

Warren-Peace, P., Parrish, E., Peace, C.B., & Xu, J. (2008). Senior surfing: Computer use, aging, and formal training. *AACE Journal*, 16(3), 253-274.

Senior Surfing: Computer Use, Aging, and Formal Training

PAULA WARREN-PEACE, ELAINE PARRISH, C. BRIAN PEACE,
AND JIANZHONG XU

Mississippi State University
Mississippi State, MS USA
prwl5@msstate.edu
esp@ebicom.net
bpeace@saffairs.msstate.edu
jx18@colled.msstate.edu

In this article, we describe data from two case studies of seniors (one younger senior and one older senior) in learning to use computers. The study combined interviews, observations, and documents to take a close look at their experiences with computers, as well as the influences of aging and computer training on their experiences. The study revealed that seniors benefited from their use of computers, ranging from the magic of email and the World Wide Web to the personal fulfillment of lifelong learning, independence, and enrichment. It further suggests that the kind of structured guidance formal computer classes provide to seniors matters more than aging or if seniors have higher formal education.

Two notable changes are occurring in our society today. One change is demographic in nature—the older population in the United States is increasing dramatically (Hilt & Lipschultz, 2004; Namazi & McClintic, 2003; Purdie & Boulton-Lewis, 2003). For example, a United Nations report recently noted that 16% of the U.S. population is 60 years of age or older and predicts that this will rise to 27% by 2050 (Chamie, 2003).

Another change is technological in nature—there is an increased reliance on computers for individuals of all ages (Namazi & McClintic, 2003; Saunders, 2004), ranging from communicating with friends and family members to searching computerized library databases and accessing online information. Given these two changes, there is a concern that one growing societal group—seniors—may lag behind in the area of computer literacy; this is particularly true as more individuals are being introduced to computers at a young age.

How can we be more responsive to a whole generation of people who have never been exposed to computers before? One important way to address this issue is to better understand the experiences of older adults in learning to use computers.

Several studies have recently examined seniors' experiences with computer use in different settings, including long-term care facilities (Namazi & McClintic, 2003), senior centers (Saunders, 2004), and their homes (Hilt & Lipschultz, 2004). However, the senior cohort in these studies was often treated as what Namazi and McClintic called “a homogeneous group” (p. 544). In addition, no data were available from this line of research about whether the use of computers may be informed by the way seniors were introduced to computers (i.e., formal versus informal learning). Consequently, there is a need to learn more from younger and older seniors about what learning to use computers means to them in their own life contexts.

RELATED LITERATURE

The present study was informed by two lines of related literature: (a) literature that taps into possible benefits of computer use for seniors, and (b) literature that alludes to the role of computer training in seniors' learning to use computers.

Computer Benefits for Seniors

With technological progression changing the ways people receive necessary services within our society, acquiring computer literacy is rapidly becoming a necessity. For example, interaction with bank tellers is being replaced by

ATM transactions. In an effort to promote ATM use, some banks charge additional fees to customers who use human tellers (Mead, Batsakes, Fisk, & Mykityshyn, 1999). Computerized systems for paying for gasoline and groceries using credit and debit cards are popular. Traditional card catalog systems for book searching in libraries have been replaced by computerized search engines and databases. These are only a few instances that suggest that computer technology is becoming ubiquitous in daily lives and tasks. Today, people (including older adults) are not likely able to avoid computer technology altogether.

While computer literacy may soon be a necessity for conducting routine tasks in both home and work environments, computer use also has the potential to enrich older adults' lives in ways beyond ordinary necessity. Often older adults are not able to get out as frequently, their social contacts are more limited, and family members including children and grandchildren may live far away (Rovner, 2001). Because of this, the computer as a communication tool (particularly the Internet and email) may have a greater impact on the independence of older adults than on any other age group. Some frequent uses reported by older adults include composing letters, genealogical searches, searching government-related web sites (e.g., Social Security Administration; Hilt & Lipschultz, 2004) and exploring the Internet for information concerning health and health services, games, news, housing, hobbies, travel, shopping, and weather (Bitterman & Shalev, 2004; Hilt & Lipschultz; Namazi & McClintic, 2003; Saunders, 2004).

Potential benefits offered by computer literacy extend to the realm of psychosocial health. Nursing home residents have reported improvements in self-esteem and feelings of life satisfaction upon the addition of personal computers to their environment (Sherer, 1996). Another study provided Internet access to a group of older adults over a five-month period (White et al., 2002). Internet users who received small group training tended to experience less loneliness, less depression, and more positive attitudes towards computers than individuals who were not regular Internet users. Some of the noted benefits in self-esteem and loneliness may stem from greater sense of independence and decreased isolation afforded by computers.

