

# A Usability Study on Elder Adults Utilizing Social Networking Sites

Jessica Arfaa and Yuanqiong (Kathy) Wang

Towson University, Dept. of Computer & Information Sciences, Towson, MD 21252  
jessicaarfaa@yahoo.com, ywangtu@gmail.com

**Abstract.** There are a growing number of elder adults using computers and the internet, however their social media presence still remains low compared to younger counterparts. What are the reasons hindering them from utilizing social media? What challenges do elder adults face when using these types of sites? Are they able to successfully utilize the site as intended? Does computer experience play a role in the usability of these sites? Can improvements be made to current social media sites to improve usability and accessibility for elders? This paper reports the preliminary findings to the questions above based on a usability study involving twenty-two elders with none to advanced computer experience. Results from this study show that previous experience with computers and the design of the sites affect the usability and accessibility for the elderly. Social networking sites are difficult for elders to use because of computer illiteracy, lack of knowledge of Web 2.0 concepts, and format, navigation, and layout issues. Future suggestions include redesigning social networking sites by abiding by known website guidelines and other suggestions found in this study.

**Keywords:** Social Media, Social Networking, Elder Adults, Usability Study.

## 1 Introduction

Social networking sites such as Facebook [6], Google+ [9], and LinkedIn [13] are popular applications for their collaborative and interactive nature. Users are able to communicate with connections and share ideas on a platform with no time or location boundaries [11]. These characteristics are very beneficial to the elderly, as declining health, limited mobility, and other age-related issues tend to cause isolation from family, friends, and other important relationships.

Despite the benefits of social media, many elders do not engage in these types of sites because of misperceptions, computer illiteracy, and website interface issues. [7, 16, 20, 21]. Although more than half of elders are online –a rise from past years, only about one third of elder’s participate in social media [18, 19]. In an effort to help elders maintain and build relationships using social media, an investigation into the barriers needs to be investigated.

The following study reports the preliminary findings of a usability study aimed towards identifying social media issues experienced by elders. This study attempts to address the following research questions:

- What are the accessibility and usability problems experienced by the elderly when utilizing social networking sites?
- Is computer experience a factor in the successfulness of these sites?
- How should a social networking site interface be designed to improve accessibility and usability for elder adults?

After the literature review on the existing elder website design and social media usage studies, the research design of a usability study is discussed in detail. Afterwards, the findings from the usability study are revealed. To conclude our findings, future research direction is discussed at the end.

## **2 Literature Review**

### **2.1 Elder Adult Website Design**

Despite having a growing number of elders utilizing computers and the internet, studies show many elders do not have the same website experiences compared to younger demographics [4]. Impairments such as vision, hand dexterity, and cognitive abilities, as well as computer illiteracy and perceptions are major issues plagued by elders that utilize website interfaces filled with small text, problematic colors, multiple inputs, numerous windows, endless scrolling, and congested screens [7, 14, 15, 23]. Therefore, website design should take into consideration deficiencies experienced by older users.

Unfortunately, although many usability and accessibility guidelines discuss the ways to accommodate the above deficiencies, such as those found in Section 508 Compliance, Web Content Accessibility Guidelines (WCAG), The National Institute of Aging (NIA), and NC State University Construction Guidelines (NCSU), they are not being applied when designing websites. One example is a usability study by Nahm et al. [15], which evaluated health websites for elderly usability and accessibility. The study concluded that an improved design based on NIA guidelines provided a better experience for the elderly. In addition, the study recommended the use of concise terminology, consistent formatting, increased text size and white space, and reduced scrolling to improve experience. Similarly, Patsoule & Koutsabasis' [17] study involving a redesign of a tourist website site utilizing best-practices, such as the Seven Principles of Universal Design [3], WCAG 2.0 [22], and other guidelines. The results of the case study concluded that a site's content should be concise, colors should be appealing and non-distracting; language and vernacular should be appropriate; and the overall design should be intuitive and aesthetically pleasing.

## 2.2 Elder Adults and Social Media Usage

Although there are studies based on elder adult internet usage, there is little focusing on Web 2.0 technologies. A majority of the research on elder adults and social media involve perceptions versus evaluations based on standards or usability studies. Most of these studies conclude that elder adults do have the capacity to use social media; however, more education needs to be provided for elders to participate.

