Usability Matters: Older Populations Accessing Online Information

Christine L. Anning

St. Catherine University

Abstract

This study, conducted during a yearlong Special Studies in Librarianship class in a Masters of Library Science program, explores older adults' perceptions and use of computers and the Internet. Interviews with a self-selected sample of 11 older residents at a senior community care facility were analyzed for patterns of information seeking, desired internet usage and perceptions of the usability of technology. Research questions for the study were: (1) What are older adults' perceptions of computers? (2) Does finding online health information interest older adults? (3) Do older adults want online search training? The findings support previous research: there is desire and interest in using online information services. Further analysis also found overwhelming inhibitions and underutilization of the Internet because of lack of knowledge and frustration with basic computer operations. The interviews suggest training and assistance would help the oldest old use computers to stay socially and intellectually engaged. For those in libraries and information science preparing to serve the rapidly growing population of older adults, it is urgent that we understand the interest, benefits and barriers for older adults accessing online information.

Keywords: Aging, Older populations, Computers, Internet, Training

Introduction

The U.S. Census Bureau (2000) estimated that the number of the oldest old (85+) in this country will more than double by 2035, climbing from the current ratio of one very old person for every fourteen middle-aged adults to an estimated one very old person to every five middle-aged adults. In developed countries, many older adults are technologically disadvantaged and underutilizing online information (Czaja et al., 2006). While the percentage of U.S. residents 65 and older who are using online technology has nearly doubled between 2003 and 2009, only 38 percent of the total population were online by 2009. The percentage is significantly lower than the 74 percent national U.S. average for all ages, and far below even the next-oldest age group, (50-64), 70 percent of whom were online by 2009 (Fox, 2010). For the aging population in this country, accessing the Internet is increasingly viewed as essential.

Data indicates that the causes for older adults' lower Internet use vary. A Pew Internet and American Life Project report (Fox, 2004) cites lack of experience, skill, and interest as barriers to online access. Included in the Pew report was the suggestion by Tobey Dichter of Generations on Line (www.generationsonline.org) that intimidation is a major barrier to low computer use among seniors. Research by Czaja et al. (2006) found declining cognitive abilities and computer anxiety decreased adoption of technology by older adults.

In the U.S., library services targeting older people are increasing as library professionals address the needs of underserved populations. The American Library Association (ALA) encourages libraries to promote better services to older adults; however, the term “older adults” is broadly defined as persons 55 or older (ALA, 2008). In a review of library and information science (LIS) research literature, Asla, Williamson and Mills (2006) found "the role of

information for the oldest old has been particularly neglected in LIS" (p. 50). Librarians and information services providers need to understand the diversity of different age groups and aim to ensure that people at all stages of life have full and unhindered access to electronic information technology.

Definition of the Oldest Old

While it is acceptable to define old by chronological age, it less useful when evaluating the wide ranges of older adults' cognitive and physiological capacities. The age most commonly defining old is 65, when people are expected to retire from employment and begin receiving government pensions. Terms such as "oldest old" and "the fourth age" are useful in distinguishing the oldest old from the younger old. Baltes and Smith (2003) refer to the oldest old as the fourth age, and helped define attributes of the oldest old in developed countries as generally beginning around age 80-85. Significant loss of cognitive abilities and other negative physiological symptoms that are generally experienced in the fourth age distinguish the group from the young old, those 75-80 years. Understanding and accommodating the characteristics of the oldest old are important for LIS professionals working to help this population satisfy their information needs.

Literature Review

Physical and Cognitive Changes

The oldest old are a rapidly growing population whose interest in and need for communications technology are expanding. The diversity of older adults' abilities should be considered when addressing their computer information needs, because research suggests age

effects are largely mediated by contextual factors such as experience and cognitive abilities (Czaja, Sharit, Ownby, Roth, & Nair, 2001, cited in Wagner, Hassanein & Head, 2010). Research suggests that the difficulties older adults experience when learning and using information technologies are age-related, including poor vision, and diminished psychomotor and cognitive abilities (Czaja et al., 2006; Xie, 2007b). Most off-the-shelf computers fail to accommodate older adults' physical and cognitive disabilities such as impaired vision, memory and motor skills. In addition, available adaptive technology options are usually unknown to less experienced users. Both Section 508 of the Federal Rehabilitation Act[1], which requires federal departments and agencies (and their contractors) to develop and maintain ADA-accessible websites, and the Twenty-first Century Communications and Video Accessibility Act of 2009[2], which requires communications technology to provide audio, video and text programming devices for Internet users, should benefit older people with vision, hearing and other disabilities. Until the technology needs of the oldest old are better understood and easily accommodated through appropriate technology such as touch-screen and audio-video technology, libraries and information service providers must find ways to make online information more accessible to older populations.