The Role of Computer Training for Older Adults

Whereas the first line of literature suggests that seniors may benefit from the use of computers to enhance the quality of their daily lives, the second line

of literature alludes to the important role of computer training for seniors. Mead and colleagues (1999) found that older adults were less likely than younger adults to complete Internet search tasks that required three or more moves (e.g., following hypertext links and scrolling down a page). Older adults were more likely to select an incorrect series of menu options than later go back and select the same incorrect series of options. The errors that older adults made were determined to be caused by age-related decline in episodic memory. On the other hand, relevant information about target buttons and directing learners' attention to target buttons were found to be effective in training older adults with episodic memory difficulties. The study suggests that age-related memory decline does not have to restrict older adults to poor or absent performance; training and interface design can combat memory problems.

Additional research by Mead, Sit, Rogers, Jamieson, and Rousseau (2000) suggested the importance of recognizing the impact of previous computer experience on older adult performance. Older and younger adults executed a series of library system search tasks. Younger novice users with higher degrees of computer experience performed *slightly* better on the tasks than younger users with low computer experience. However, older adult novice users with some previous computer experience performed much better than older adults with little computer experience. Experience level appears to make a big difference in how quickly older adults' performance will respond to training. Although overall success rates tend to be lower for older adults when compared to younger, the findings suggest that older people are likely to benefit greatly with some computer experience.

Computer training and experiences may play a particularly important role for older adults. However, much of what we know about learning to use computers derives from studies that compare older adults' performance levels to those of younger adults (Mead et al., 1999; Mead et al., 2000; Morrell, Park, Mayhorn, & Kelley, 2000; Stine-Morrow, Loveless, & Soederberg, 1996). Little attention has been paid to the differences *within* the older adult population that impact learning to use computers (Mayhorn, Stronge, McLaughlin, & Rogers, 2004; Purdie & Boulton-Lewis, 2003).

To address this gap in previous studies, we describe data from two case studies of seniors (one younger senior and one older senior) in learning to use the computer. The study combines interviews, observations, and documents to examine the seniors' computer use and the possible influences of aging and computer training on their use. This line of indepth research is

important for at least two reasons: (a) there is a wider range of age differences within the senior group (e.g., from lower 50s to upper 80s) than any other age group and (b) compared with younger seniors (i.e., 50-64), older seniors (i.e., 75 and over) are much less likely to use computers (American Association of Retired Persons [AARP], 2005). Consequently, there is a critical need to better understand how to facilitate seniors—particularly older seniors—in learning to use computers.

METHOD

Case study methodology (Stake, 2000; Yin, 1994) was employed to better understand what learning to use computers means to seniors. The two seniors selected for this study were Caucasian females with diverse backgrounds that include age, educational level, and computer training. Selecting participants who vary on several characteristics is often useful in case study designs; it helps researchers compare and contrast relevant findings from limited numbers of participants (Firestone, 1993; Stake, 2000).

For the purposes of this study, the participants are referred to as “Lois” and “Barbara.” Lois is a widow and was 83 years old at the time of initial data collection. She has a high school education and has taken formal computer classes for seniors. Barbara (59 years old during data collection) is married and has a bachelor’s degree in elementary education. Unlike Lois, Barbara has not received any formal computer training. Most of Barbara’s computer knowledge has been acquired through informal means.

Computer Training and Work Experience

Lois. Lois managed a low-rent housing project for a company where she worked for 50 years, and she never used a computer in her work. In 1998 at the age of 77, she began taking computer classes designed especially for senior citizens that were offered through the Continuing Education office of a small southeastern university. After completing the initial formal computer training program, Lois purchased a computer and continued to enroll in a variety of computer courses through June of 2002. The courses included Intro to Computers, Microsoft Word, Creativity with Word, PowerPoint,

Excel, Access, Internet, Web Page Design, and Genealogy. The courses were free to senior citizens, and a senior could take the same course as many times as desired. Each workshop course included five class meetings, lasting three hours each and spaced over a two-and-one half week period. The lesson plans were loosely designed to allow the seniors to progress at their own pace. The emphasis was on learning in a relaxed, no pressure atmosphere as opposed to covering a predetermined amount of material. She completed all of the workshops offered and has maintained the computer skills she gained through classroom training. Lois owned a computer for six years at the time of the first interview in this study.

