Usable Computers for the Elderly: Applying Coaching Experiences

Laurie Kantner
Tec-Ed, Inc.
laurie@teced.com

Stephanie Rosenbaum
Tec-Ed, Inc.
stephanie@teced.com

Abstract

Computer technology promises great potential to improve the quality of life and foster independence of the elderly. However, this population has special problems learning how to use computers and the Internet. Research studies have been conducted with older users to identify better ways to design user interfaces for the elderly and the best ways to train older users. To augment this research, the authors have begun collecting and analyzing the observations of people who informally coach the elderly. This paper reports the results of our preliminary research.

1. Introduction

At a recent annual meeting, an Intel executive answered an audience question of "How do people learn to use those products?" with, "My grandson showed me." His answer was amusing but also accurate; many children and younger friends of elderly computer novices informally coach seniors in computer use.

By the year 2020, census estimates predict that senior citizens (age 65 and older) will comprise about 20% of the U.S. population [1]. Seniors are increasingly going online [2]. Average "healthy life expectancy" for persons 60 years old in the United States is about 15 more years [3]. We can expect seniors to have the time and energy to become competent computer and Internet users, but are computers and the Internet easy for seniors to learn?

Research studies have been conducted with older users to identify better ways to design user interfaces for the elderly [4, 5, 6]. Also, the training profession has a tradition of conscientiously measuring how well students achieve training objectives. However, the observations of those who informally coach the elderly in computer use have not been collected or analyzed in a structured way.

The authors believe that the experience gained by people who coach elderly computer users can be applied to improving the usability of computer systems, the Internet, and their documentation and training components. Coaches comprise a large community of unique observers—people who know both what kinds of problems elderly learners encounter and what explanations work to build their competence.

Tec-Ed recently conducted a research study in which we interviewed a small sample of individuals who coach the elderly on computer and Internet use. This paper reports the results of the study, intended as the initial work in a longer-term research effort.

The preliminary findings raise issues and concerns that, when addressed, will benefit the elderly population of novice computer and Internet users. As our next step toward defining guidelines for user interfaces, documentation, and training to support the goals and tasks of elderly users of computers and the Internet, we plan to research a broader population of both coaches and their trainees through additional interviews and contextual observation.

2. Methodology

Tec-Ed usability specialists interviewed seven people who coach one or more elderly people (age 65 or older) on using computers and the Internet. We recruited participants by placing an advertisement in the local newspaper (Ann Arbor, Michigan, USA). Respondents were asked to reply by email, to limit participation to people with email access. We then emailed respondents a brief survey that asked questions about their coaching role, the ages of the people they trained, the top two problems they have observed in computer and in Internet use, and their training strategy. We also asked if they would be willing to participate in an interview. All seven respondents agreed to be interviewed.

Here is a summary of the participant (coach) characteristics and the characteristics of the people they coach.

2.1. Characteristics of participants (coaches)

Primarily volunteer. Six participants volunteer their coaching services; the seventh is a paid activity coordinator at a senior citizen center.

Half coach their family and friends, and half coach at centers. Four participants coach a parent or the friends of parents, and four participants coach at senior citizen centers. One person overlaps both groups; he started by coaching a parent and the parent's friends, then began volunteering at a senior citizen center. One center coach teaches a class; the remaining center coaches mentor drop-in visitors at the center's computer room.

Aged 44 to 79. The four participants who coach family/friends are in their 40s and 50s, three participants who coach at senior citizen centers are in their 60s and 70s, and the person doing both is in his late 50s.

Long-term computer users. Six coaches have used computers for 20+ years; the seventh coach has used computers for 14 years. All but one rated their knowledge, experience, and confidence in using computers at the middle to high end of a 5-point scale. The exception is the paid activity coordinator, who rated her computer experience at the lower end of the scale.

Experienced Internet users. Six coaches have used the Internet for 6+ years; the seventh coach has used the Internet for 3.5 years. Four rated their Internet knowledge, experience, and confidence at the middle of the scale, and the remaining three rated their Internet knowledge, experience, and confidence at the higher end of the scale.

Untrained trainers. Six coaches are not formally trained in training or in working with the elderly. The seventh (the paid activity coordinator) is a trained gerontologist.

