
MyFamilyTree: A Web Application to Simplify Online Communication with Family Members

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Abstract

MyFamilyTree, a web application that facilitates communication with the user's family through the visual metaphor of a genealogical family tree, began as a user experience (UX) design project to improve older adults' experiences online. Through contextual interviews and analysis, it was determined that older adults constitute a diverse population with a wide range of needs and concerns. A prototype of the MyFamilyTree web application was created with the goal of improving the experience of a commonly-mentioned activity—staying in touch with family—while also addressing concerns about organization, simplicity and privacy. Methods used to improve the design included heuristic evaluation, creation of personas, evaluation sessions with users, and analysis of critical incidents and UX problem instances and groups. The final design facilitates multiple forms of communication within the same web application, and while it reflects needs stated by older adults, it is flexible enough to be used by the general population.

Author Keywords

Older adults; Internet use; online communication; user experience; web applications

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ACM Classification Keywords

H.4.3 [Information Systems Applications]:
Communications Applications---information browsers;
H.4.m [Information Systems Applications]:
Miscellaneous.

Design Focus

The initial focus of the project was to improve older adults' experiences of their daily online activities by designing a new piece of hardware or software that would help to simplify and organize these activities. Over time, the focus narrowed to center on developing a web application that would facilitate online communication between family members and allow individuals to visualize their family relationships. Our solution attempts to build on previous research regarding older adults and Internet use, as well as on existing commercial solutions for facilitating older adults' online activities.

Literature review

Existing research has looked at the challenges older adults face when using the Internet. de Lara et al (2010) found that the cognitive changes associated with aging, such as less working memory, difficulty multitasking, and slower reaction time, may be assisted through design changes to websites. Sayago and Blat (2009) found that older people struggle most with remembering series of steps, understanding jargon, and physically using a mouse. Future technology designs could simplify interactions and use more consistent terminology. Chadwick-Dias et al (2004) found an expertise gap between younger and older users, with older users experiencing more usability issues on average. It would be reasonable to expect that the expertise of older adults using the Internet has

increased in the past five to ten years since this research was published. New design solutions must therefore be both sensitive to cognitive and knowledge differences in older adults, and aware of the fact that not all older adults necessarily experience these challenges.

Commercial solutions

Numerous commercial products strive to improve older adults' experiences in a general capacity. Telikin (<http://telikin.com>), a simplified touchscreen device with its own operating system, uses large, clear visuals to address the possible vision challenges of older adults. Eldy (<http://eldy.eu>), a bundle of programs that constitutes a "simplified operating system," helps older adults who are isolated from others, providing them with easy access to email, chat, web browsing, and other tools. A third product is SeeYouLink (<http://seeyoulink.com>), software that can be downloaded or accessed online, which helps older people with limited technological experience and mild cognitive or visual impairments, incorporating simplified menus and adjustable text size.

Proposed Solution

Our solution is to create a new interface design, which includes providing a more simplified and friendly interface for older adults to maintain and contact family members, integrating several popular communication applications and adjusting their visualization and features with a full consideration of the characteristics of older adults. Specifically, we call this app "My Family Tree." It allows users to create their own family tree in the home page as an appealing way to manage their contacts. Users are also able to contact their family members in the tree through all possible tools currently



Figure 1: Affinity diagram created from interview notes.

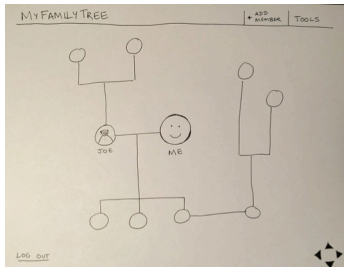


Figure 2: A screen from the low-quality paper prototype.

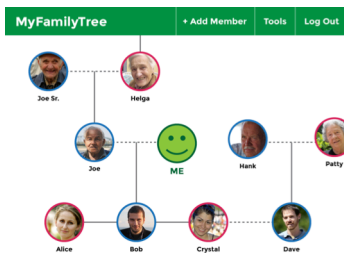


Figure 3: The same screen from the high-quality prototype.

used in daily life. More importantly, these tools have been integrated within one single page so that they can be well organized and simplified for old adults. This design can help older adults manage their communication within family members in a more friendly, simplified and effort-saving way.