Technology Usability

Most research on older adults' computer use concludes that there is interest in using computers (Xie, 2006; Namazi & McClintic, 2003; Lagana, 2008). Older adults generally want to be productive to society and continue learning as they did at younger ages. In addition to the physical and cognitive barriers that make computer use difficult for the elderly, hardware and

[1] http://www.section508.gov/index.cfm?fuseAction=stdsSum

[2] http://www.govtrack.us/congress/bill.xpd?bill=h111-3101&tab=summary

software design limits computer use by older adults. Namazi and McClintic (2003) explored the obstacles experienced during computer classes offered to elderly persons in long-term residential care. The complaints by participants during the 15-month study suggested computer technology and software design lack consideration of the physical and cognitive impairments of the elderly (p. 546). Access tools (i.e. mouse, monitor screen), terminology (i.e. cursor, backspace, control key) and physical environment (i.e. room size, seating), were obstacles for the elderly residents in the study (p. 543-544). A study by Wicks (2004) compared information seeking behavior of young old to older adults and found that older adults preferred in-person contact and print over electronic resources. Wicks found that age contributed to less computer experience and suggests age be considered a factor of the digital divide (p. 20). Interview data collected by Selwyn (2004) from people over 60 found that work-related computer experience did not always translate into continued use of the computer for reasons that suggested ambivalence because of perceived (non)relevance to their lives. Even those with computer experience have more computer anxiety than younger adults (Czaja et al., 2006). To increase technology's daily usefulness and relevance for older populations, computer equipment design should involve older adults in defining needs and adapting equipment for their abilities and needs (Hart, Chaparro, & Halcomb, 2008; Selwyn, 2004). Ease of computer use and perceived success were factors that Czaja et al., (2006) found reduced anxiety and increased older adults' interest in computers. Their findings recommend developing training techniques for older adults that focus on reducing anxiety and building confidence in the ability to use technology.

Training

For many older adults, training has helped them overcome computer anxiety (Cody, Dunn, Hoppin, & Wendt, 1999; Czaja et al., 2006; Xie, 2009). Researchers have studied the training of

older adults as a factor in adoption of information communications technology (ICT) using various quantitative and qualitative methods. Results consistently show improved attitude toward computers and learning (Cody et al., 1999; Lagana, 2008; Xie, 2006, 2007a, 2007b, 2009). Older adults experience empowerment during the process of learning as much as they do from successfully using information technology (Xie, 2007a). Multiple studies on computer use by older populations done by Xie (2006, 2007a, 2007b, 2009) contribute to better understanding of online information needs and positive training outcomes for older adults.

Social cognitive theory (SCT) offers a holistic approach to studying information use by older adults by evaluating the triad of personal attributes, experiences and computer system use. In an SCT framework, learning is described in terms of the interrelationship between personal experience, environment and behavior. In their review of multidisciplinary studies, Wagner et al. (2010) suggest further consideration and research on the reciprocal relationship between computer systems environments and behaviors of older adults. Finding personal information interests on the Internet could increase an older person's motivation to use the computer. In a care facility, social hierarchies can be factors inhibiting residents using computers and learning skills. Namazi & McClintic (2003) found that hierarchies based on gender, social, physical and cognitive abilities were factors leading residents to stereotype computer users, inhibiting those labeled withdrawn, unsociable or technologically inexperienced.

Internet Tools

Research findings differ on what participants considered the most useful Internet tools. These different preferences most likely reflect the diversity of the population. Xie's (2007b) analysis of seniors' online interactions using different types of social media (e.g. email, instant messaging, forums) found that most of the participants preferred to search online for information

that was personally relevant to their lives (e.g. stocks, banking, medical conditions and genealogy) (p. 399). Namazi and McClintic (2003) found that older adults were most interested in email communications, but participants also used the Internet to shop, play games and search historical records (p. 540-543).