Coaching for 5 months to 6 years. Five coaches reported that they had been in the coaching role for 4 to 6 years. The paid activity coordinator began her job 5 months ago. The center coach who teaches a class has been mentoring peers on computers and the Internet for 15 years.

Intrinsically motivated to assist seniors. Through their stories, coaches communicated that they were motivated by seniors' goals, by a desire to volunteer their time usefully, and by their sense of having knowledge to offer. We expected to find a largely volunteer base of these coaches and were not disappointed. Most coaches were busy people who had limited time for providing their assistance and would benefit from seniors' becoming more independent users of computers and the Internet.

2.2. Characteristics of senior citizens coached

Many older than 75. Most senior citizens who were being coached by family members or friends were over 75 years old. Most seniors being coached at senior citizen centers were older than 70.

Senior citizens were mostly college educated. This study took place in Ann Arbor, Michigan, a university community. Many of the seniors with whom coaches worked were college educated.

Seniors generally had no prior computer experience. In all but two cases, seniors were learning how to use computers and the Internet at the same time. In those two cases, the seniors had gained limited computer experience while employed and, in retirement, had purchased a home computer.

Email and children were primary reasons seniors started using a computer. In many cases, seniors bought their computer because they wanted to communicate with their peers and children and saw email as a faster, cost-effective way to do so—they were "missing something" without it. In many cases, children purchased a computer for the parent because "it's time to learn" or they wanted email contact with the parent.

Seniors without home computers used computers in the senior center for email, games, and socializing. Coaches working in senior centers provide two types of assistance: helping seniors learn how to use a computer, and helping them complete tasks on the computer. Many seniors without home computers use the senior center computers as a "cyber café" to keep up with email, print documents, play online games, and look for information.

2.3. Interview protocol

Tec-Ed conducted a total of seven one-hour interviews at the participant's preferred location. Five interviews took place at Tec-Ed's offices, one took place in a participant's home (our oldest participant, 79 years old), and one interview took place at a participant's office (our youngest participant, a University of Michigan professor who coaches his father by phone—this interview was the only one that took place in the context where the participant does his coaching).

The interview began with ice-breaking and context-setting questions about the participant's coaching role and computer/Internet experience and the reasons that the senior(s) they coached began using the computer and Internet. Next, we probed on the top two computer problems and top two Internet problems that the participant had described in the survey. In this probing, we elicited stories about what led to the problems and how the participant helped the person overcome the problems. People who do one-on-one coaching with seniors told us

personal stories, while people who coach groups of seniors tended to aggregate their stories.

Next, we presented the participant with a list of 18 problems and asked them to rate the problem severity. The list consisted of problems that had been reported by respondents in the initial survey. This technique enabled us to learn of additional problems that participants rated as severe, as well as how they ranked their own problems in the context of the more comprehensive list. For all problems that the participant rated as severe and had not discussed earlier in the interview, we then probed further to learn coaching strategies the participant used.

In addition, during the problem discussion or at the end of the interview, we asked participants to describe the personal qualities that helped the seniors make progress with the computer and the Internet, what would make computers and the Internet easier for seniors to walk up and use, and what adjustments the coaches had made to participant's computers or browsers to accommodate lower dexterity and vision.

3. Coaching strategies and learner qualities

In this initial research, we collected information about the strategies employed by coaches and the qualities of seniors that made them better learners. This information provided context for understanding the scope of the problems seniors experience in using computers and the Internet.

3.1. Strategies employed by coaches

In the survey responses, coaches described their strategies for helping seniors overcome the problems they experience using computers and the Internet. Among the coaches at senior citizen centers, strategies consisted of working slowly one-on-one (two different coaches); demonstration first before asking the senior to take over; and having seniors work "completely hands on" (from the coach who teaches a computer class).

From the coaches who work with family and friends, strategies included listening and asking seniors questions to learn their goals, walking through processes over the phone, and making sure seniors take notes.