Methods

Contextual interviews

In the contextual interviews, we designed a series of questions to evaluate needs, habits, and concerns around the Internet usage of older adults. We visited five older adults in their homes and at work, where we had them demonstrate online tasks they perform on their own devices, and tell us about their habits and preferences.

Analysis of interview results

To analyze the interview results, we created affinity diagrams (figure 1). Numerous key words that were generated from the interview results were grouped and clustered to help us better understand the main requirement of older adults.

Personas

Based on our findings, we created two personas to represent the goals and characteristics of older adults. The primary persona, who we named "Esther Smith," was a 65-year-old woman who lived alone in an assisted living facility. This fictional person represents a combination of the individuals we interviewed.

Design ideation

Each team member generated 20 ideas in the form of paper sketches, which were then displayed, compared, and evaluated by the entire team. Through comparing

and combining these ideas, we arrived at our final design concept.

Interactive prototypes

We created a low-quality paper prototype of the design (figure 2) and, after fixing flaws in the paper prototype, a high-quality prototype with mock-up screens created in Adobe Illustrator (figure 3). The prototypes allow users to simulate interacting with the application in a realistic way. This was useful for locating and fixing interaction problems in the design.

Evaluation sessions

We contacted five older adults to evaluate our high quality prototype in the second round of interviews. These interviews provided us with valuable feedback about the usability of the design and participants' overall impressions of it.

Evaluation Results

We collected data from the evaluation interviews and identified all the critical incidents in the notes. We consolidated the critical incidents that we observed during the evaluation process into a list of UX problem instances in the spreadsheet and merged these UX problem instances to identify UX problem groups. Then we identified the underlying UX problems. We grouped 10 problems and ranked these observed problems from 1 to 10 according to their priority ratio (table 1). We chose top three problems and found the solutions for these three main problems. We identified these three most impactful improvements to our design.

Problem 1 is the confusion with the tree concept. The solution is to change visual of tree to be more tree-like background. We added a tree graphic in the

Table of UX Problem Groups

Problem	Severity
Confusion with tree concept	Catastrophic
Understanding privacy setting	Major
Understanding form fields	Major
Mental model expectations	Minor
Understanding emoji feature	Minor
Relationships of windows	Minor
Understanding notifications	Minor
Ease of mouse movement	Minor
Information visibility	Minor
Entering text	Minor

Table 1: Ten UX problem groups based on issues that individual test users had while using the prototype, rated for severity.

background of home screen and added a walkthrough when the user logs in to explain the features.

Problem 2 is understanding privacy settings. The solution is to add descriptions and help. We added a tooltip that brings up more information about what privacy settings mean, added lines between options, and changed the password and save settings to indicate that these are separate actions.

Problem 3 is understanding form fields in add member form. The solution is to add stars to required fields and eliminate unnecessary fields. We removed certain fields, clarified the names of others, and added a note providing help.

Story of Design Project

Early Ideation

The original design idea was to create an online hub that would combine all the necessary applications into one convenient place. The original assumption that older adults, while wanting to stay in touch and up to date with daily online tasks such as communication, shopping, and entertainment, were overwhelmed by complex interfaces designed for tech-savvy individuals with more expertise.

To provide older adults with a more straightforward experience on the Internet, we planned to create a web app, mobile app, or website that served as a home

page for our target audience. We decided that combining common applications or sites like Facebook, Netflix, New York Times, and similar commonly used apps would be a good way to start. We went into our first round of interviews with these ideals in mind.

Contextual Interviews and Findings

To get a better sense of the needs and preferences of older adults, we interviewed five individuals at their places of work or at assisted living facilities, contexts in which they frequently engage in Internet use. We asked them to describe their patterns of use and demonstrate common tasks they perform online. We then processed our notes from the five, creating an affinity diagram and other design informing models.