In summary, electronic information seeking of the oldest old is greatly affected by the physical and cognitive decline associated with older age. With the rapidly rising number of the oldest old (85+) in this country, librarians and information services providers need to understand the various aging factors and aim to ensure that people at all stages of life have full access to electronic information technology. The oldest old need access to online information. Their needs are not being met, and we as a society (and especially as web designers/developers, government agency web IT personnel, health care providers and library professionals) have an obligation to meet their needs and fulfill their wants for online information, whether it is seeking up-to-date information on Alzheimer's treatment or just helping them improve their quality of life through social media such as email, instant messaging and photo-sharing opportunities. Until the technology needs of the oldest old are understood and accommodated through appropriate technology such as touch-screen and audio-video technology, libraries and information service providers must find ways to make online information more accessible to older populations. Further research into the computer use of the oldest old will assist LIS professionals to better serve those currently in the fourth age, as well as prepare for the large baby-boom generation soon to be transitioning to the fourth age.

The Study

Purpose

The qualitative methods used in this study included semi-structured interviews with a self-selected purposive sample. The chosen care facility offers independent, assisted and long-term care. Most residents are over 80 and computers are available -- both privately owned and communally available in a lab as well as on each residential floor. This exploratory study was not intended to generalize the issues and perceptions of older adults. Recruiting included a verbal statement of the research goal of improving technology for older populations. Individuals with both positive and negative technology experiences were encouraged to volunteer. Recruiting was limited to a verbal invitation which, even though amplified with a microphone, inadvertently excluded residents with very poor hearing.

It is hoped that this study will contribute to existing research by providing a better understanding of the information technology uses, interest and issues of this rapidly expanding oldest old population. In addition, the researcher offers methods and suggestions for further areas of new and comparable research with older populations.

Research Questions

Research questions guiding this study were: (1) What are older adults' perceptions of computers? (2) Does finding online health information interest older adults? (3) Do older adults want online search training?

Participants

The target population for the study included people over 80 years of age, living independently in a facility in an upper Midwestern city, who may or may not be experiencing

cognitive and physical changes typical of the oldest old and who may or may not be using computers. Two participants were aged 80 and 81 and the remaining nine were aged 84-94. The average age was 86. All the participants were living independently, all but one at the care facility where the interviews were conducted.

Procedure

At a regular weekly community meeting, the researcher briefly described the study as an investigation of older adults who do or do not use computers to find information on the Internet. Those present were invited to participate. Following the meeting, 11 self-selected women volunteered to be interviewed. Each 30- to 60-minute interview was recorded using a digital recorder and written observations. The audio recordings were transcribed, by the researcher, within 48 hours of each interview.

Interview Instruments

The major interview questions were reviewed by the facility program director and approved as appropriate for those participating in the study. The program director completed a supplemental questionnaire about the participants to help verify demographic information and appropriateness of the interview, and to consent authority for each person (see Appendix A).

The interview questions were written to aid in the long-range goal of improving computer services to older users. Past experiences, both general and computer-related, provided background information. Discussions about Internet use were used to explore information seeking behavior as well as interest in and use of computers to connect with other people socially. A question on finding health information was included for its relevance in previous research on information seeking behavior and older populations (Xie, 2009; Wicks, 2004).

Starting each interview, the purpose of the study was stated or read from the consent form provided to each participant (approved by Institutional Review Board of St. Catherine University). The researcher offered to read aloud the text and clarify any questions prior to starting the interview or acquiring the volunteer's signature on the form. When reporting, pseudonyms were used for all participants.

Interview Questions

Participants were asked to talk a little about themselves and their prior experience with computers. Their responses directed further questioning about their attitude, computer use and opinions on the challenges for older people using the Internet. Final questions related to training; each participant was asked about past computer training, interest in receiving training and a desired location if they were to receive training.

Each interview focused on the following areas of computer use:

- Computer and Internet use (experience, perceptions, purposes, software)
- Health information seeking behavior (self, others, Internet, print)
- Training for general computer use (past, future interest, location)

Transcriptions of the interviews were coded and analyzed using Nvivo9 software as an organizational tool.

Member Assessment

Following completion of the research, the report with the findings highlighted was shared with the participants for their voluntary review.