For example, a study by Braun [1] conducted research to understand what factors hinder elders from using social media by using a survey based on perception. Using the technology acceptance model, the study focused on the perceived usefulness and use of social media, social norms and pressures, as well as trust. The results showed that as perceived usefulness and trust increased, so did the intention to use social media.

Similarly, a study by Lehtinen et al. [12] showed that elders perceive the internet in a negative light, finding it unpleasant for socializing and full of superficial relationships. In addition to these perceptions, the researchers found that limited computer skills were a major factor in their negative outlook of social media, including lack of confidence in computer skills, fear of breaking something, and negative perceptions regarding relationships. Suggestions to these issues included updating and automating privacy and reevaluating the longevity between social media applications through different times of a person's life.

In addition, a usability study by Gibson et al. [8] included interviews and focus groups to identify deficiencies needed to support the elderly's social media usage. Similar to other studies, the elders were asked their opinion on social networking sites. The elders expressed fear of false relationships, bad behavior, and privacy concerns.

## 3 Methodology

To investigate the issues associated with the social networking design for the elderly as well as the impact of computer experience toward the perceived usability of the design, elder adults were invited to participate in a usability study to interact with a social networking site simulation.

### 3.1 Study Procedure

Prior to each usability session, each participant was presented a consent form. Depending on the participant's vision, the consent form was either reviewed or read aloud by the researcher. After signing the consent form, a pre-test questionnaire was filled out to collect participant's background information. The researcher read each question in the pre-test questionnaire to the participant and recorded their answers on the question sheet. The participants were then asked to complete a series of tasks on a simulated social networking site. During each study session, the researcher recorded whether the task was completed successfully and the time spent on each task using a stop watch. The interaction was also captured using Camtasia [2]. Once the tasks were

completed, a post-test questionnaire was filled out to collect their perception and feedback in terms of their experience during the study session. Each session lasted about an hour.

### **3.2 Participants**

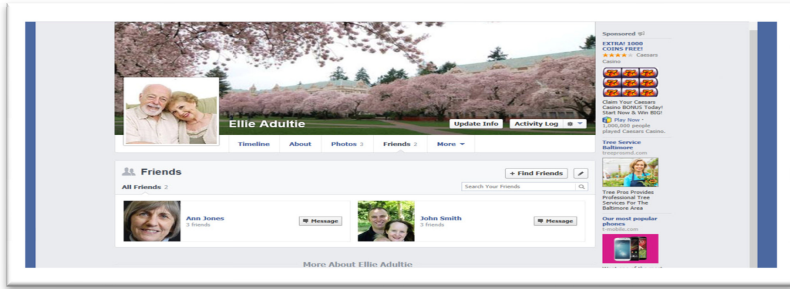
Elders aged 65 and older were recruited from personal connections as well as visits to local libraries and senior activity centers to participate in this study. As an appreciation for their participation, each participant was compensated 10 dollars per session. Twenty-two seniors volunteered to participate in this study. There were no specific requirements in terms of gender, education status, or social media experience. Based on their answers to the pre-task questionnaire, the participants were put into two groups based on their computer experience: none-to-basic and intermediate-to-advanced computer users. There were 11 participants in each group. Those that had never touched a computer, or had only engaged in basic activities such as light word-processing or searching the internet using a search engine were put into the none-to-basic experience group. The elders in the intermediate-to-advanced group felt comfortable with computers and had experience with heavy word-processing, paying bills online, programming, database usage, graphics editing, or web development.

### **3.3 Data Collection**

Background information of the participant, including demographics, work experience, computer experience, and social media experience was collected in the pre-test questionnaire. Following the pre-test questionnaire, participants were asked to interact with a simulation of a social networking site, completing a list of activities measured by successful completion of the tasks (pass or fail) and the amount of time (in seconds) to complete a task. Task performance data was timed by a stopwatch and validated by video screen recordings [2]. In addition, observations during the activities were noted. Afterwards, a post-test questionnaire based on the participant's experience with the social networking site simulation was completed. The 12 post-test questions consisted of one multiple-choice question referencing the difficulties experienced with the simulation and seven questions using a Likert scale to measure the participant's reaction to the site. The remaining questions were open-ended pertaining to positive and negative features of the site as well as future improvement suggestions.