3.2. Personal qualities that help seniors learn computers and the Internet, reported by coaches

When asked what the elderly brought to the learning task that helped them succeed, coaches identified these characteristics: college education (know how to learn), active and knowledge seeking, typing experience (so that the keyboard is not a hindrance), inquisitive, upbeat,

liking to read, liking to interact with people, and desire to communicate. Our coach who tended to do tasks for seniors identified the quality of "willingness to suffer."

4. How coaches rated computer/Internet problems experienced by the elderly

In response to the survey question, "What kinds of things about computers and the Internet cause repeated difficulty for the person(s) you've trained? Please provide two typical examples each for computer and the Internet," respondents supplied a total of 18 problems, 9 for computer and 9 for Internet. We then compiled the list and presented it to participants during their interview. Participants assigned a severity rating of High, Medium, or Low, defined as the degree to which the problem had caused an elderly person to fail or become frustrated, in the coach's experience.

Table 1 lists the top problems that four or more coaches identified in their survey responses or rated High during their interview.

Table 1. Problems identified by 4 or more coaches.

Problem	Total	Who
Dexterity	5	2 VF, 1 VCF, 2 VC
Fear of making a mistake	5	2 VF, 2 VC, 1 PC
Working with files/folders	4	3 VF, 1 VC
Specifying searches	4	2 VF, 1 VC, 1 PC
Too much information	4	1 VF, 1 VCF, 1 VC, 1 PC
Using different computers and operating systems	4	1 VF, 1 VCF, 1 VC, 1 PC
Vision	4	1 VF, 1 VCF, 1 VC, 1 PC
Working with attachments	4	1 VF, 1 VC, 1 PC
Downloading	4	3 VF
Typing	4	1 VF, 1 VCF, 2 VC

V=volunteer, P=paid, F=family/friend, C=center

Table 2 lists the top problems that three or fewer participants identified in the survey or rated High during their interview.

Participants demonstrated consistency in subsequently rating High during the interview the problems they identified in the survey. The final four problems in Table 2 were not on the rating sheet provided in the interview, but participants either added them to the rating sheet or emphasized them during the interview. In follow-on research, we will use an expanded problem list that reflects the additional problems people described.

Table 2. Problems identified by 3 or fewer coaches.

Problem	Total	Who
What is the Internet	3	1 VF, 1 VCF, 1 PC
Computer freezing up	3	1 VF, 1 VC, 1 PC
Internet freezing up	3	1 VF, 1 VC, 1 PC
Formatting documents	2	2 VF
Filling in forms	1	VC
Signing on to email	1	PC
Adding foreign language capability	1	VF
Vocabulary	1	VF
Interpreting searches	1	VF
Lack of printed documentation	1	VF

5. Problem highlights: coach-reported experiences and strategies

Problems with dexterity and vision receive much deserved attention in the literature on usability of computers for the elderly. In our coaching study, these problems received high emphasis as well. Dexterity and vision problems were cited more often by participants who coach at senior centers than participants who coach family members and friends. When dexterity or vision is not an issue of high severity for an individual, other problems rise to the surface for that individual and his/her coach.

The following sections describe the specific problems identified by coaches, in order of highest to lowest reporting by coaches. Each problem description includes strategies the coaches discussed for overcoming or mitigating the problems.

5.1. Dexterity

Problems described included not anchoring the mouse or holding it straight, as well as not anchoring the mouse during double-clicking. Tremor or lack of fine muscle control caused problems with dragging menus open and then selecting from a secondary list.

Center coaches use the following strategies:
- Demonstrate actions first
- Send trainee to public library's "mousing class"
- Work one-on-one
- Teach them Alt keystrokes, use of Enter instead of double-clicking, use of up and down arrows instead of scrolling, use of two hands to hold the mouse (works for some, not all)

Family/friend coaches use the following strategies:
- Try out mouse at computer store to find one that is comfortable
- Make sure computer desk is at right height
- Keep trainee in the driver's seat (don't take over)

5.2. Fear of making a mistake

Trainees feared "making a mistake" such as doing something the wrong way and losing data or breaking something. Solutions from group coaches included:
- Assess the person's capability at the beginning of training; if low, offer a tour before asking trainee to try something.
- Offer reassurance that everyone makes mistakes.
- Have the person work in Word and type and erase text, to experience the ease of fixing mistakes.
- Work with individuals privately (in case the fear is of looking bad to peers).