Findings

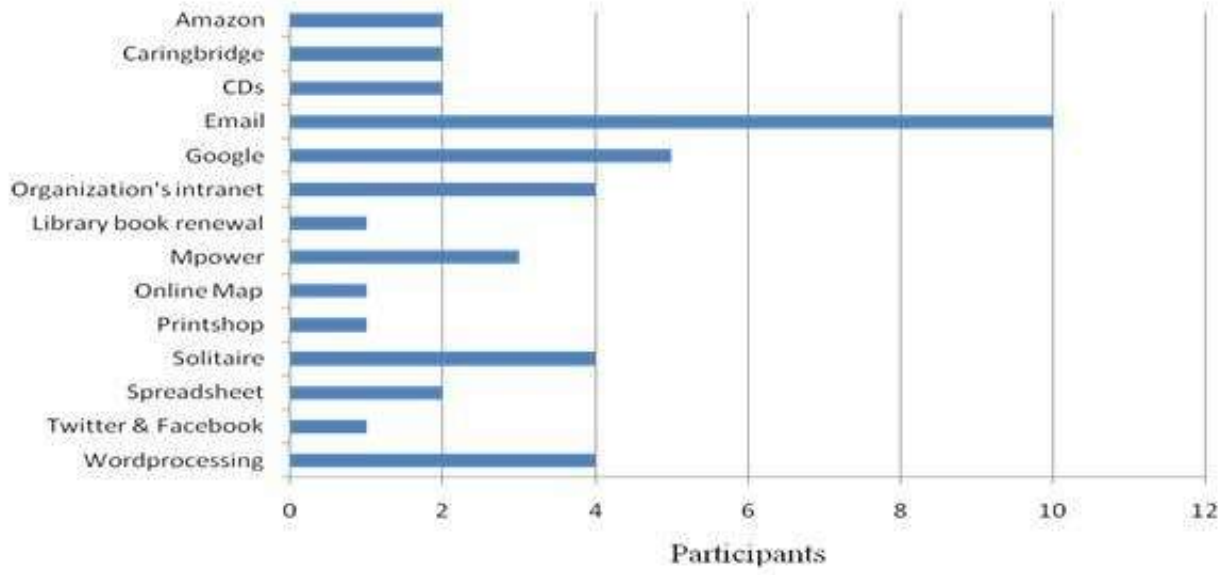
Description of the Study Population

All participants interviewed for this study were women aged 80 to 94. The mean age was 86 and most (82 percent) were in the oldest old age group of 84-94. Two subjects were 80 and 81. Ten of the eleven women lived independently in rooms at the care facility, and one lived at her own home. The participants are educated professionals and paraprofessionals with work experience in teaching, health care, or business administration.

Experience with Computers

Participants indicated a range of familiarity and uses when asked to describe their experience with computers. All had previous experience using computers for both work and personal use. One reported getting her first computer in the 1970s and another had not learned anything about them until 1995. They used a variety of Internet tools and programs as represented in Figure 1. Email was the most popular and regularly used Internet tool. Eight people were regular email users; of the three non-users, only one had never used email. One person had an email account, but had stopped using it when she encountered technical problems and was unable to send a message. Another did not have her own email but had borrowed a friend's email. "On a couple of occasions I've had to ask somebody to tell me her email so she could get email for me" (Gloria).

Figure 1. References to Computer & Internet Tools



The tools named in Figure 1 were identified during the interviews as programs the participants had used. The tallies were counted using text queries of the source transcripts in Nvivo software. Email and web browsing were the most popular activities, followed by word processing, games and the community's online intranet. One non-computer user said if she did use the computer, email and accessing the Community intranet were the two services she would want to use.

The use of these computer tools causes both positive and negative experiences. Several tools were tried out of curiosity — such as Facebook, Twitter and MapQuest — and then abandoned as not that useful. MapQuest was considered no more helpful than a road atlas, and Facebook was deemed too intrusive. The resident who explored Facebook also tried Twitter and said, "I'm on it but I don't use it; I mean, I'd be glad if I had the time to talk to people *here* without talking to somebody I don't know about walking their dog or something" (Rosa). Using Amazon to order

books was easier for Eileen than it was for Emma, who because of poor vision caused by macular degeneration said she "spends a whole day buying something" on Amazon. Common frustrations leading to negative experiences were uncertainty and mistakes when choosing screen buttons, errors when transcribing text, difficulty focusing vision on screen texts, and moving images. Emma, in response to questions about her Internet use, said, "I stumble frequently; after a while I just quit." Marie, also in the oldest old group, wanted to stay socially connected through email, and likes to play computer games to pass the time. Unfortunately she is unable to get basic personal or written instruction for fixing small user errors. She explains, "Often it's just one little thing you need to know how to do."

Positive experiences recounted were related to successful social and business email connections to friends, family and past and current associates. Successful Internet searching was mostly for quick inquiries, such as finding addresses, information about a place, or current news. Some individuals were confident of the information they found about medication, while others preferred to ask the nurses on staff. Participants' answers about health information are reported in the section on Health Information.

