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Older Adults Embracing Technology: Leave No One Behind

Susan Pratten

Sheridan College, susan.pratten@sheridancollege.ca

Lori Schindel Martn Dr.

Ruth Sherman Centre, Shalom Village

Ellen Ryan Dr.

McMaster University

Ann Anas

McMaster University

Pat Spadafora

Sheridan College, pat.spadafora@sheridancollege.ca

See next page for additional authors

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Authors

Susan Pratten, Lori Schindel Martn Dr., Ellen Ryan Dr., Ann Anas, Pat Spadafora, and Rebecca Hart



Report Series - # 14

Older Adults Embracing Technology: Leave No One Behind

Project Team

Susan Pratten	<i>Sheridan Elder Research Centre (SERC)</i>
Dr. Lori Schindel Martn	<i>Ruth Sherman Centre, Shalom Village</i>
Dr. Ellen Ryan	<i>McMaster University</i>
Ann Anas	<i>McMaster University</i>
Pat Spadafora (Director)	<i>Sheridan Elder Research Centre (SERC)</i>
Rebecca Hart	<i>SERC Research Assistant</i>



About SERC (Sheridan Elder Research Centre)

Through applied research the Sheridan Elder Research Centre (SERC) will identify, develop, test and support implementation of innovative strategies that improve the quality of life for older adults and their families.

1. Wherever possible, older adults participate in the identification of research questions and contribute to the development of research projects at SERC.
2. We conduct applied research from a psychosocial perspective which builds on the strengths of older adults.
3. Our research is intended to directly benefit older adults and their families in their everyday lives. The process of knowledge translation takes our research findings from lab to life.
4. SERC affiliated researchers disseminate research findings to a range of stakeholders through the SERC Research Report Series, research forums, educational events and other means.
5. A multigenerational approach is implicit, and frequently explicit, in our research.
6. To the extent possible our research is linked to and complements academic programs at the Sheridan College Institute of Technology and Advanced Learning.

EXAMPLES OF SERC RESEARCH

The Built Environment	Information & Communication Technology (ICT)	Human Communication	Public Policy	Other research interests
- Indoor/Outdoor Design - Graphic Design	- Accessible computing - Age appropriate games	- Hearing/low vision - Vision - Language	- Elder Abuse - Ageism	- Self image/self esteem - Care-giver support

Contact Information:

Pat Spadafora, Director, Sheridan Elder Research Centre
Sheridan Institute of Technology and Advanced Learning
1430 Trafalgar Road, Oakville, ON L6H 2L1
Tel: (905) 845-9430 ext. 8615, Fax: (905) 815-4230
Email: pat.spadafora@sheridaninstitute.ca

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The goal of this exploratory study, conducted throughout 2005 - 2006, was to examine effective ways to provide both initial computer training and ongoing technical support for elders with little or no computer experience, and to explore whether the accomplishment of acquiring computer skills had an impact on the elders' quality of life. The computer training and follow-up technical support were provided by student volunteers trained specifically for this study. Following the computer training, all participants were offered 12 weeks of ongoing technical support (phone, email or in person) by the same student tech tutors and additional student volunteers. Questionnaires measuring computer comfort and proficiency were administered pre and post training and again at 6 weeks and 12 weeks after the training. Participants kept logs of their computer use and recorded their goals, successes, and challenges throughout the study. The trained and volunteer tech tutors kept field notes of the elders' learning, and recorded the nature of the technical help requested by the participants. A number of common themes were revealed in the narrative data of both the elders and the student tech tutors. These were clustered into four categories: social inclusion; the teaching and learning experience; expanding horizons; and expressions of self-efficacy. Specific challenges encountered by tech tutors and participants are presented and innovative teaching strategies are proposed. Findings point to the need for further studies to explore the psychosocial factors that motivate and hinder elder requests for ongoing technical help as well as the need for outreach to convey the unexpected benefits of going online to nonusers. A number of recommendations and implications for policy, education and further research were highlighted by the study.

1. Introduction

The overall theme of technology research at the Sheridan Elder Research Centre (SERC) is to enhance the inclusion of elders in a technologically driven society with the objective of maintaining and enhancing quality of life. Contrary to beliefs about elders being technophobic, studies that have investigated attitudes about technology report that elders are receptive to learning new technologies and experience a positive attitude change after involvement with technology (Weisman, 1983; Brown et al, 1990; Jay & Willis, 1992). More recent studies have suggested a positive relationship between computer use and well-being for elder adults (Cody et al, 1999; Heyn Billipp, 2001). White & Weatherall (2000) proposed one of the most significant reasons for elder computer use to be communication with family and friends.