### **3.4 Test Environment**

To ensure the confidentiality of the participants, a mock-up simulating the behavior of a social networking site was created using the prototyping tool InVision [7]. Facebook, one of the most popular networking sites, was used as the basis for the simulated site. The participant played the role of a fictional profile owner, Ellie Adultie, with two friends named Ann Jones and John Smith (Fig. 1).



**Fig. 1.** Screen capture of Ellie Adultie’s friend’s list (Image credit: Microsoft Office 2010 Clipart)

A timed-script of tasks featuring activities found on social networking sites (see section 3.5), such as logging into an account, viewing newsfeeds, profile pages, and photos was completed. Timed by a stopwatch, the participants had a maximum of 3 minutes to successfully complete each task; with the timer starting after the task was read by the researcher. The participant was given the opportunity to click once on the correct link before the hotspot was revealed. Once the participant clicked on the correct area, the time and success status was recorded. Alternatively, when the participant clicked on an incorrect area, only the fail status was recorded. After each failed attempt, the researcher showed the participant how to complete the task successfully before moving onto the next task.

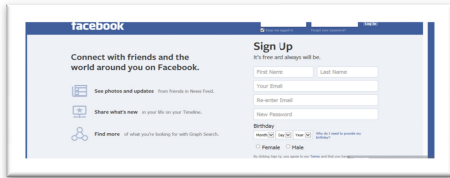
### 3.5 Tasks

For the usability study, social media activities were identified and then grouped into six groups of tasks:

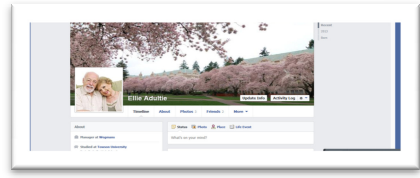
- Task 1: Logging into your account
- Task 2: Understanding the homepage
- Task 3: Understanding your profile
- Task 4: Navigating through the site
- Task 5: Understanding information on a profile
- Task 6: Commenting on profiles

Each task group was further defined by several subtasks. A total of 37 subtasks were performed reflecting the layout, terminology, and intuitive of the site. A highlight of the tasks included:

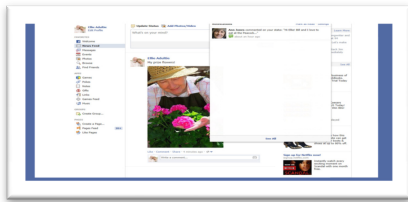
- Click where you would enter your username (Fig. 2)
- Click on the timeline area of your profile (Fig. 3)
- Click on the latest post in your newsfeed (Fig. 4)
- Click on an advertisement on the homepage (Fig. 4)
- Click the appropriate link to view Ellie’s notifications on the homepage (Fig. 4)
- Read out loud where John went to high school
- Demonstrate how you would tag John Smith in his family photo (Fig. 5)



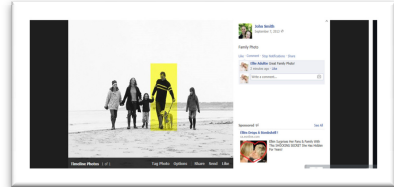
**Fig. 2.** Screen capture of login page



**Fig. 3.** Screen capture of Ellie Adulie's profile page (Image credit: Microsoft Office 2010 Clipart)



**Fig. 4.** Screen capture of newsfeed, advertisements, and notifications on homepage (Image credit: Microsoft Office 2010 Clipart)



**Fig. 5.** Screen capture of tagging an image (Image credit: Microsoft Office 2010 Clipart)

The outcome of the questionnaires and tasks are discussed next.

## 4 Results

### 4.1 Participant Demographics

Twenty-two elders, ranging from age 65 to 89 (with an average age of 73) participated in this usability study. There were 10 males and 12 females with education levels ranging from a General Education Development (GED) degree to a doctoral degree. For those with higher education, majors included Business, Education, and Medicine.

All participants had at least 2 to 10 years of work experience, with a copious amount working 41-50 years (27%) and more than 61 years (4%). The majority of surveyed elders were retired and not working (64%). However, a few elders remained employed in their primary career (13%) or were retired and working part-time (13%). More than two-thirds of the elders (73%) had used a computer at some point in their career.

### 4.2 Computer and Social Media Experience

22% of participants who had none-to-basic computer experience reported that not knowing how to use a computer hindered them from learning about them further. The majority of these less experienced elders (63%) also admitted that they required assistance when using a computer in comparison to the more advanced group (9%).