Using shared computers presents usability problems for people, who are uncertain about who is responsible for programs or updates. They fear making changes that might damage the computer or program. "I think that's one of the fears of using the computer, that you're going to do something so outrageous that it just wrecks all the programs for other people who come and want to use it. Because here at [this facility] all kinds of people use the same computer. It's not just yours, see. At home, I mean in my apartment, it was just me and I was finally getting emails on it" (Annie). Individuals who had their own computers seemed comfortable and confident using computers for daily tasks and had fewer negative experiences.

Challenges to Internet Use

Challenges to searching the Internet were identified and categorized into the following seven areas: (1) Space, (2) Technical Support, (3) Fear, (4) Physical, (5) Usability, (6) Privacy and (7) Cost. The three challenges most often mentioned as obstacles to using computers were Space, Technical Support and Fear. Both physical limitations related to aging and information privacy were considered challenges by half the women. Cost was mentioned as an obstacle by four.

Space: physical environment of the computer.

The physical location of the computer was mentioned in nine interviews. Of the responses mentioning physical location of the computers, six described the current physical space as a barrier to using computers. The challenges of the computer's location included uncertain computer availability and lack of instruction, distractions from other users in the open space, and accessible seating such as a stable chair with arms and no wheels. "It would be nice to have a regular computer lab or something rather than just a room [for] people who want to use it. I mean it's not organized with goals and instructions" (Rosa).

Technical support and user instruction.

Eight participants emphatically stated their need for technical support and user instruction. One person had concerns about computers breaking and needing repairs. Most said that they and other residents needed reliable help with basic program instruction:

- "Well I would appreciate having help that I could count on" (Marie).
- "It's hard to find someone, but I could use someone who is a computer whiz and work a few hours for pay" (Emma).
- "We need a lab and a teacher" (Ada).

- "I think that's the thing that holds me back, because I'm always asking somebody, ‘Can you help me, can you help me find this, or come and tell me what I'm doing wrong?’" (Annie).

Fear.

Fear was reported in three different contexts. One was the fear of lack of information privacy. One person stated she did not want anyone to know what personal health information she was looking up; she chose to use a printed encyclopedia, which she could use privately and on her own. A second context was the fear of being overwhelmed by the properties and proper use of the computer. The most common context was fear of damaging the computer equipment.

Concern over losing programs and "wrecking" the computer were mentioned in five of the 11 interviews. "That's the biggest thing is fear; fear you're going to ruin something on somebody else. I don't like to get scolded, even at 80" (Ada).

Age-related physical limitations.

Six of the women mentioned physical challenges resulting in reduced use of the computer. Physical age-related challenges included rheumatoid arthritis, macular degeneration, general poor vision, short-term memory loss and "laziness" (i.e. lack of motivation). One person mentioned her diabetes as a complication; she said anticipating care of her insulin levels takes a lot of planning and forethought when leaving the center for any period of time.

Computer usability.

Some of the computer usability limitations were being addressed at the facility with the aid of large screen monitors and oversize keyboards. Several people mentioned the computer in the lab that contained a (paid subscription) memory exercise program called MPower. Participants reported successful use of this program and several used it as an example of an easy

to use machine that required minimal instruction. One non-internet user said that if other computers were as easy to use as MPower, she would use them for email and Internet use. "We have one computer that is a touch screen so some of the [people] that are challenged are able to get into it. Some of the difficulty that some [people] have getting into the Internet, are insurmountable. I wish it could be easier especially for challenged elders" (Eileen).

Privacy.

Computer privacy concerns were reported by four people. Issues included difficulty remembering and typing passwords correctly to concerns about secure files on shared computers. "I should think you have to have a secure way, if you have a folder, of keeping it" (Joan).

Cost.

Four people mentioned the cost burden of owning a computer and accessing the Internet. Personal expenses as well as facility outlay were considered barriers to increased access to online information. Some individuals knew they could not afford broadband and others assumed it was an unnecessary cost. "We're too conscious of money and cost. You don't just use everything because it's available. You use what you need" (Sarah). Several residents expressed interest in having their own computers but considered it unwarranted. "It would be really nice to have your own computer; then you know what's on it. I don't expect to have that, at my age" (Ida).

In summary, some of the challenges to using computers and the Internet have potentially easy resolutions, while others require more consideration. Challenges with known solutions, while not effortless, have been addressed by other diverse populations such as academic campuses. These challenges include space, technical support, fear, privacy and cost. The human computer usability challenges noted in this study, though, are unique to people with physical limitations of the oldest old; they need more user-defined solutions.