Solution from a family/friend coach included:
- Let them know that what they want to accomplish is a reasonable thing to want to do.

5.3. Working with files and folders

Three coaches (one center coach and two family/friend coaches) said they teach the analogy of the hard disk as a 4-drawer filing cabinet, with folders and additional folders inside folders. Two of the three coaches have observed progress with this analogy. The third coach said his father has difficulty recognizing the analogy in the visual representation of the hard drive on the user interface.

In contrast to helping seniors understand and learn about the filing system, a fourth coach has changed program settings to store files on the desktops of the two computers at his senior citizen center. People who drop in and create files can easily find them on the desktop.

5.4. Specifying searches

The coach teaching the class helps seniors understand search strategies, including interpreting results and adding keywords to narrow the results. He has observed progress in his students.

Two additional coaches described work-in-pair activities where seniors formulate searches together or the coach and trainee formulate searches together. For some seniors, formulating searches is a social activity.

5.5. Too much information

Coaches described a few examples of this problem: two different mail icons to choose between, confusion about what is and what is not an ad on web pages, prevalence of popup ads, the clutter of portal pages such as Excite and AOL, and the overabundance of functions within Word.

Strategies employed by coaches to mitigate the "too much information" problem are: asking seniors to take notes of what they are learning, switching the start page from a cluttered portal page to Google, training seniors how to recognize ads, and training seniors to click the "x" to close windows.

5.6. Using different computers or operating systems

A repeated problem that the study team observed with many coaches is how computer or operating system differences impede the training process. Nearly all coaches explained that seniors who take notes and write down the steps for a task succeed better because they have something to follow. However, when seniors encounter slight differences in the steps to follow from one machine to another, they often cannot solve the problem on their own.

Many senior centers supply computers that are "hand me downs" from donations or retired stock. In addition, the coaches are not IT-trained, nor can the center afford to hire an IT person to reprogram machines to operate more similarly. The coach must explain carefully the slight differences in steps to follow between the individual computers.

The problem is more severe when seniors learn on one kind of computer in the center, then return to their own computer in their residence and need to apply what they learned. In some cases, coaches visit the seniors in their residence to sort out the differences.

In the family/friend coaching situation, the problem of machine differences occurs when the coach has one kind of computer or operating system and the person being coached has a different kind of computer or operating system. Some amount of family/friend coaching occurs over the phone or by email. Coaches often receive a request or call for help, work out a solution to the request on their own computer, and then communicate the solution to the trainee. If what the coach communicates for a choice or step is different from what the trainee experiences, many elderly people cannot go further without additional help.

An extension of this problem, described as "more than one way of doing something" by one coach (the paid activity coordinator), is using different browsers. The coach described the case of an 88-year-old who drops in to her computer center to use a Hotmail account for which the coach has given her the steps to use. When the senior accessed her account from a different browser, the process did not work the way the coach had showed her.

Another extension of this problem is when web pages that seniors have learned how to use are updated by their providers. One coach described problems that arose when the Hotmail email page changed, and when a local public library changed its home page.

Difficulty in modifying steps for different computers and software is also a barrier to seniors upgrading to new equipment and software. It is reasonable to assume that most young seniors will need to upgrade their equipment and software more than once during their remaining lifetimes. Thus the problem of different computers and software will only get worse, not better.

The only solution coaches described for mitigating this category of problem was to help the person modify their written procedure to match the machine.

5.7. Vision

Coaches were generally at a loss about how to assist seniors with vision problems. The paid activity coordinator said she sets the Word document to a bigger font for the seniors, but she did not know how to adjust the browser text size (the study team showed her after the session).

Another center coach had several solutions he implements, based on his adjusting machines for himself: set the monitors to 800x600 pixels, install glare filters on the monitors, create easier targets for people, such as favorites that he renames to be "user friendly," and adjust room lighting to suit the individual. He tried changing the contrast settings through the computer Accessibility control panel but was displeased with the results.

The center coach who teaches a class simply said, "I tell them to get computer glasses so they don't get a crick in their necks."