Barbara. Barbara has limited experience in using most common and current computer operating systems and applications (e.g., word processing, email, and internet applications). Barbara used a limited access (terminal) computer with Windows but without standard PC applications and Internet. While working toward completing the requirements of her bachelor's degree (from 1993 to 1994), she gained some experience with IBM PCs outfitted with 5 ¼" floppy drives. However, she received no formal training in computers during her college education. After graduating, Barbara worked for several years as a part-time elementary school teacher; she did not operate a computer during this time. She last worked as a hotel reservations clerk, which required some basic computer use. She received some on-the-job training for a specific hotel reservation program that was used at her employer's office. She used the program for entering customer data, as well as accessing and saving reservation information. The only training she described as relevant in helping her use the home computer was self-teaching and instruction by family/friends. For example, she has learned about the kinds of information available on the Internet through trial-and-error searches; she has also gained some computer knowledge by watching her husband and other family members browse the Web. Both Barbara and her husband are computer users of about the same experience. Barbara purchased a computer three months prior to the first interview in this study.

Data Collection

Data for this study was collected from the following sources: (a) open-ended interviews, (b) observations of routine computer activities at home, and (c) collections of relevant artifacts.

Interviews. Each participant was interviewed four times at home. The initial interview was conducted in February, 2004. After the initial interview, three follow-up interviews were conducted one month, three months, and two years later.

Open-ended interviews were conducted to understand the meanings of learning to use computers for the participants and their experiences with computers over time. Examples of questions are: "What kinds of things do you do with your computer? What would you like to be able to do more effectively with your computer? How do you feel about training classes designed especially for Senior Citizens?" The initial interviews lasted approximately 60 to 90 minutes.

Three follow-up interviews (i.e., one month, three months, and two years later) were used to tap into the progress of the participants' learning and computer use over time, informed by their responses to initial interview questions as well as by relevant observations and documents. These follow-up interviews lasted approximately 40 to 50 minutes.

Observations. We conducted two observations of each participant using her personal computer. Each session lasted about one hour and was conducted in the participant's home. During the session, the participant was asked to simply "do what you usually do" at the computer on any given day. In both observations, field notes were taken using a pen and notepad and then typewritten immediately after the session ended. We felt that the use of a notepad would be less intrusive and intimidating than the use of video camera equipment or a laptop. The observations were conducted twice at each participant's home in February and March, 2004.

In both of the initial observation sessions, we maintained primarily an observer role. However, we were *participant* observers in the second observation. Rationale for the participant observer role transition was based on the need to observe the effect of computer training provided by the observer. In the second observation session, each participant performed various skills using her computer. The performance allowed the researcher to observe differences in the effects of computer training methods—*formal* (computer classes) or *informal* (self-teaching or instruction by family/friend).

Documents. Documents and artifacts were collected, including web sites frequently visited, search results relating to travel destinations, email

samples, and greeting card design. These documents complemented relevant data from interview and observation relating to their experiences of learning to use computers. What we learned from these documents was also used to inform ongoing data collection (e.g., what questions to ask during the follow-up interviews).

Data Analysis

Data analysis was conducted simultaneously with data collection, in which analytical files (Glesne, 1999) were built after a home visit or during the audiotape transcription. These analytical files facilitated the next stage of data analysis—the use of matrix displays (Miles & Huberman, 1994).

The matrix displays were then used to serve two functions. First, they were used to help the development of two major themes that commonly appeared in multiple data sources: (a) computer experiences for seniors and (b) formal versus informal learning. In addition, the displays were used to help triangulation of these two themes from different data sources to enhance credibility and safeguard against researcher bias (Patton, 2002; Yin, 1994). *Triangulation* refers to multiple methods in qualitative inquiry (Glesne, 1999). In our study, triangulation involved the collection of three kinds of data: interview, observation, and document data. Multiple data types were triangulated with each other to increase confidence in the themes.

In addition to triangulation, we conducted follow-up interviews for an extended period of time (two years) to better capture and understand the participants' worldviews over time. Finally, peer debriefing was used to minimize potential bias (Erickson, 1986; Vaughan, 1992). For example, we used analytical files and reflection papers to help us examine our subjectivities and potential biases in each step of the research process, both individually and collectively.

FINDINGS

Computer Experiences for Seniors

We found many similarities between our participants relating to their computer experiences, both technological and nontechnological. They

ranged from the magic of email and the World Wide Web to the personal fulfillment of lifelong learning, independence, and enrichment.

Technological aspects. Both participants reported using email. Lois stated, "Email is what I do most. I have a lot of friends and family." Likewise Barbara noted, "I usually check my email and see if I got any" and "It helps you keep in contact with the relatives instantly." On the importance of email, Lois stated:

Oh, it has been very important to me. Most of my family lives out of town and some are out of state. Talking with them was much more difficult before email. Letters took a long time and phone calls had to be arranged around everybody's schedule. My grandkids were never much for writing letters, so I didn't hear from them very often. Once I learned email, I talk to them every few days. I've got great grandkids ranging in age from 5 to 18. The ones that are old enough to use a computer write to me all the time. I don't think that I would hear from them very often if I didn't use email. I know that we have become a closer family because of email. I have a great relationship with my kids, their kids, and their kids because of it. The same goes for friends that I have known during my life. Some of them live close by, but others are scattered all over the country. [Chuckle] I have a friend that I went to high school with that I stay in touch with. She lives in California but we talk every few days just like she still lived across town. It is amazing. About the Internet [pause] I've already talked about all the things the Internet has offered me. It's been very important. [Chuckle] I don't know how I lived 75 years without it!