Attitude Toward Computers

An attitude rating was used to gain a sense of how this study group views computers in society. Comments were labeled subjectively and used to gain a general measure of the value placed on computers and the participants' expectations about having access to online information. Because this was a purposive self-selected sample, it was expected that participants would already be curious and interested in using computers.

The participants' comments about computers were mostly positive. All 11 interviews contained positive words about computers. Three transcripts contained both positive and negative views. Negative responses mentioned fear of getting into pornography, Internet health searches that might encourage hypochondria and general frustration with lack of knowledge about computers.

Health Information

The health questions generated mixed responses; participants were given an opportunity to revisit the topic, depending on the comfort level of respondent and whether the question had been previously answered during discussion of Internet searching. Of the 11 interviews, five people said they never used the Internet to search for health information and chose instead to ask a doctor or nurse, attend a class, or use print sources. Three participants had searched the Internet occasionally to look up diseases, and three indicated they had searched about medication themselves or had asked a nurse to look it up on the Internet. Two online users mentioned using the Mayo Clinic website for information and the other three said they Google the disease or medication.

The average age of those who never used the Internet for health information was 87 and the average age of those who did use the Internet for health information was 85. Searching health information is personal, and the interviews revealed that it can be difficult for people to recall their search strategy. A different method of data collection, such as anonymous survey, diary logs, or ethnography might produce better data for analyzing health information seeking behavior of this population.

Computer Training

The questions asked during the interviews regarding training were: (1) Have you had any training on searching the Internet? (2) Would you be interested in (more) training? (3) Where would you like to go for training? Ten interviewees were asked if they had ever received training to search the Internet. Five people said they had received computer training, two indicated it was informal or minimal, two described their training as self-taught, and one said she had not received training — although she had asked for it at a word processing job she had taken after retiring from teaching.

Responses to the question, "Would you be interested in training?" were mostly favorable; seven people said yes, and included enthusiastic responses such as "Yes, decidedly" (Emma) and "Much more, yes, and practice too" (Ada). Two people said they would be interested if the classes met their current level of skill. "If they offered a class … and there were some things that I really wanted to learn more about … I'd probably take it, and not from the very beginning, I mean I wouldn't want to start all over again" (Ida). Two interviewees said they were not interested in training. These were two of the oldest participants. One had received previous

training and was currently interested but asking others to search the Internet for her. The other had no training and did not use a computer to find information.

When asked about a preferred location for training, all the participants who wanted training said they would like it to be easy to get to, and most indicated they wanted it to be "right here" at the care facility. Physical mobility and health limitations were the primary concerns for requesting that training be located nearby. "I would be interested, yes. That's one thing. But would it be a convenient thing? Like if the training was right here and not having to go over to the university to do it" (Annie).

Table 1 summarizes descriptions of preferred location and the setting for computer and Internet training. Additional comments were given about the type of setting that would be best for participants. Responses varied from able to work independently to personal training to classroom setting. Several mentioned the need for appropriate and comfortable seating.

Table 1. Computer Training Location Preferences

Interviewee	Preferred training location	Setting provides
Emma	On-site or close, comfortable seating	Able to work alone, quiet units
Ida	Small class, on-site	Person to train
Joan	Small class, on-site	Learn with others
Ada	Classroom, fast computers	Able to work alone, quiet units
Sarah	Class first then one-on-one, on-site	Class then one-on-one instruction
Rosa	Organized computer lab, here	Goals and instructions
Annie	On-site	
Marie	On-site, comfortable seating	One-on-one instruction

In summary, computer and Internet training is desired by most study participants. Comments provided by those interested in computer training indicate strong preference for having training close by, ideally at the facility. The suggested environment for classroom settings indicates different learning community preferences for receiving instruction.

Discussion

This study examines older adults' perceptions and use of computers for online searching, including health information, and interest in computer training. A search of the library literature did not find any previous LIS studies examining observations on the use of computers by a group of professional women in the oldest old category. This study builds on the existing LIS research on older populations' information seeking behavior in care facilities (Wicks, 2004; Chatman, 1991). Research on computer training for older adults by Xie (2006, 2009), Xie & Bugg (2009)

and Namazi and McClintic (2003), influenced my interest in the exploration of the information seeking behavior related to heath information as well as the interest in computer training. The positive attitude toward computers, from the members of this study group, is useful for considering the accommodations for today's online older adults entering the oldest old stages of aging.

The self-selected participants were educated women with some prior computer experience gained through work or personal time. These participants wished to stay informed and connected to their community, and they recognized the value of being online. Most of them desired ongoing training and support to be able to continue independent use of the computer for personal enjoyment, communications and information.