When the none-to-basic computer users were asked about their social media experience, 36% stated they had no experience and 45% said they had little exposure, such as watching someone use a social networking site or personally using it less than 5 times. 18% said they were a basic user and able to view photos, read walls, visit profiles, or comment on posts. None of the participants in this group aligned themselves as an intermediate to advanced social media user. In comparison, more than half (54%) of the advanced group described themselves as intermediate and advanced social media users. Despite the larger amount of social media exposure, the more advanced group had less social media site profiles (36%) than the less experienced group (64%), stating they did not see a benefit of its usage. For those participants with a profile, the majority preferred Facebook to LinkedIn, Twitter, and Google+.

### 4.3 Task Performances

The following table shows the results of both computer experience groups: none-to-basic and advanced-to-intermediate. Each group's average time to complete a task as well as the number of correct clicks (success rates) is presented below (Table 1):

**Table 1.** Results of task performance based on previous computer experience

Task	Average Time for Completion in seconds (standard deviation)		Success Rate	
	Group 1*	Group 2**	Group 1	Group 2
<b>Task 1:</b> Logging into your account	5 (4.3)	4 (6.8)	67%	91%
<b>Task 2:</b> Understanding the homepage	8 (11.0)	2 (1.6)	58%	81%
<b>Task 3:</b> Understanding your profile	8 (10.9)	4 (5.4)	61%	81%
<b>Task 4:</b> Navigating	14 (11.0)	9 (8.5)	50%	66%
<b>Task 5:</b> Understanding information on a profile	8 (8.9)	3 (3.7)	82%	90%
<b>Task 6:</b> Commenting on other profiles	11 (12.9)	7 (11.4)	42%	51%

\*Group 1: none-to-basic computer experience participant group

\*\*Group 2: intermediate-to-advanced computer experience participant group

Table 2 below shows the tasks that presented the most problem for the participants. None of the less experienced participants were able to complete the task which requires them to identify the location for posting comments to a photo. For several of the sub-tasks (e.g. identify link for viewing notifications, tagging a photo), only one participant was able to successfully complete the task. Therefore, there was no standard deviation for that specific sub-task.

**Table 2.** Results of problematic sub-tasks based on previous computer experience

Sub-Task	Average Time for Completion in seconds (standard deviation)		Success Rate (percentage)	
	Group 1*	Group 2**	Group 1	Group 2
Click the appropriate link to go to your profile page	37 (N/A)	13 (16.8)	9%	27%
Click the appropriate link to view notifications	30 (N/A)	9 (8.3)	9%	27%
Click where you would leave a comment on John Smith's family photo	N/A(N/A)	8 (10.6)	0%	18%
Demonstrate how you would tag John Smith in his family picture	33 (N/A)	17 (N/A)	9%	9%
Click where you would leave a new post on Ann Jones' wall.	10 (4.1)	15 (20.2)	36%	54%

#### 4.4 Post- Questionnaire

After completing the tasks, participants were asked follow-up questions regarding their experience with the simulated social media site. Overall, 36% of the less experienced participants felt that the simulated social media site was not easy to use while more than one-third (35%) of experienced participants had a neutral opinion of the site, stating they needed more familiarity. Problems experienced by all the participants included text that was too small (36%), lack of contrasting text and background colors (50%), and difficulties understanding the layout and navigation (68%).

When asked their opinion about the simulation's tasks, both the less experienced (55%) and more experienced participants (63%) felt that logging into the social networking site and understanding information on a profile was neutral to very easy. However, more than half of participants in both groups found that tasks associated with understanding the homepage, such as identifying posts as well as navigating through the site, were difficult to complete because of the difficulties in identifying the correct button or area for the action. The majority of participants (63%) also agreed that commenting on profiles, such as writing a new post or commenting on pictures was difficult to very difficult. Despite their inexperience, the majority of participants with less computer experience felt more comfortable with the tasks compared to the more experienced users (see Table 3).