Both participants also spoke of the advantages of using the Internet for searching for information. Lois noted, "I do lots of Genealogy searching. I do online banking, check the stock market, read newspapers from all across the country. I play games." Barbara told us, "Well, it helps to find out information about a place you want to travel. What it is going to look like, what it is going to cost. It is very helpful to know these things about traveling."

Lois reported that shopping on the Internet was an advantage for her. "Shopping has been a real convenient option and I use it a lot. I can send gifts without having to take them to the post office and I can send bigger items without having to worry about trying to get them to UPS or FedEx." Barbara reported that she hasn't done any shopping yet. "I thought about it at Christmas so I could get some things ahead of time and wouldn't have to do any last minute shopping. This would be a potential help to me."

Nontechnological aspects. In addition to the advantages that technology such as the Internet provides, there are also nontechnological advantages that emerged from the study. Both participants reported an increase in positive feelings of self from learning about the computer. In answer to a question that asked about personal perception of proficiency with computers, Lois enthusiastically stated, "I'm really good! [Laughter] of course, I have classes to thank for it, but I'm good." Lois was "grinning from ear to ear" as she described her computer expertise. When asked about how it feels to be more computer savvy, Barbara responded, "Well, it makes you feel better about yourself. There are some things on the computer that every time you learn something you are accomplishing something new." The researcher observed, "[Barbara was] eager to learn, [her] face lights up when talking about learning how to search better."

Another advantage that emerged was that learning promotes learning. Both participants reported that they were eager to learn more. From the time Lois took her first class in 1998 at the age of 77, her interest in learning more remained strong. When Lois was asked what interested her in becoming a computer user, she responded:

[Chuckle] Well, to tell the truth, I really wasn't interested. My grandkids had them and they were always telling me things and sometimes they would look things up for me. Honestly? I'd lived 75 years without one and I figured they were no big deal. Just another toy, you know? I really got interested when I started taking classes. Did you know that my friend [name omitted] drug me to the first class? She said that she didn't want to go alone and that it wouldn't hurt me go sit beside her! [laugh]. Well, I'll tell you. It was the best thing that could have happened to me.

Lois reported that she is still interested in learning more. She would like to be able to troubleshoot her applications and peripherals more effectively. She would also like to be able to install applications.

Barbara expressed her interests in learning more, as well. Barbara stated:

I would like to be able to get a camera—a digital camera and use it on my computer. I would like to know how to do that. I haven't learned how to forward an email. You know when someone sends you an email and you want to send it to someone else. I know it's not hard but I don't know

how to do it yet. The camera thing will probably be the hardest. Hummm. I would like to learn more about going to different websites. Like searching and researching different things.

Barbara's affect appeared to brighten as she described herself learning and enjoying new experiences using her computer.

Both respondents noted that they liked the feeling of being up-to-date. Lois stated, "[Laugh] well, now I can talk to my grandkids! They are impressed by all the things I can do. It makes me feel good when they say, "Way to go, Grandma!" Barbara stated, "You are not still in the dark ages, you are accomplishing something new and it makes you feel good. You know. Something new makes you feel like you're rewarded....It makes you feel that you are up to date with everyone else."

Another advantage that emerged was that of independence. Whereas each participant viewed the independence differently, both felt the advantage. Lois noted that using a computer gave her choices that she would not have otherwise.

Well, I'm pretty independent. I think it has given me more choices. If I want to get out and go to town I can. If I don't want to, I can do my banking or shopping, etc on line. I think it has made me more independent in the winter or when it is rainy or very cold or after dark...at those times when I don't want to get out. Then I have choices that I wouldn't have without my computer.

Barbara told us:

You know there are lots of people older and even younger than you that are more advanced but you feel like you can compare. You were computer illiterate but now you are not computer illiterate. So, people cannot talk above your head anymore. You know what they are talking about now. It does make you feel more independent. Like if you want to go on a vacation, you can book a room without calling them and you can get the best buy for a room by using the computer. No one has to help you do that anymore.

Still another advantage that came to light was of being enriched by computer use. Lois reported, "I know it has certainly enriched my life. Being 83 years

old, it is something to keep my mind alert and it's been a lot of company to me, especially during the winter months." Barbara noted, "Well, anytime that you can learn something new, just a little bit about it can help. It keeps your mind more active. As you get older, you need to keep stimulating yourself and stay active. It is important to do this."

