

# Improving User Experience and Engagement for Older Adults: A Case Study

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**Abstract.** Our work focuses on user engagement and the impact of UI design on older users' level of engagement when using web-based applications. For the purpose of this research we are using [Chumbuggy.com](#), an online service which allows people over 50 to engage in small group discussions about topics that are important and interesting to them. Due to the nature of the service provided by Chumbuggy and its target audience, we needed to design its UI to meet the high level of usability required to maximize the engagement of older adults. To this end, we created an iterative and incremental process of designing and testing Chumbuggy's UI components. This paper presents our design and testing process, our findings, and a set of guidelines for increasing the online engagement of older adults through effective UI design.

**Keywords:** Aging and social media · Aging and technology acceptance · Elderly-specific web design

## 1 Introduction

The adoption of older adults' technology has increased in recent years, [1] but current websites have not been designed with the needs of older adults in mind; resulting in the challenges that older adults are facing. Recent studies show that older adults are facing challenges when using new technologies, and in particular, online services which often stem from how they are presented to older adults [2]. As a result, in recent years a field of research has emerged within the HCI community to explore HCI and aging [3].

This paper will focus on technically proficient adults ages 50 to 70, and the impact of UI design and user engagement when using web-based applications. [Chumbuggy.com](#) will be used for this study, as its services allow users 50 and over to take part in small group discussions and to meet new people. Due to the site's nature, the UI needed to be designed so as to maximize older adults' engagement and to address the

challenges that they are facing when using new technology. And so, an iterative and incremental process was created to test Chumbuggy’s UI components.

It will also present our design and testing process, our findings, and a set of compiled guidelines from both research literature and user feedback; targeted for increasing the online engagement of technically proficient older adults ages 50 to 70 through effective UI design.

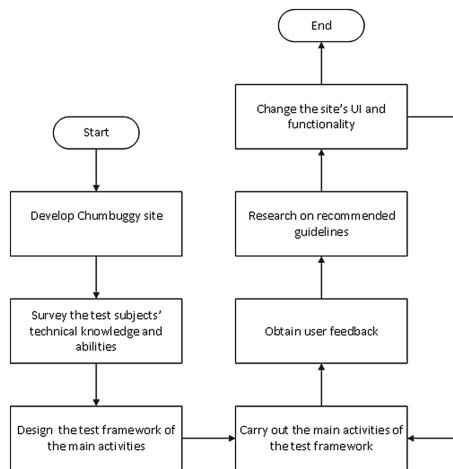
## 2 Aging Challenges and the Web

We start by examining literature covering multiple impairments that effect older adults as they age. Such impairments can affect their ability to see [4–7] and adapt to rapidly changing visual stimuli [8, 9], to hear the correct tone, intensity and pitch [10], to remember and process information correctly [9, 11] and to move with stability, strength and flexibility [12, 13].

Ultimately when it comes to using computers, older adults have different needs and concerns due to the physical and cognitive changes associated with aging, which become evident around 45 years of age [14]. To meet the needs of older users experiencing these common conditions, all of these changes need to be reflected in computers. As such, these challenges along with the compiled guidelines were included throughout the iterative design process; to ensure that the website factored the changes associated with aging.

## 3 Methodology

In order to determine what UI designs would be most effective and engaging to technologically literate users’ ages 50 to 70; two user tests were designed which will be presented below (Fig. 1).



**Fig. 1.** Process to determine user interface and design effects on users 50 to 70 years old

### 3.1 Outline

The process began with the development of [Chumbuggy.com](http://Chumbuggy.com) via paper prototyping; with significant consideration for colour contrast, white space, simplistic design, and minimum required font size. During development we also obtained the help of The Sheridan Centre for Elder Research to provide their expertise on the design and implementation of the test framework.

A survey via Survey Monkey was used to collect and measure the test subjects' technical knowledge and abilities as well potential psychological and socio-economic factors.

After obtaining test users, designing the test framework in which the users would carry out the main activities came next. Once user feedback from the first test was obtained, further research on usability and engagement was done; and changes were then made within the site and were once again tested a second time by a different set of users in an iterative and incremental process.

### 3.2 Test Users

In order to accurately obtain the correct sample type representing the desired demographic the survey included their age, sex, location, highest level of education and tech savviness. The survey results were then categorized by age and sorted to determine if they met our desired profile of testers that consisted of being comfortable in using technology and desired meeting new people.

A minimum of 6 users were used to test the 2 versions of the website. The first was a formal testing, while the second was an informal testing workshop where users would be observed while testing the website and verbally asked about their feedback. In the first version there were 6 users with a median age of 70 and an average of 68.3 who were all women and in the second version there were a varying number of users who were a mix between men and women.

### 3.3 Testing Framework

[Chumbuggy.com](http://Chumbuggy.com)'s end to end experience consists of four main activities and thus, there were four components to the test. First, users would create a profile by providing their name, age, address, email address, password, hobbies and interest (Fig. 2).

Second, users would create a discussion based on a pre-defined topic by writing a short description of the elements of the topic they wanted to discuss, the date, time and number of users they wanted in the discussion (Fig. 3).