5.8. Working with attachments and downloading

This problem is closely related to the problem of working with folders and files. One center coach works very closely with seniors to help them locate attachments that arrive in email, as these are often important legal documents such as wills. One family/friend coach said he has resent email when his parent could not find an attachment he sent. Another family/friend coach said she advises her mother to copy herself when emailing attachments so that she can make sure it arrived with its attachment intact.

Coaches reported that the seniors they coached do not download programs or files. One coach rated the downloading problem High, referring to downloading email attachments.

5.9. Typing

Coaches commented consistently that typing skills were necessary to succeed in learning how to use a computer and the Internet. A center coach said that for senior citizens who learned how to type earlier in life, his strategy was to assure them that the skills would return. In his coaching, he makes analogies to the typewriter but explains the differences. Otherwise, he said, there's "not a lot I can do." Another said that three-finger typing was workable, as long as seniors knew where the keys were.

In cases where typing skills are weak or nonexistent, the center coach who teaches a class tells students to "go away and learn how to type" on a program such as the Mavis Beacon program. Another center coach said he advises seniors to write out emails ahead of time and make them short, to simplify the keyboarding process. (He also offers to type emails.)

One family/friend coach said she tried voice recognition software for her mother, but it did not reliably detect her mother's voice.

5.10. What is the Internet?

As one coach said, seniors just want results and that is what he is helping them achieve. Helping them understand the Internet is not crucial to achieving those results.

As communicators who employ minimalist approaches, the authors support this idea. However, the problem was rated High on two coaches' lists, and there are scenarios in which a lack of understanding of the Internet impedes the learning process.

Confusion about the Internet is often confusion about the Internet versus the browser software versus the Internet Service Provider (and perhaps other layers as well, such as the network layers that produce error messages at one of the senior centers we learned about). Seniors have no mental model from which they can articulate goals or describe problems they are having. This situation adds unnecessary mystery to the new capabilities seniors are gaining through Internet access.

One coach, who started by coaching his mother and her friends and is now at a senior center, said he explains the Internet two ways. First, he explains that the Internet is like a "bunch of libraries hooked up electronically." This analogy remains abstract until he explains the flip side: how a person creates and posts a web page to the Internet. He uses a concrete example: a neighborhood bridge group's web page. He finds that this explanation begins to communicate the idea of the Internet to seniors.

One coach admitted she was unsure herself of the difference between a browser and the ISP. If not only seniors but also their coaches have this uncertainty, how will they know which organization's technical support number to call and how to describe the problem they are having?

5.11. Computer freezing up, Internet freezing up

Coaches universally have taught the "reboot" solution to the "freezing up" problem of the computer or the Internet. Seniors have adopted this solution, but their concern (and fear) is in facing what they have lost when the machine resumes operation. In senior centers with older machines, the freezing up problem occurs more frequently. One center coach said that when seniors face this situation on their own at the center computers, they often just put a note on the machine and walk away.

5.12. Formatting documents

The coaches who identified solutions to this problem are working in person with seniors. In contrast, the participant who is coaching his father by phone said that if his father wanted to format a document, "it would be a big problem because he's never tried it." The coach is not motivated to try teaching his father something so complex from afar.

One center coach said the biggest problem with word processing use in general is seniors' understanding of the difference between the blinking insertion point and the cursor arrow. They do not understand about clicking to set their typing location.

A family/friend coach said a problem she encountered with her mother was partial menus in Word 2000, where the program shows only the most frequently used menu commands. The effect is that the menus show different choices each time they are open, and a desired choice might not appear until the user thinks to click on a down arrow at the bottom of the menu. The coach reset her mother's Word preferences to show whole menus.

5.13. Filling in Web forms

Only one coach tries teaching seniors how to fill in forms correctly—the coach who teaches a class. He uses an exercise where seniors set up a Yahoo account, because Yahoo's form is complex, requesting unfamiliar information such as clues for password recovery. He uses the exercise to teach accuracy, especially the exactness of the password. He trains them to re-read what they type before pressing Enter. He also teaches them that they

have to click on *some* button, and how to look for the correct button.