Formal versus Informal Learning

There was great disparity between the two participants regarding formal versus informal learning methods. Lois had taken a variety of formal computer classes, while Barbara had not taken any classes and had been self-taught. Further widening the gap between them was the length of time of computer use. Lois had been using her computer for six years, while Barbara had been using her computer for about three months.

During the observations, Lois showed us what she could do with her computer. Examples included internet applications (e.g., Internet Explorer, search engines, and Outlook Express), MS Word (e.g., MS Word art functions of WordArt), the drawing tools (e.g., AutoShapes, color functions, 3-D functions, and shadow functions), the picture tools (e.g., inserting clip art, and borders, shading), PowerPoint, and the genealogy application.

When Lois was asked how she feels about training classes designed especially for seniors, she replied, "I can't say enough good things about them. I took all the classes offered and I'm living proof that they were fantastic. Everything we have talked about today I can do because of those classes."

Due to the fact that Barbara had owned a home computer for only three months at the time of this study, it would be unfair to draw any conclusions about the effectiveness of Barbara's self-taught learning. However, there are inferences that may be drawn from her method as compared to the formal courses that Lois experienced.

Barbara displayed a basic distrust of the Internet, especially in the area of communications such as instant messenger and chat rooms. Regarding chat rooms, she declared, "I don't think I would ever be interested in doing something like that." Later in the conversation, she added:

If you don't have the ability to get out much, you can be taken advantage of easier. I think this could be a detrimental effect of socially interacting on the computer. Some people are gullible and trust people too much. They may believe what people say to them over the computer.

This distrust certainly is not unfounded and a healthy dose of circumspection is often wise. However, this attitude may hinder Barbara from exploring the vast possibilities that Lois was enjoying. Barbara did say that she wanted to visit Bloomingdales (web site), so with time she may venture into new areas. Barbara also said that she thought the issues of internet safety should be addressed in computer classes. The classes that Lois took did address internet safety and offered tips, hints, and guidelines for personal protection on the Internet.

Barbara exhibited a lack of computer vocabulary. When asked which applications she used, she replied, "I don't understand what an application is." Barbara also stated, "We do use the Internet and send emails. Isn't that the Internet? That shows how much I know about the Internet." The researcher observed that Lois had referenced the segments of the Internet with the terms she had learned in computer class.

Barbara experienced frustration from her lack of knowledge. She knew enough to try and search for information. Yet, she did not have adequate knowledge to accomplish the task successfully. Without intervention from one of the researchers, Barbara would have had to abandon her search or suffer further frustration as she battled with trial and error. During this observation session with Barbara, the researcher recorded the following scenario:

Barbara: I am looking for a travel spot for our summer vacation. I think we should go to the East coast. Don't you think that is a good idea?

Observation: She slowly began typing in search terms for vacation destinations. She looked for North Carolina as she stated it aloud. She read the hits but nothing mentioned vacation areas. State, general info, University of North Carolina, etc. were all the terms provided as she read through the list. Frustrated, she continued to read instead of changing the search terms.

Barbara: I don't understand why it doesn't give me a beach site or something. Maybe I should go to one of the sites that our friend uses. Hey honey, what is that web site that Tom uses to find the condos he gets in the summer?

Barbara's husband: I don't know but I think it has to do with 'Holiday' or something like that.

Observation: Frustrated by the answer she received as indicated by her sighs, she began another search. She tapped her fingers on the desk and thought aloud saying, "holiday, beach, vacation, what do I use?"

Barbara was able to complete her search with search term suggestions provided by a researcher. In doing so, she experienced one of the advantages of guided learning that formal training can offer. Experimentation is a form of learning in using search engines, and having a teacher nearby to traverse the rough spots allows for the gratification of success while minimizing frustration. Once Barbara had followed some simple helpful tips, she was successful. The following was what the researcher observed regarding that success.

Observation: Barbara finally found some sites that appealed to her as she exclaimed, oh, here is something interesting. How about North Carolina golf resorts? She smiled as she loudly announced this find to her husband awaiting his response. She looked to her left into in the den area where he sat in an easy chair watching the 32" screen television. A few minutes passed, she was busy reading the monitor. She yelled a little louder to her husband in the other room. Still no response, she got up from her chair and walked into the other room. She came back in and told me that her husband had fallen asleep so she woke him up to tell him about the websites that she had been looking at for North Carolina golf resorts. She sat back down seemingly pleased with her success.

In learning, success is essential in keeping one motivated. Guided learning, such as a class setting, can help a student achieve success. In addition, guided learning gives hands-on assistance when a wrong button is hit or a computer glitch occurs. It also offers a more thorough understanding of an application or function so that a student has the information needed for success, which results in less frustration and more confidence.