Third, users would take part in the audio/video or chat-only discussion and in the fourth step, they would test payment for membership by using test credit card

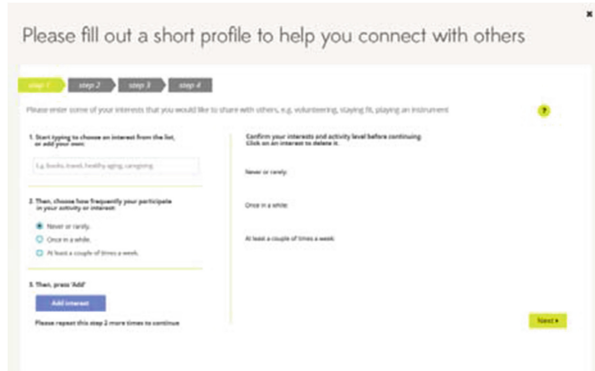


Fig. 2. Screen shot of the step 1 of user profile process



Fig. 3. Screen shot of the discussion topic creation

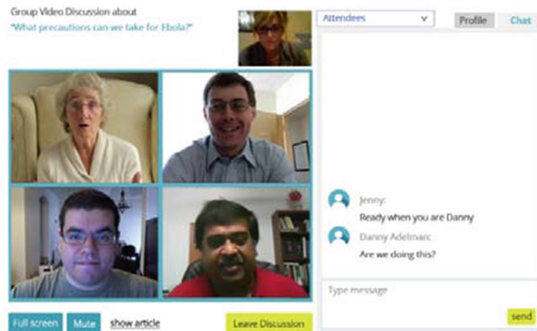


Fig. 4. Screen shot of users participating in a group discussion

information (Fig. 4). During each activity, specific feedback would be obtained from the users and after completing all the activities additional feedback would be obtained from a focus-group style discussion.

### **3.4 Testing Process**

Prior to the start of the first test, users were informed of what they could expect to see throughout the test. After receiving this explanation, users could decide if they still wanted to continue with the test. Each individual was then seated in front of a test computer, and provided with a set of written tasks to complete and space to document their experience on performing each task. After completing all the tasks, they were then invited to a focus-group style discussion to provide additional qualitative feedback.

Prior to the start of the second test, users were given a brief introduction to the website and were invited to test the site without strict parameters; to emulate a true user experience. While testing the site their feedback was recorded. Users were also provided with verbal guidance if they had any questions.

## **4 Findings**

Users' feedback in both tests was primarily on UI design, starting with and in descending order of focus: navigation, content and organization, readability, and accessibility. It was also learned that web pages that more closely followed usability guidelines resulted in a more positive user experience. It is interesting to note that users were very selective in terms of the type of words or media used and the tone that it conveyed, and as such there were multiple revisions of diction and sentence structure. Users also expressed a desire in having the ability to change font size and to have a printer friendly version of the site and group discussions in order to think about and revisit at a later time.

## **5 Guidelines**

Included below is a subset of a compiled list of guidelines obtained from research literature and user feedback from testing, for application developers aimed at increasing engagement for technically proficient users 50 to 70 [8, 15–24] (Table 1).

**Table 1.** Compiled guidelines for increasing engagement for older adults 50 to 70

	Guidelines	Used?	Effect on 50 to 70 year olds		Guidelines	Used?	Effect on 50 to 70 year olds
Navigation	Breadcrumbs and site map			Content and Organization	Form labels and hint outside of form field	✓	Minimize form input submission
	Flat navigational layout	✓	Minimize motor difficulty with mouse navigation		Form fields do not auto correct for names, home and email addresses	✓	Minimize typing errors and form submission
	Consistent navigation	✓	Minimize navigation confusion		Active and positive tone used	✓	Higher engagement
Content and Organization	Enough spacing for form input and area	✓	Higher visibility and minimize input selection errors	Readability	Printer friendly version		
	Visual and/or audio notice for correct user data submission	✓			Information focused on center	✓	Better readability
	Avoid deeply nested info , cascading and pull down menu /input	✓	Increase user access and minimize motor difficulty with mouse navigation		Customer focus language	✓	Higher engagement
	Group similar information together	✓	Better understanding	Able to change font size and contrast		Better readability	
	Avoid moving text and unnecessary info	✓	Better understanding	Accessibility	Shortest steps possible to complete actions	✓	Minimize mental workload
	Simple displays	✓	Minimize mental workload		Confirmation prompts		
	Visible search functionality				Event based reminders with unique tones	✓	Minimize mental workload
	Search accepts spelling errors and provide suggestions				Simple instructions that are context based	✓	Minimize mental workload
	Online help available	✓	Higher engagement		Plenty of time to read information	✓	Minimize mental workload and better readability
	Graphic is simple and meaningful	✓	Minimize mental workload		Develop with a focus on recognition rather than recall	✓	Minimize mental workload
	Information on graphic available on text				High contrast between foreground and background	✓	Minimize mental workload and better readability
	Audio follows linguistic structure and pauses	✓	Minimize mental workload and higher engagement				

## 6 Conclusion

In conclusion, this paper aims to serve as a starting point to compile a subset of multiple guidelines for desktop sites on what UI designs provide higher engagement for technically proficient adults ages 50 to 70.

Based on the findings, it was learned that overall a higher compliance to usability guidelines for older adults lead to a more positive user experience, and that certain UIs have more impact on technically proficient users than others. And so, it would be interesting in the future to observe technically proficient older adults' interactions with the site when other guidelines that they did not focus on or were not initially used, are included or removed. Would user engagement decrease, increase or stay neutral?

As for the limitations of the study, it was learned that a limited number of sample size and test cases were present which may skew the study validity.

Overall, further investigation into using advanced equipment, such as eye tracking or muscle tracking technologies, could provide more insight into usability and engagement. Moreover, as [Chumbuggy.com](http://Chumbuggy.com)'s client base grows, more information could be gathered to verify if the findings would also apply to other technologies, such as tablets, TV, and wearable technologies. As the population of older adult increases, so increases the need for investigation into the older adult-specific HCI and the multiplicity of possible future research streams which spring from this area of study.

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