of issues relevant to communication while also taking the surrounding context into consideration. Conducting a separate focus group with caregivers provided important additional insight since elder's perceptions of their own abilities are often out of step with their actual abilities [4]. We analyzed the focus group data using grounded theory which revealed the salient challenges elders face and the context of those challenges [2]. Finally, we created design implications based on the identified challenges.

Design ideation

The design implications are meant to drive the creation of a product that can address the outlined communication challenges. These design implications led to the first concept for the Message Center. This initial concept relied on several assumptions such as elders' good handwriting capability, their willingness to accept a moderate level of technology, and the appropriateness of the size and footprint of the design for elders' living spaces. To assess whether or not these initial assumptions were correct, we conducted two in-home interviews with both elders and caregivers (n=5). We also ran two focus groups with eight and six elders who were recruited from retirement centers in Atlanta. During in-home interviews, we were also able to observe users' living spaces, which helped us determine whether or not our design was appropriate for its intended environment. Based on the feedback, we refined the concepts and determined a final design.

Design evaluation

After creating a final design, there was a need to gather feedback on the aesthetics, size, functionality, and concept of the Message Center. To gather this information, we created a tangible prototype. We

displayed the prototype at a local living community for seniors as part of a five-participant focus group. After viewing a demonstration of the prototype and hearing an explanation of its functionality, participants gave their feedback and expressed both interests and concerns. This focus group provided us with guidelines based on which we created a full appearance model.

Results

User research

The two focus groups revealed 47 challenges that elders experience while performing daily activities including depression, need for stimulation, phone usage and concerns for physical distance from others. One of the most salient barriers to elder communication stems from the large generational gap between communication methods familiar to elders and those familiar to younger generations. While elders are often familiar with using handwriting as a form of communication, their primary points of contact are with younger generations who are more familiar with digital communication options such as email, cell phones, and PDAs. This phenomenon can lead to an elder's communicatory isolation from others within their sphere of care [4]. Additional barriers to elder communication revolve around a caregiver's desire to check on their elder's status throughout the day. While elders acknowledge the importance of conveying their status to concerned caregivers, they also do not wish to feel "checked up on" or to have their privacy invaded. In order to address the large generational gap, a method for communicating between analog and digital methods should be provided. To tackle the issue of elder privacy despite a concern for elder status, a method of conveying an elder's status remotely should be provided by the final solution. Most importantly, the

solution should facilitate meaningful and more frequent communication between elders and others.

Design ideation

The implications derived from our user research led to the initial Message Center concept. A key theme of this initial design (Figure 1) is to digitally connect elders through familiar mediums.



figure 1. This figure shows the initial design of the Message Center.

The Message Center enables elders to handwrite or typewrite to compose a message and then send that item to an email, cell phone (SMS), PDA, or fax machine. This device can also receive messages from those devices in printed form. The initial concept evoked both concerns and positive feedback from users. Caregivers favored the utilization of a written form of communication since this method may provide a quick way to communicate with elders, especially as a method for checking on health status. Elders liked the device for its “personal touch”. However, many expressed apprehension toward the outward level of technology in this device as cited in the quote, “it just

looks like a fax machine.” Users also commented that the intended size for the device was bigger than their available space. This comment was further upheld by our observation of small living areas with limited counter space. Finally, we determined through these interviews that approximately half of our participants (n=17) used writing as a form of communication and the majority were physically able to write even though they may not do as a regular form of communication. Based on this feedback, we made several changes to the initial concept. Figure 2 shows the redesigned concept.

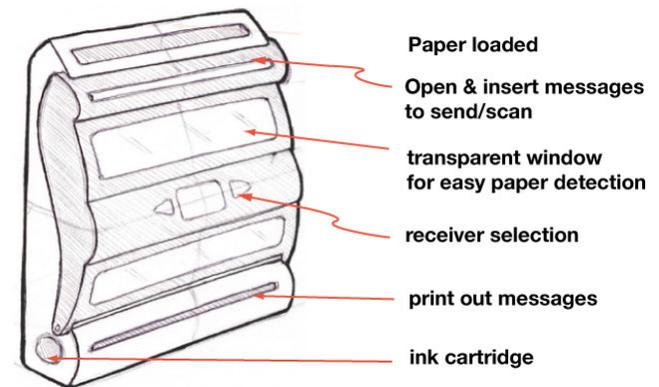


figure 2. This figure shows the design of the Message Center as well as its important features.

In this redesign, the device slimmed down to occupy a smaller footprint on a table or be hung on a wall. It now has only three buttons, the minimal number necessary to scroll through recipients and send messages. To send a message, a user would open the door to the device, place a document in the scanning area, close the door, select a recipient using the arrow

keys, and press the middle button to send. This middle button is also a screen that displays a recipient's name and face. When a message is received, it is automatically printed out and held at the bottom of the Message Center. The design ideation process focuses on promoting the four types of pleasure, which allows the design to be more inclusive for the user group. To maximize its inclusiveness, the Message Center provides increased physiological pleasure by enhancing ergonomics such as a larger handle, bigger buttons and multi-modal feedback for users with declined vision and audition. The device improves psychological pleasure by alleviating memory burdens through displaying both the name and picture of contacts. To address ideology pleasure, which is associated with aesthetics [5], the Message Center bases its design metaphor on physical mailboxes already familiar to elders. Finally, all three pleasures above encourage more frequent and meaningful communication for elders, which will eventually promote social pleasure.

Design evaluation

A tangible prototype (Figure 3) allowed participants to provide more concrete feedback than verbal or hand drawn concepts. The five focus group participants had varied levels of technology experience ranging from having used email once to 15 years of computer usage. Nevertheless, they all welcomed the idea that they could use email through something simple such as the Message Center. Participants felt they would use this device in their own homes and that it would be "great for people who did not have a computer" or did not want to use one. The focus group participants also expressed a desire for clear visual or auditory feedback when sending and receiving messages as well as a clear way of sending documents smaller than the standard

8.5" x 11" sheet of paper. These suggestions became the design guidelines for the full appearance model as shown in figure 4.



figure 3. This figure shows the first Message Center prototype which was used in a focus group to gather feedback on the device.



figure 4. This figure shows the final Message Center prototype that will be used in further usability testing.

Conclusion

The Message Center uses USID as a driving force for innovation. As a guiding point to the design rather than a methodology, USID helped us consider the surrounding context of the user groups and design for their specific needs instead of “designing for all”. We generated an initial concept based on elders’ daily challenges to gain contextual knowledge. We found that the challenges primarily resulted from different comfort levels in using communication technology between elders and younger generations. Therefore, we created the Message Center to allow elders to send instantaneous messages to email, cell phones and PDA(s) through handwriting. In designing the Message Center, we invited active user engagement during the development in order to achieve “sensitive” and “inclusive” design. As a result of this user driven process, we observed positive changes in elders’ reception toward technology. User comments such as “it’s like a fax” after the first design had changed to “I am all up for it” and “terrific” after the final design. This change indicates that deriving design from user involvement can become a key element of success in designing a technology intervention for elders. In continuing our process, we will conduct a full usability test using the final prototype. Since this prototype is not functional, we will virtually simulate working components. This step will help quantitatively evaluate the Message Center’s ease of use for elders. Based on feedback, we will make design changes as necessary and begin developing a working prototype using existing technology.

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