When the researcher asked her to print a page of the search results, Barbara was unable to do so. The researcher then showed her how to do it and asked her to print some screens for the researcher to take with her the next time they met for a session. At the next session, the researcher asked about the print screen project of last time. The following was what the researcher observed.

Barbara: I really worked hard on this task. I kept doing what you showed me and I couldn't get it right for a long time. So, I took a break for a couple of days, regrouped and tried it again. Eureka! I finally got the print screen button to function properly—you know, where you can edit and things. I was so excited!

Observation: She was sitting at her desk with animated expressions of joy as she described the successful accomplishment of the task. She said she had visited several golf resort areas, holiday vacation websites and even prescription information websites. Barbara was asked if she would like to show how she performed the new task she had learned.

Barbara: Yes, just watch me.

Observation: The participant turned toward her computer monitor and began typing slowly on the keyboard. She spent several minutes searching. Her face exhibited excitement and anticipation. Barbara appeared eager to show off her new skill.

In line with what we observed regarding guided learning, Lois had many positive things to say about her experiences with the computer classes designed especially for seniors.

I know they [the classes] were worth my time and effort. I can't say enough good things about them. I took all the classes...offered and I'm living proof that they were fantastic. Everything we have talked about today I can do because of those classes.

When Lois was asked if she thought she would use her computer as much if she had not attended some training classes, she responded quickly.

Certainly not! No! I could never have learned all this on my own and I'm still not any good at trying to learn it out of a book. I need someone to show me which buttons to push and explain why I am supposed to push them. I think I would have learned a little on my own—if I would have even bought a computer in the first place—but I wouldn't have the skills and knowledge I have today if I hadn't taken the classes. I have found that I learn things easier now when I try something new—because of the basics I learned—and I do try new things now. The classes gave me the confidence to try.

When asked for final thoughts about her experiences with computer classes, Lois gave the following summation.

Is there anything left to say? [Chuckle] I do wish they would start up the Senior program again. I think it was very valuable and very important. Seniors have become the forgotten group from what I have seen. Most of my friends do nothing but go to church and watch television. I worked almost all of my life and managed a low rent housing project for 50 years, so I am not a person to just sit. The computer has opened a whole new world to me. It keeps me in touch and it keeps my mind active. I hadn't realized that before the computer classes came along, I had a lot of time on my hands. My main thinking is that I needed something beside the television. There is nothing too much there. I am a baseball addict and when the season ended I was lost. The winters [baseball off-season] can be long. Other seniors are a lot like I was.

Follow-up Interviews Three Months Later

Although Barbara had limited experiences with computers in her workplaces, she had owned a home computer for only three months at the time of the study. Consequently, it would be important to see her progress over time to have a better sense of the effectiveness of her self-taught learning approach. During the follow-up interview, however, Barbara reported no further computer use due to a computer virus that disabled her computer. She stated that her computer had become infected when she opened an email attachment sent by a relative whose computer had recently been infected. Therefore, Barbara had little opportunity to increase her computer skills by experience and practice during the three-month period.

Lois also participated in a follow-up interview. The additional observation did not show any significant change in skill level; because of her considerable level of computer knowledge and skill, no skill change was expected. However, two things of note did emerge from the follow-up with her. First, when asked about computer viruses, Lois stated that she had never had a problem. She attributed this to the classes she took, saying that several of the classes covered the subject of viruses and virus protection in depth. Second, she had indicated in the initial interview that she spent more time on her computer during the winter months than in the summer months. The follow-up interview, conducted in the summer of 2004, supported her previous assertions and suggested that she used the computer somewhat less during the summer. The greatest difference came in the lesser amount of time she spent doing genealogy research and surfing the net for entertainment during the summer. She still spent virtually the same amount of time with email and with creating cards for birthdays and other special occasions.

Follow-up Interviews Two Years Later

We contacted both participants in the spring of 2006, approximately two years after the initial interviews and observations. Lois had recently suffered health complications and was in the recovery process at the time of the follow-up. Therefore she was unable to participate in an interview, and her computer use had likely been limited in recent months.

Barbara was available to participate in this follow-up. She reported that she had not received any computer training since her last interview. Since the experience with the virus, her computer use was more limited than before. She said "we don't use email anymore. My husband probably uses the Internet more than I do." Her hesitancy to use email persisted despite the fact that the computer had been repaired and the virus problem resolved. When questioned about reluctance to use email, she responded "I need to learn more about viruses before trying it again. If I want to talk to someone, I call them on the phone!" She indicated that she still occasionally performs web searches but not with any greater frequency or skill than she did during the first two interviews.

DISCUSSION

This study examined two seniors' experiences in learning to use computers. We were interested in their reactions to computer training and the effects of different training modalities (i.e., formal and informal). We were also interested in what impact different ages might have on participant responses, considering the wide range of ages that are present in the older adult population.