**Table 3.** Experience of elders per group. Figure shows total number and percentages. VD = Very Difficult; D = Difficult; N = Neutral, E = Easy; VE = Very Easy

	Group	Logging into your account		Understanding the homepage		Understanding profile		Navigating		Commenting on other profiles	
VD	1	2	18%	1	9%	1	9%	1	9%	1	(9%)
	2	0	0%	1	9%	1	9%	1	9%	0	0%
D	1	3	27%	5	45%	2	18%	5	45%	6	54%
	2	2	18%	6	54%	0	0%	6	54%	6	54%
N	1	1	9%	3	27%	1	9%	2	18%	2	18%
	2	5	45%	2	18%	1	9%	2	18%	1	9%
E	1	5	45%	2	18%	6	54%	3	27%	2	18%
	2	3	27%	2	18%	6	54%	2	18%	3	27%
VE	1	0	0%	0	0%	1	9%	0	0%	0	0%
	2	1	9%	0	0%	3	27%	0	0%	1	9%

Participants were also asked what could be done to improve social networking site usage. In addition to alleviating the issues mentioned above, the participants suggested highlighting important words, incorporating an appendix or other feature defining Web 2.0 terminology, removing extraneous options such as groups, pages, and tagging, and using consistent layout, navigation, and terminology. In addition, the majority of the participants discussed the need for training of the site prior to usage.

## 5 Discussion

A majority of the participants enjoyed this study because they are interested in learning about computers and increasing their social media usage so that they can view photos, connect with family and friends, and communicate through email, instant message, and posts. It was surprising that less experienced computer users had more social networking site profiles, however many of them mentioned that a family member set-up the account for them in order to view pictures of grandchildren. On the other hand, those with more computer experience felt there was no benefit to using these types of sites, stating they did not want social media to be their primary communication with friends and family. Alternatively, those without a profile mentioned they would utilize a spouse’s or family member’s account when they did want to engage in social media. We were also surprised that the majority of participants with less computer experience felt more comfortable with the tasks compared to the more experienced users. Many of the less experienced users mentioned that they were eager to learn about computers and social media, however did not have someone to teach them. Many used this usability study as a learning opportunity, paying attention after a task was completed to learn about social media features and the correct ways to complete a task.

Although many of the elders showed interest in using social networking sites, many experienced usability and accessibility issues such as small text, non-contrasting colors, confusing navigation and layout, and lack of understanding of Web 2.0 terminology. More than half of the participants stated they would increase their usage of social media if the interface was improved.

Due to the limited number of participants in this study, no statistical analysis was done. However, it does show that computer experience may play a role regarding the overall successfulness and timeliness of completing the tasks; as those with computer experience surpassed task completion and timeliness in all tasks compared to those with none-to-basic computer experience. However, participants with more computer experience still encountered issues with layout and navigation, as well as issues with Web 2.0 terminology, failing many tasks that included keywords such as “homepage”, “notifications”, “posts”, “poster”, “comment”, and “tagging”. Many suggested having some sort of available appendix or defining mechanism to address the new terminology.

Many of the elder adults suggested formatting, layout, navigation, and terminology improvements, such as larger text and appropriately highlight content using a dark font color and light contrasting background color. Others favored images and buttons as clickable areas versus text and underlined phrases, however many complained that icons without labels, such as the globe icon for “Notifications” was not intuitive.

Regarding layout, the elders preferred clustered information with fewer options. In addition, they recommended more labeling and layout consistency. For example, many were confused when more than one feature, such as “Find Friends” was available on the top and left side navigation. In addition, a large amount of the elders had scrolling issues. Many did not prefer/want to scroll to reveal more information and many became resigned when experiencing dexterity issues with the mouse.

Finally, a majority of the elders stated that more training, practice, and increased familiarity of the site would improve their social media skills and likeliness to utilize these types of sites.

## **6 Conclusion and Future Work**

This study has demonstrated that the elderly experience a number of usability and accessibility issues when using social media. Many elders have the desire to use a computer and the majority of those surveyed are interested in maintaining a relationship with friends, families, and other important entities through viewing photos or communicating through social networking. Based on this study, there is opportunity to redesign social media site interfaces to improve usability and accessibility for the elderly. Redesign considerations should include the suggestions noted by the elderlies, such as larger font, reduced features, intuitive layout and navigation, and training.

This paper presented only some preliminary data collected from a usability study. Due to the limited number of participants, no statistical analysis was done. More in-depth analysis of the data collected will need to be conducted. In addition, the results from this study can be utilized as a baseline for the elderly using social networking sites.

The suggestions and findings from this study along with accessibility design guidelines will be used to develop a more user-friendly interface for elders. In addition, with elders adopting more and more mobile devices, additional studies regarding elderly accessibility and usability of social media applications on mobile devices should be explored.

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