The overarching finding from this process was that the experiences of older adults are incredibly diverse. Interviewees at the same stage in life did not necessarily have the same skill level, habits, preferences, or concerns regarding Internet use. Nevertheless, several common themes stood out among our interview findings. First, most interviewees expressed a strong dislike of online ads and concern about privacy. Second, they showed interest in communication and keeping in touch with family, primarily through email and social media. Finally, they expressed a preference for simple, predictable, organized systems and a dislike of needing to switch between apps and/or devices to perform certain tasks.

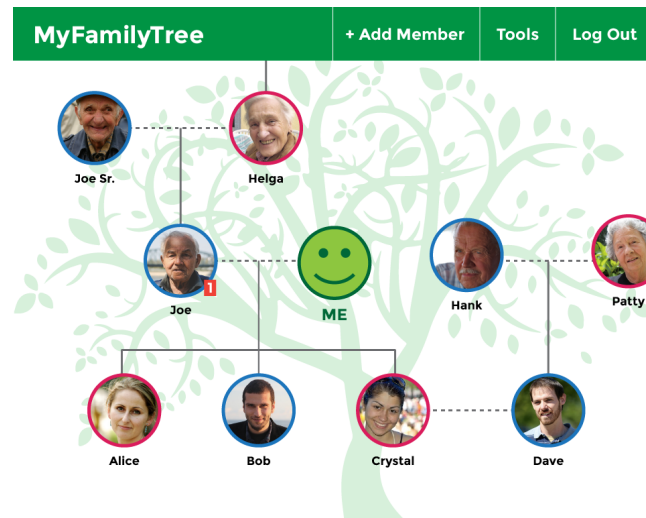


Figure 4: Examples of revised screens from the high-quality prototype after conducting evaluation sessions. The home screen has an added tree graphic and revised branch structure, and the add member form has only the most necessary form fields.

Design Prototype

Because social communication was such a popular activity among our interview participants, the focus of the design shifted from a general system to facilitate online activities to a system specifically meant for communication with family. We created a prototype of a web app that uses the metaphor of a genealogical family tree to allow users to create a visual contact book of their family members. Users can perform common social activities without leaving the app, thus staying within a single interface, never seeing ads, and keeping in complete control of their privacy settings.

We first created a paper prototype, performed heuristic evaluations using Nielsen's heuristics (Nielsen, 1995) to identify flaws, then created a prototype with high-quality visuals using the InVision web application (<http://invisionapp.com>). Problems such as consistency, error recovery, and visibility were addressed before testing the prototype with users.

Evaluation Sessions

We then tested the prototype with five older adults who represented typical users of the system. Some of these individuals were re-contacted from the first round of interviews, while others were new participants. Evaluations took place in contexts of use similar to the previous interviews. Users performed tasks with the prototype such as adding a family member and sending a message, then reported their impressions of the app and whether they would actually use it.

Again, as expected for such a broad demographic, reactions were quite varied. Some users said they would never use the app, while others stated they would recommend it to friends. The app's major failing was its inability to clearly convey the family tree metaphor. Participants also expressed confusion about notification symbols, and about the privacy settings that governed the visibility of their personal information and that of their family members. The group codified

these findings into critical incidents, UX problem instances, and UX problem groups (Hartson and Pyla, 2012), then modified the prototype to reflect users' principal concerns and areas of confusion.

Final Design

Our final design incorporates changes that address users' confusion with the tree concept, understanding of privacy settings, and understanding the nature of information they are entering. We added a tutorial when the user first enters the app, explanations of privacy settings on the "Add Member" form and the privacy settings menu, and removed several confusing form fields from the "Add Member" form. Given more time, we would complete an additional evaluation session to determine if these changes are effective or if further refinements are needed.

While our design began with the goal of addressing problems specific to older adults, its ultimate form is quite flexible and could theoretically be used by individuals of any demographic who wish to keep in contact with their families. We learned in the design process that there is no single set of problems, needs, or concerns common to older adults, and that this is a diverse population whose needs vary depending on their lifestyle and personal circumstances. Thus, ultimately, the design of MyFamilyTree attempts to address a need that is a human universal: the need for communication and connectedness.

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