The data revealed that both participants benefited from their current levels of computer use. They each reported enjoying the various activities they performed with their computers, especially internet searches involving their individual hobbies and interests. These findings are in line with those of other studies (Hilt & Lipschultz, 2004; Namazi & McClintic, 2003; Saunders, 2004). These studies generally found that older adult learners who successfully begin to use the Internet are pleased with the amount and kinds of information available to them. Likewise, both of our senior participants reported that they find a wide variety of information on the Web that is important to them. Both also used the Internet to find information not readily available elsewhere. When seniors have positive initial and continued experiences with technology, they are eager, curious, adapt well to the computer, and truly want to learn (Namazi & McClintic). We found that to be true with both of the participants in our study. The misconception that older adults are either afraid to explore the Internet or not motivated to learn about computers was not supported.

Several studies have indicated self-esteem and self-efficacy benefits that result from the use of computers (Sherer, 1996; Hollis-Sawyer & Sterns, 1999; White et al., 2002). Each of our participants' responses and reactions to performing computer tasks suggested increased pride in accomplishment and positive attitudes towards computer technology. Each participant made encouraging comments about the role of computers in their lives; this was true for both despite the difference between them in computer skills.

The data further revealed that aging alone did not necessarily have a deleterious effect on performance, as Lois (83 years old) emerged as a much more proficient computer user than Barbara (59 years old). Interestingly, Barbara had earned an undergraduate degree and Lois did not have a college degree, so general level of education (in this case) seemed not to influence computer performance. The fact that Lois had taken formal computer classes, while Barbara had completed no formal computer training, appeared

to account for much of the difference between the two in observed computer skills. The importance of computer classes was further evident in the participants' reactions to an incident with a computer virus. Due to the incident, Barbara's misgivings about her ability to use email persisted through to the two-year follow-up interview. She viewed viruses as mysterious and unpredictable, and she did not trust her ability to deal with them; subsequently, her computer use became more limited. Because her formal training included virus protection instruction, Lois had no such misgivings about email. Formal training seems to make seniors more capable of handling problems associated with viruses and other technological interruptions.

In addition, our study provided new insights regarding the older adult computer users. Several studies that examine computer training methods for senior users (Mead et al., 1999; Mead et al., 2000) evaluate those methods by comparing older adult performance to younger adult performance. Based on results from these studies, age-related memory deficits seem to contribute to poorer or slower performance for older adults. However, these studies do not reveal reasons for performance differences that exist within the older adult group. If cognitive decline that progressively occurs with age is expected, we might also suspect that age-related performance decrements would be less likely in younger seniors than older seniors. However, we found just the opposite—the older participant in our study (Lois) was much more capable than the younger (Barbara). Our findings suggest that formal training methods may have the capacity to mitigate any cognitive declines that are often more pronounced in the older members of the senior population.

Implications and Future Work

The present study has important implications for seniors in learning to use computers. The fact that older seniors may encounter age-related physical, cognitive, and sensory limitations does not mean that these limitations function as insurmountable barriers to computer knowledge, skills, and use. Our study suggests that the kind of structured guidance formal computer classes provide to seniors matters more than aging or whether seniors have higher formal education. This is good news for both older seniors and younger seniors from diverse educational and socioeconomic levels. Formal and guided computer training may play an important role in helping seniors learn to use computers.

Student mentoring programs are a specific form of guided computer training that can help bridge the digital divide between older adults and technology. Partnering senior computer learners with increasingly technology-savvy school age students appears to be effective on several fronts (Christensen & Soreff, 2006; Jennings, 2003). Student mentoring programs aimed at assisting older adults in computer skill development have resulted in increased technological capability for seniors and greater intergenerational understanding for students. In such programs, student mentors are trained on how to best communicate with older adults and how to accommodate their special needs in operating computers (e.g., poor eyesight, physical difficulties in operating a mouse, and other potential barriers to computer use). The students are then paired with older adults to provide educational guidance in using computers, including modeling successful computer performance. Individual pairings also promote communication and relationship building. In these partnering programs, both groups have reported improvement in skill development as well as in each generation's perceptions of the other. As our study shows, there can also be substantial differences between younger seniors and older seniors. Future work should examine the effectiveness of partnering younger seniors with older seniors in similar mentoring programs; the coeducational experience involving disparate senior groups could enrich the lives of both groups technologically and personally.

Finally, data drawn from two cases of Caucasian females are suggestive rather than conclusive. Future research involving a more diverse group of seniors (e.g., males and from diverse cultural backgrounds) is needed to enrich our understanding in this new frontier. This line of research is important for several reasons. For example, there appears to be a gender difference among seniors in attitudes toward computers (Adler, 2003; Purdie & Boulton-Lewis, 2003), computer knowledge (Namazi & McClintic, 2003), and Internet usage (Adler; Saunders, 2004). It would be interesting to examine how possible influences such as gender and cultural differences may play out in seniors' efforts in learning to use computers. Determining the impact of diversity within the senior population should help address the computer literacy gap within the senior group as well as between younger and older adults.