Two other coaches said they fill in forms for the seniors, without trying to train them. Otherwise, one said, "it would have taken hours." She is the paid activity coordinator and does computer coaching for only one hour per week. These results indicate a discrepancy between the skills seniors need to perform a useful and necessary task in the Internet world—filling in forms— and the time and experience that coaches need to impart those skills. Many people coaching the elderly would benefit from the exercise used by the center coach who teaches a class.

5.14. Signing on to email

The paid activity coordinator has observed one of her senior citizens having difficulty getting email due to forgetting a necessary step, such as opening the inbox. The senior's daughter wrote instructions for her which have helped her avoid the problem.

5.15. Adding foreign language capability

A family/friend coach received a request from his father by phone to help him add the Hebrew font to his computer so he could read Hebrew newspapers on the Web. The son needed to acquire the font, send it to his father, and walk him through installing it. (They both own Macintoshes, although of different vintages.) Part of this sequence is the attachment problem reported earlier.

After the son resent the font file as an attachment and walked the father through placing it in the correct folder, he was unable to guide his father through installing the font. The father, who lives across the country, uses a local computer store for serious problems he encounters, such as when he deleted his System folder. The son thinks the father will call on that store to help him with the font.

5.16. Window management

A coach helping her mother learn how to use a Windows-based computer and the Internet has observed her mother focusing on only one window at a time and losing her place if the wrong window comes to the front. The mother does not look at the Windows task bar, and even closes all but the window she's currently using on the desktop. This situation causes her problems if, for example, she has her email inbox open and then chooses to read an email, which opens in a second window. If the mother closes her inbox, she loses her context. The daughter has not found a successful way to coach her mother to keep multiple windows open.

5.17. Vocabulary

The coach who is advising his father by phone on using a Macintosh described how his father has not chosen to learn common computer vocabulary. Whenever the son uses words such as "desktop," "keyboard," "search," "Ctrl-key" sequences, "window," "drop-down," "highlight," or "select the text," his 76-year-old father asks what he means.

The son recounted some of these conversations, and it was apparent that the son has modified his own vocabulary to communicate with his father, describing in very visual and literal terms the actions and cues he wants his father to recognize.

5.18. Interpreting searches

The same coach has had limited success helping his father do searches, perhaps because they are communicating by telephone. His observation from afar is that the father does not know how to visually sort through the results. The coach said he will work more with his father on this when he visits next. This statement reinforces the technique mentioned under the "specifying searches" problem of having seniors work with partners on formulating searches.

6. Coaches' successes, continuing challenges, and suggestions

Each coach provided one or two stories describing seniors' successes in learning about the computer and Internet. In addition, coaches described ongoing barriers to seniors' success. When asked, coaches offered suggestions for ways to improve the usability of computers and the Internet for seniors.

6.1. Biggest Successes Coaches Observed

Coaches were asked two different ways to describe the successes they have observed with the people they coach. By asking coaches where they had observed success, we learned that seniors are:
- Using the computer
- Succeeding at email on their own
- Working with attachments
- Playing games
- Understanding how the hard drive is organized (visualization)
- Using the Internet to do research such as homework for classes
- Opening a Word document, making changes, and saving it on their own

By asking coaches where they had observed seniors having an "ah hah" experience with computers, we learned these experiences occur when seniors:

- Realize what they can do, especially finding information useful to their lives (such as maps). With respect to searching, one coach said, "Like hitting the pot of gold—once they learn how, I can't get them off the machine."
- Find something of true interest that they didn't know they could access: art collections, genealogy, shopping (some are buying online), games.
- Learn tips and tricks for working productively, such as composing eBay descriptions in a Works document for easy editing, then copying the final text into the Web form for eBay sellers. (One senior was typing his descriptions into the website and then losing his work when he tried uploading photos that were too large, freezing up his Internet connection.)

6.2. Continuing Problems Coaches Observed

When asked what problems elderly users continue to have despite regular coaching, coaches observed:

- Seniors not keeping track of actions that led to problems (Mom saying, "I need help, but I can't remember all the things I clicked to get here.").
- Disinclination to keep backups of work.
- Inability to grasp word processing techniques: tabs, margins, placing the cursor.
- Inability to remember the steps of a task unless it is written down and the software or website doesn't change. As one coach put it, "Success doesn't last." Several coaches stressed that they saw more success if seniors wrote down the steps they were learning, but this solution is successful only as long as things stay the same—which, in the Internet world, is not long.