Once the oldest Baby Boomers reach later life, this older cohort will begin increasing even more rapidly than it has in the past (Foot, 2002). A growing number of health, financial, leisure, social and educational resources geared to this elder population are becoming available on the World Wide Web. Computer users take these online services and resources for granted, but elders who would like to shop, bank, apply for a Canada Pension Plan Retirement pension, or make travel arrangements online may not have the requisite computer skills. As mobility of elders declines, the potential for web based service delivery increases, but only if they have access.

Even though older Canadians are the fastest growing cohort online, the proportion of users declines with age, dropping from one in eight at age 60 to one in twenty among those aged 75 and older (Silver, 2001). There exists a large percentage of elders who are non-users. Adler (2002) proposes that the majority of elders are 'late adopters' of technology, not because they resist technology per se, but because access is not easily available, they have not felt the need, it is costly, and is not easy to learn. He predicts that as the benefits of technology become more apparent and compelling to elders, more will embrace it. However, a number of factors including the complexity of computer technologies, the time and effort required to learn to use them, and the sensory, cognitive and dexterity changes of normal aging continue to be major barriers for older adults (Kelley & Charness, 1995; Czaja & Lee, 2001). Despite the advances in accessibility features of newer computers and software packages, a novice user of any age would have difficulty modifying the default settings without some assistance.

Many elders are now being encouraged by their children and grandchildren to go online in order to keep in touch by email. This allows families to connect across distances and across generations. In a review of the literature on computer use and quality of life, White summarizes the key benefits of a social support network and its potential to reduce depression and decrease loneliness (White et al, 1999). More recent studies have demonstrated additional psychosocial¹ benefits and describe the computer as a tool to alleviate social isolation by strengthening family connections and by providing opportunities to develop new social networks (Clark, 2002; McMellon & Schiffman, 2002; White et al, 2002). The advent of e-learning and the potential for elder learning 'anytime, anywhere' are also compelling reasons to explore ways to encourage more elders to go online.

Many of the studies of computer use by older adults have taken place in retirement homes and long term care facilities where the training is of an extended duration over several months (McConatha et al, 1995; White et al, 1999; Namazi & McClintic, 2003). Other studies have examined computer courses for older adults offered by community centres and libraries (Larkin-Lieffers, 2000; Segrist, 2004). These are generally for a limited duration with no ongoing technical help once the classes end.

The primary site for the computer training in this study was the Internet Café of the Sheridan Elder Research Centre (SERC) which is located on the campus of the Sheridan Institute of Technology and Advanced Learning in Oakville, Ontario, Canada. Although a number of computer training programs for elders use peer tutors it was logical to choose an intergenerational training model for this study as SERC has access to adult students in the wide range of diploma and applied degree programs at Sheridan. Although not the primary focus of this study, intergenerational programming has been shown to enhance the lives of people of all ages and has a role in challenging intergenerational stereotypes (Ventura-Merkel et al, 1989; Seedsman et al, 2003).

¹ A holistic approach that builds on each person's strengths.

This study was also carried out at two off-campus sites located in the community. Research partnerships were created between SERC and a retirement home in Oakville and a long term care facility in Hamilton².

2. Purpose

Few studies have explored the factors related to continued computer usage after elders complete computer training and none appear to examine how elders acquire needed technical help. A study of residents in long term care observed a rapid decline in computer use after an initial enthusiasm with using the Internet (Namazi & McClintic, 2003). To that end, the nature and extent of age appropriate training and ongoing technical support for elders with no computer experience is a central focus of this study. This builds on Sheridan's institutional strengths in technology by adapting Sheridan's technical support system and learning techniques to the needs of older learners.

Even experienced computer users encounter usability problems when they have to learn new systems. The growth in the information technologies support industry attests to this ongoing consumer need for technical support. Those in the workplace are able to access in-house technical staff or get help from co-workers. Many older adults today retired before computers became ubiquitous in the workplace.

Increasingly, computer companies and Internet service providers offer call centres and online support but access to these services requires a basic level of computer proficiency and comfort with technology that many elders do not have. The vision and hearing changes of normal aging create further barriers to using these support desks.