For future library and information services, this study provides the insights of a group of people in the latest years of life, who have integrated technology into their lives and want to continue to use the computer for pleasure, social and informational purposes.

Technology Use

The technology use described by participants shows email and web searching to be the most popular online activities. Word processing, the organization's internal intranet, and games were the second most popular uses. Most frustrations with accessing online tools were noted as basic operational features and the lack of any consistent technical support to answer questions. The challenges of physical limitations common to people in the oldest-age also caused frustration and reduced use of available computers. While some of these issues are being addressed with larger keyboards and monitors, the elements of screen texts, website layouts, and file organization are insurmountable barriers for many older people.

Information Needs

The results of this study showed less interest in using the Internet for health information than was expected. The results do support Wick's (2004) finding that people in a care facility rely more on the medical staff to answer their health questions. These residents all had access to nurses stationed on the floors, so this finding likely would not be similar with participants not living in such facilities. The searching reported by those who had used the computer was noted as seldom or occasional, with medications being the most consistent inquiry. Participants generally asked the medical staff their health-related questions or used printed resources. There was less interest in using the computer to search for health information than there was to stay connected socially through email or find news and information.

Shared Computers

The negative aspects of sharing computers was unexpected and an important observation resulting from this study. Fear of “wrecking” the programs and machines caused more resistance and non-use among residents who shared computers than those who had their own computers. These findings support Generations on Line (2010) data that fear of breaking the computer is one of the main reasons seniors don't go online. Also mentioned was the lack of privacy for personal files and online searching. This is a barrier to overcome in facilities making use of shared computers.

Training Interest

One of the strongest suggestions for improving access to online information was the need for training. Those participants interested in training expressed curiosity, interest and the need to be connected to online information. Several people felt left-behind and expressed a need for basic technology support so they could stay socially and intellectually connected.

Future Research

There are numerous barriers, some easily addressed, for older populations sharing and receiving information on the Internet. Computer assistance and training at senior living and care facilities would provide both social benefits and access to desired online information. The senior living community used for this study provides opportunities for continued LIS research with older populations. Through further and ongoing exploration of technology use by older adults, access to online information for these and future residents can be improved.

Questions for future exploration of the use of computers and the learning of computer skills by the oldest old include: (1) Do older adults learn better if taught by older adults? (2) How does small group versus one-on-one training inhibit or enhance computer information training for the oldest old? (3) Could online collaborative tools such as a wikis be designed to facilitate learning specifically for the oldest old? (4) How can computer training and environments be altered for improved use by the oldest old?

This study raises additional questions to be explored related to the health information needs of the oldest old, including whether interest in health information decreases as people reach the oldest old age. Building on Wicks' (2004) comparative study of the information seeking of

residents living independently versus in a care facility, future studies could explore whether needs for online health information increase for this age group not living in a facility environment. Improving technology usability will empower the oldest old to comfortably access the Internet. Further investigation of their information and computing needs is important to understanding better ways to serve the growing population of baby boomers who will increasingly rely on daily access to online information.

Conclusion

This study suggests that age could be less of a factor in the "digital divide" than is generally believed and the challenges for older people are based more on fear and a basic lack of knowledge and skills needed to use the computer and the Internet, rather than (as is often assumed) disinterest. The people interviewed for this study are already in or soon to enter the oldest old age. Most of them desire to use online services and want ongoing computer learning opportunities. With information increasingly being found exclusively online, providing assistance with searching is critical. Continuing to study older populations will help guide library and information professionals to understand the best methods and resources for serving the aging populations' diverse information needs.

References

ALA (2008). *Guidelines for library and information services to older adults.* Reference and User Services Association. Retrieved from: http://www.ala.org/ala/mgrps/divs/rusa/resources/guidelines/libraryservices.cfm

Asla, T., Williamson, K., & Mills, J. (2006). The role of information in successful aging: The case for a research focus on the oldest old. *Library & Information Science Research (07408188), 28*(1), 49-63. doi:10.1016/j.lisr.2005.11.005.

Baltes, P. B., & Smith, J. (2003). New frontiers in the future of aging: From successful aging of the young old to the dilemmas of the fourth age. *Gerontology*, 49(2), 123-135. doi:10.1159/000067946

Chatman, E. A. (1992). *The information world of retired women*. Westport, CT: Greenwood Press.

Cody, M., Dunn, D., Hoppin, S., &Wendt, P. (1999). Silver surfers: Training and evaluating internet use among older adult learners. *Communication Education*, 48(4), 269. Retrieved from Communication & Mass Media Complete database.