6.3. What would make computers easier for seniors to use?

Coaches suggested the following ideas for improving the usability of computers for the elderly:

- Large print onscreen (suggested by two coaches).
- Screen simplified—for email, word processing (suggested by two coaches).
- Have a checkbox to indicate the level of user; then, for the low level, remove all of the "Are you sure?" messages, and put an "Exit" button on every page.

- Design a question-and-answer type of interface to help seniors articulate their goal. In describing her coaching strategy, this coach stressed that "the specific questions seniors ask will not really solve the bigger task they're trying to do." Her idea is an interface that does the kind of "asking back" that she does during coaching.
- Make the hard-disk icon look like a file cabinet.
- Design flat panel monitors to display more crisply at larger resolutions.

6.4. What would make the Internet easier for seniors to use?

Coaches suggested the following ideas for improving the usability of the Internet for the elderly:

- Display information that helps seniors know what they can look up, such as a large-print list of sites.
- Simpler pages, just a few buttons.
- Make Back and Forward clearer. If a second browser window opens; have Back go back to the previous window.
- In search results, present related topics, similar to how e-commerce sites display related items.
- Have fewer pop-ups.

7. A Note about use of accessibility settings

When we asked coaches what adjustments they have made to computers and browsers to accommodate any motor control or vision problems among the seniors they work with, four said they have not made any adjustments. Three of the four said they had not thought of it, and the fourth said he did not have the access authority at the senior center where he volunteers to make machine adjustments of that sort.

Among the three participants who have made some accessibility adjustments, all three have adjusted the speed of mouse movement and the timing of the double-click. In addition, one of these coaches has set the wallpaper to dark blue and has adjusted the monitor controls so that the displayed image uses the entire monitor area. He has tried Accessibility adjustments in the control panel for contrast but did not like the results. He has not explored browser accessibility adjustments.

Another of these coaches has set her mother's display resolution to 800 x 600 pixels. She said she did not make other accessibility adjustments because the hot keys would need labeling to be useful for her mother.

8. Issues and concerns about computer and Internet usability for seniors

In this preliminary research, we uncovered problems seniors have with computer and Internet usability as reported by people coaching seniors on computer and Internet use. Some of these problems are already emphasized in published research and some are not. In particular, problems that seniors have in their own residences tend to be different from the problems that are the focus of published research.

For almost every senior citizen who is learning how to use a computer and the Internet for the first time in their advancing years, there is a person coaching that senior. From that person, the senior is learning not only how to achieve their goals but also what is available through computer and Internet technology that they've been missing.

Some common problems emerged in this study for seniors learning about computers and the Internet. One problem is reliance on exact instructions rather than learning concepts and applying them to new or changing situations. Some of this reliance may be fear of making a mistake, but some of it may also be impaired working memory as people age.

Seniors' reliance on exact instructions is incompatible with the all-too-common situation of different machines, different operating systems, different software versions, and frequent updating of web pages. Senior citizen centers do not have the latest hardware or software. Seniors have different computers at home from what they use at a public location. Seniors and their children use different equipment.

Even within any single software program or web page, high graphical content places high cognitive load on seniors by requiring them to recall symbol meanings rather than recognize textual choices for performing their tasks. Screen clutter, lack of text labels, and cryptic menu names and menu items create unnecessary visual barriers to comprehension.

Improvements to user interfaces to reduce cognitive loading will make computers easier to use for seniors— and for the rest of us as well. Improvements identified from our initial research include:

- Reduction of screen clutter so that targets are easier to identify.
- More similarity between the visual representation of the hard disk and the analogy of a file drawer and folders.
- Menu names that represent the choices they provide.
- Meaningful text choices for commands, and reduction of symbols and icons, to reduce cognitive load as well as clutter.
- Design for lower-bandwidth connections and backward compatibility with older versions [7].
- Simple, printable step-by-step instructions for common email, browser, and file management tasks that seniors or their coaches can use as job aids. Provide versions for different computers, operating systems, and browsers. Conduct usability testing with these job aids to ensure that seniors and coaches can work with them easily.
- A small guide to computer vocabulary.
- A "Strategies for Computer/Internet Coaching for Seniors" guide, with advice from a wide variety of coaches.