In 2003, SERC carried out a pilot study with a small group of elders living in the community to explore the benefits and challenges to acquiring computer skills. This study concluded that unwillingness to use new technology was not a barrier. "Rather, it is the accessibility of technology and the lack of computer training opportunities that were identified as significant obstacles" (Klein, 2003). All participants were enthusiastic about their learning and reported being motivated by the social interaction and safe, positive atmosphere created during the classes. Although they stated their intentions to continue using the computer after the classes ended, they were not confident they would remember what to do on their own. For those who asked their children or grandchildren for assistance at home, the family member either provided directions too quickly for them to follow, or were not available to provide regular technical support.

Based on the above observations, this study was undertaken to address the following

² Qualitative data derived from the Sunrise and Shalom research sites will be documented as case studies in a separate SERC report.

three questions:

1. What factors related to the nature of the computer instruction itself are the most significant in assisting elder non-users in learning basic computer skills?
2. Following six weeks of basic computer training, what is the nature and extent of ongoing technical support requested by elder computer users to maintain and build upon learned computer skills?
3. In what ways does the accomplishment of acquiring computer skills impact the older adult's quality of life?

3. Methodology

The qualitative orientation of this study reflects the psychosocial focus of the Sheridan Elder Research Centre (SERC). This approach recognizes the individual variability in experience as well as the unique life experiences of the elders who participated in this study. Their experiences will be conveyed throughout this report by the use of quotations that were recorded through written questionnaires and logs, and informal conversations which the tech tutors recorded in regular field notes.

3.1 *The Tech Tutors*

3.1.1 Recruitment

This study adapted Sheridan's tech tutor model by training student volunteers as 'Senior Tech Tutors'³ to provide computer training and ongoing technical support to the older participants. A request for student volunteers was sent to the Deans of the four Schools at Sheridan and to the Dean of Continuing Education. The Deans were asked to forward a recruitment flyer (Appendix C.1) to faculty, to share with their students, describing the research study, criteria, and expectations. Posters were also displayed on bulletin boards throughout the campus. The criteria requested for applicants included computer skills, good communication and problem solving skills, patience, and an interest in teaching elders. Although some faculty were skeptical that students would volunteer for such an extended commitment, three factors seemed to motivate the students. First the Internet Café where the training took place is located on the campus where the students attend classes. Secondly, the opportunity to participate in an applied research study which provided hands-on experience linking theory with practice is not available in most academic programs. Third, all the participants were aware of the aging demographics and knew that practical knowledge of the aging population would assist them in seeking employment, no matter what career area they were pursuing.

3.1.2 Tech Tutor Profiles

3.1.2.1 SERC site. Of the 31 people who responded, ten students (six females) who met the criteria and were willing to make the full year (academic) commitment were

³ For further information and an evaluation of the Tech Tutor Training refer to Sheppard, N. (2006). *SERC Report Series - # 15*.

recruited for training. All signed a contract and completed a Volunteer Profile (Appendices C.2 and C.3, respectively). They ranged in age from 20 to 31. (One person did not provide a date of birth on the form.) The mean age based on the nine individuals was 22.4 years ($SD = 3.6$); five were born in Canada; the rest were born in China, Egypt, Jamaica, Korea, and Poland. Nine listed English as their first language. They had between 6.5 and 22 years experience using a computer. On a scale from 1 to 10 with 1 indicating no computer skill, seven students gave a rating of eight or higher with four as the lowest rating given. The students were also asked to rate their level of skill with specific computer topics such as games, 'chat', and computer problem solving. All of the students rated their skills at seven or higher for word processing, the internet, email, file management, software, while only five gave that level of rating for the other skills. They had varying degrees of experience communicating with elders, ranging from none ($N = 3$), to a lifetime of experience with grandparents. On a second question about their experience communicating with elders, with 1 indicating 'no experience', all gave a rating of five or higher. In addition, eight of the ten tutors also indicated that they had had some previous experience teaching older adults to use a computer. The tech tutors were also asked to list their reasons for joining the study. The most cited reasons were to gain experience for their careers, and to learn more.