Czaja, S. Fisk, A., Hertzog, C., Rogers, W., Charness, N., Nair, S., & Sharit, J. (2006). Factors predicting the use of technology: Findings from the center for research and education on aging and technology enhancement (create). *Psychology and Aging,* 21(2) 333-352.

Fox, S. (2004). *Older Americans and the Internet*. Washington, DC: PEW Internet & American Life. Retrieved from : http://www.pewinternet.org/~/media//Files/Reports/2004/PIP_Seniors_Online_2004.pdf.pdf

Fox, S. (2010). *Four in ten seniors go online*. Pew Internet & American Life Project. Retrieved from : http://www.pewinternet.org/Commentary/2010/January/38-of-adults-age-65-go-online.aspx

Generations On Line. (2010). *Generations on line: Elders and the Internet*. Retrieved from: http://www.generationsonline.org/

Hart, T., Chaparro, B., & Halcomb, C. (2008). Evaluating websites for older adults: Adherence to 'senior-friendly' guidelines and end-user performance. *Behaviour & Information Technology*, 27(3), 191-199. doi:10.1080/01449290600802031.

Lagana, L. (2008). Enhancing the attitudes and self-efficacy of older adults toward computers and the Internet: Results of a pilot study. *Educational Gerontology*, 34(9), 831-843.

Namazi, K., & McClintic, M. (2003). Computer use among elderly persons in long-term care facilities. *Educational Gerontology*, 29(6), 535. Retrieved from EBSCO MegaFILE database.

Selwyn, N. (2004) The information aged: A qualitative study of older adults' use of information and communications technology. *Journal of Aging Studies*, 18, 369-384. Retrieved from ScienceDirect. doi:10.1016/j.jaging.2004.06.008

U. S. Census Bureau. Table 2. Projections of the population by selected age groups and sex for the United States: 2010 to 2050 (NP2008-T2). *Population Division*. Release date: August 14, 2008. Retrieved from http://www.census.gov/population/www/projections/summarytables.html

Wagner, N., Hassanein, K., & Head, M., (2010). Computer use by older adults: A multi-disciplinary review. *Computers in Human Behavior*, 26 870-882. Retrieved from http://www.business.mcmaster.ca/IS/head/Articles/Computer%20use%20by%20older%20adults.pdf

Wicks, D. (2004) . Older adults and their information seeking. *Behavioral & Social Sciences Librarian, 222* (2) 1-16.

Xie, B. (2006). Perceptions of computer learning among older Americans and older Chinese. *First Monday*, 11(10) Retrieved from: http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1408/1326

Xie, B. (2007a). Information technology education for older adults as a continuing peer-learning process: A Chinese case study. *Educational Gerontology*, 33(5), 429-450. doi:10.1080/03601270701252872.

Xie, B. (2007b). Using the Internet for offline relationship formation. *Social Science Computer Review*, 25(3), 396-404. doi:10.1177/0894439307297622.

Xie, B. (2009). Older adults' health information wants in the internet age: Implications for patient-provider relationships. *Journal of Health Communications*, 14, 510-524. doi:10.1080/10810730903089614.

Xie B., & Bugg, J. (2009). Public library computer training for older adults to access high-quality Internet health information. *Library & Information Science Research*, *31*(3), 155-62. doi: 10.1016/j.lisr.2009.03.004

Appendix A

Volunteer profile questionnaire

Care Giver/Activity Director Questionnaire

Subject's name: _____ Prefers to be called: _____

Age_____ Number of years has lived here _____

Currently resides in: ❑ Independent ❑ Assisted living ❑ Nursing Care

In the last 3 months, I think this person has used a computer
❑ Daily ❑ 1 x Week ❑ 1 x Month ❑ Never ❑
Other_____

Do they need assistance when using the computer?
❑ Always ❑ Sometimes ❑ Never

Below are example interview questions. Do you believe the subject will understand these questions? ❑ Yes ❑ No ❑ Probably Yes ❑ Probably Not

Interview questions
The following questions will be used to facilitate discussion of the major areas of this exploratory study:

- What experience do you have using computers?
- Is there certain information you (would) like to find on the internet?
- Would you be interested in using the internet for (more) information?
- How do you find health information?
- Have you used the Internet to find health information?
- How was the experience?
- Have you had any training on searching the Internet?
- Would you be interested in training?
- Where would you like to go for training?

Does the subject have authority to sign a research consent form? ❑ Yes ❑ No