Two coaches in our study mentioned a failed ISP venture, Beautiful Island.com, that provided a very simple interface to basic Internet functions. We learned that its email interface was easy to use. However, once users clicked on the Web choice, they entered the complexity of the regular Web world.

Organizations are creating published guidelines for designing web pages for seniors, such as the guidelines published by the National Library of Medicine [8]. If existing sites begin offering alternative web pages for people who need less complexity (and some are starting to), they will increase the usability of the Internet not only for seniors but for many other user populations.

9. Conclusion

People who coach senior family members or friends on how to use computers and the Internet have to live with the results of their work. Coaches and seniors have an ongoing relationship that may include living under the same roof. Classes do not end after an arbitrary number of weeks, so the coach is invested in the senior successfully gaining knowledge.

People who coach senior citizens in geriatric centers or assisted living residences might or might not be personally invested in each person's success, depending on whether they also live in the residence themselves or are members of the senior center. On the other hand, these people see many more seniors and can test and refine strategies more frequently.

Any successful strategies reported by people coaching seniors on how to use computers and the Internet can benefit a greater population of seniors and provide tools for more people to coach their senior-citizen family members, friends, and community members.

Most of the seniors being coached in this study were college educated. In our continuing research, we plan to talk with people coaching seniors outside a university community, to learn of additional issues or concerns.

In addition to conducting additional interviews, the research team also plans to conduct contextual observation of coaches working with seniors, to ground the research in the environments and conversations that are the settings for this important coaching work.

[1] U.S. Census Bureau: Projections of the Total Resident Population by 5-Year Age Groups and Sex with Special Age Categories: Middle Series, 2016 to 2020 and 2025 to 2045. Source: Population Projections Program, Population Division, U.S. Census Bureau, Washington, D.C. 20233. Internet Release Date: January 13, 2000.

[2] AARP: "Breaking the Stereotypes of Older Adults Online." Online, available at http://www.aarp.org/tools/olderwiserwired/Articles/a2003-02-20-oww-barriers.html

[3] World Health Organization: "Healthy Life Expectancy: The World Health Report 2001". Online, available at http://www3.who.int/whosis/hale/hale.cfm

[4] Charness, N. and Dijkstra, K., (1999) "Age, luminance, and print legibility in homes, offices, and public places," Human Factors, 41(2), 173-193.

[5] Czaja, S.J., (1997) "Computer Technology and Older Adults," In M.E. Helander, T.K. Landauer and P. Prabhu (Eds.), Handbook of Human-Computer Interaction (2nd Edition), New York: Elsevier, 797-812.

[6] Ellis, R.D. and Kurniawan, S.H., (2000) "Increasing the usability of online information for older users: A case study in participatory design," International Journal of Human-Computer Interaction, 12(2), 263-276.

[7] Brown, H., (2000) "Accessibility and Usability of Information Technology by the Elderly" in *UU Guide, Practical Design Guidelines for Universal Usability* (www.otal.umd.edu/uuguide/), Computer Science Department, University of Maryland, College Park.

[8] National Library of Medicine: "Making Your Web Site Senior Friendly." Online, available at http://www.nlm.nih.gov/pubs/staffpubs/od/ocpl/agingchecklist.html

Laurie Kantner is a senior usability specialist and documentation project manager for Tec-Ed, Inc. Laurie is an active member of the Usability Professionals' Association and a senior member of the Society for Technical Communication. She is the primary author of an IPCC 2002 paper on "Structured Heuristic Evaluation of Online Documentation."

Stephanie Rosenbaum is founder and president of Tec-Ed, Inc. Stephanie is a senior member of the IEEE and served for many years on the Administrative Committee of IEEE PCS, which awarded her an IEEE Millennium Medal in 2000. She is also an Exemplar and Fellow of the Society for Technical Communication. Stephanie Her many publications include a chapter on "Making Usability Research Usable" in *Software Design and Usability*.