References

- American Association of Retired Persons. (2005). *The state of 50+ America*. Washington, DC: AARP.
- Adler, M. (2003, February 23). *Women over the age of 65 still underrepresented on the Net*. Weekend Edition. National Public Radio.
- Bitterman, N., & Shalev, I. (2004). The silver surfer: Making the internet usable for seniors. *Ergonomics in Design*, 12(1), 24-28.
- Chamie, J. (2003). *World population prospects: The 2002 revision*. Retrieved July 27, 2006, from <http://www.un.org/esa/population/publications/wpp2002/WPP2002-HIGHLIGHTSrev1.PDF>
- Christensen, R., & Soreff, S. (2006). Eldertech: Promoting intergenerational understanding. *Nursing Homes: Long Term Care Management*, 55(12), 46-49.
- Erickson, F. (1986). Qualitative methods in research on teaching. In M. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed., pp. 119-161). New York: Macmillan.
- Firestone, W.A. (1993). Alternative arguments for generalizing from data as applied to qualitative research. *Educational Researcher*, 22(4), 16-23.
- Glesne, C. (1999). *Becoming qualitative researchers: An introduction* (2nd ed.) New York: Longman.
- Hilt, M.L., & Lipschultz, J.H. (2004). Elderly Americans and the internet: Email, TV news, information and entertainment websites. *Educational Gerontology*, 30, 57-72.
- Hollis-Sawyer, L.A., & Sterns, H.L. (1999). A novel goal-oriented approach for training older adult computer novices: Beyond the effects of individual-difference factors. *Educational Gerontology*, 25, 661-684.
- Jennings, M. (2003). Ambassadors of the computer age. *Phi Delta Kappan*, 84(8), 598-599.
- Mayhorn, C.B., Stronge, A.J., McLaughlin, A.C., & Rogers, W.A. (2004). Older adults, computer training, and the systems approach: A formula for success. *Educational Gerontology*, 30, 185-203.
- Mead, S.E., Batsakes, P., Fisk, A.D., & Mykityshyn, A. (1999). Application of cognitive theory to training and design solutions for age-related computer use. *International Journal of Behavioral Development*, 23(3), 553-573.
- Mead, S.E., Sit, R.A., Rogers, W.A., Jamieson, B.A., & Rousseau, G.K. (2000). Influences of general computer experience and age on library database search performance. *Behaviour & Information Technology*, 19(2), 107-123.
- Miles, M.B., & Huberman, A.M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage.
- Morrell, R.W., Park, D.C., Mayhorn, C.B., & Kelley, C.L. (2000). The effects of age and instructional format on teaching older adults how to

- use ELDERCOMM: An electronic bulletin board system. *Educational Gerontology*, 26, 221-236.
- Namazi, K.H., & McClintic, M. (2003). Computer use among elderly persons in long-term care facilities. *Educational Gerontology*, 29, 535-550.
- Patton, M.Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.
- Purdie, N., & Boulton-Lewis, G. (2003). The learning needs of older adults. *Educational Gerontology*, 29, 129-149.
- Rovner, R. (2001). Senior citizens are getting in line with being on-line. *Northeast Times* [Electronic version]. Retrieved October 2, 2003, from <http://www.northeasttimes.com/2001/0905/seniors.html>
- Saunders, E.J. (2004). Maximizing computer use among elderly in rural senior centers. *Educational Gerontology*, 30, 573-585.
- Sherer, M. (1996). The impact of using personal computers on the lives of nursing home residents. *Physical and Occupational Therapy in Geriatrics*, 14, 13-31.
- Stake, R. (2000). Case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 435-454). Thousand Oaks, CA: Sage.
- Stine-Morrow, E.A.L., Loveless, M.K., & Soederberg, L.M. (1996). Resource allocation in on-line reading by younger and older adults. *Psychology and Aging*, 11(3), 475-486.
- Vaughan, D. (1992). Theory elaboration: The heuristics of case analysis. In C.C. Ragin & H.S. Becker (Eds.), *What is case? Exploring the foundations of social inquiry* (pp. 173-202). New York: Cambridge University Press.
- White, H., McConnell, E., Clipp, E., Branch, L.G., Sloane, R., Pieper, C., et al. (2002). A randomized controlled trial of the psychosocial impact of providing internet training and access to older adults. *Aging & Mental Health*, 6(3), 213-221.
- Yin, R.K. (1994). *Case study research: Design and methods* (2nd ed.). Beverly Hills, CA: Sage.