In addition, ten other student volunteers (nine females) were recruited to give post training computer support in the open lab sessions. These tutors ranged in age from 19 to 59 ($M = 26.6$ years, $SD = 12.4$). Seven were born in Canada; the others were born in Guyana, Poland and Sri Lanka and eight listed English as their first language. They had between seven and 14 years experience on the computer and all rated their level of computer skill as at least 7 on the 10-point scale. For their level of skill with the various computer topics, all students considered themselves to be adept at word processing, the internet and email, giving a rating of 7 or higher. For the other topics, several of the students gave ratings below 7 and as low as 2. All of these students had at least one year of experience communicating with older adults, up to a lifetime. Similar to the trainee tutors, they all rated their experience communicating with older adults as at least 5 on the 10 point scale. Five had some additional experience teaching older adult to use a computer. Interestingly, the reasons these students gave for volunteering in the project were more related to learning more about and helping older adults rather than career experience.

3.1.2.2 Off-Campus Sites⁴. At both satellite sites the tech tutors were students or staff already knowledgeable about aging, communication and basic technology skills. At the Oakville site the students' participation was part of their field practicum in Sheridan's Social Service Worker Gerontology Program. Of the three students at the Hamilton site, one was in the Honours Biology and Psychology Program finishing an independent study course in Gerontology at McMaster University. This student

⁴ For further information about the results from these sites, see *SERC Report Series - # 17*.

also directed an activity with older adults at the site; the other two were recent graduates of the Gerontology Program at McMaster.

3.1.2.2.1 Oakville Site. There were two tech tutors, one male and one female, both aged 19. Their first language was English and they were born in Canada. One had seven years experience using a computer and had volunteered at a longterm care facility in grade nine. The other tutor had ten years experience using a computer and three years working with older adults. They had had no prior experience teaching older adults, but rated their experience communicating with older adults as 8.5 and nine on the ten-point scale. For their level of skill with the various computer topics, both students gave ratings of seven or higher for all except games which one student gave a rating of five. Both students expressed enthusiasm for the project and thought it would be an enjoyable experience.

“.. being able to teach [older adults] how to use the computer will help them with improving their quality of life! ...also have a great time while I’m at it”.

*“I thought it would be a great learning experience to teach older adults.
...Plus...it would be a great deal of fun to teach them to use the computer”.*

3.1.2.2.2 Hamilton Site. The tech tutors were three females aged 20, 23 and 28. All listed English as their first language. Two were born in Canada and one listed her birthplace as “Iran/India” and also spoke Farsi, Dari, and Hindi. They all had at least ten years experience using a computer and at least four years working with older adults. All had had some experience teaching older adults and rated their experience with communicating with older adults at eight or higher. They rated their level of skill with the computer topics at six and above except one who gave a rating of four for ‘chat’ and one a rating of three for games. Each had different reasons for participating in the project.

“I think this is valuable research”.

“I was interested in observing how this generation of older adults would receive the computer”.

“More volunteer work”

3.1.3 Tech Tutor Training

Three training modules (Appendix A) were developed to train the ten student volunteers as ‘Senior Tech Tutors’. This training included not only instruction specific to teaching basic computer skills to elder non users but content specific to sensitizing students to the aging process and effective communication skills to be used in their work with the elder participants. Information was also provided on data collection and documentation in a qualitative research study. The modules were taught with a combination of informal lectures, handouts, demonstrations, practice teaching, role

plays and discussions. The class gave feedback to each student who taught a practice lesson followed by a discussion about effective teaching strategies.

Because one of the tech tutors at the Hamilton site already had considerable knowledge and experience with older adults and with providing computer training, she did not attend the tech tutor training sessions at SERC. Working as a recreation assistant she was designated as the on-site resource for the other student tech tutors there. One of these students attended two of the training sessions and the other attended the last session. They were given handouts and online teaching materials from the Tech Tutor Training.

The Oakville site became part of the research project after the completion of the tech tutor training. Both tech tutors were students in Sheridan's Social Service Worker Gerontology Program which is part of Sheridan's laptop initiative. Both students use laptops in most of their classes and were very familiar with computers and older adults. They received an orientation to the project and were given handouts and online teaching materials from the Tech Tutor Training.

3.2 The Older Adult Participants

3.2.1 Recruitment.

To be eligible for the study, the participants at all three sites had to be at least 60 years of age, non-computer users with a good command of the English language and no apparent cognitive impairment. Participants at the SERC site had to be able to travel to this location twice per week.

Fifty flyers (Appendix D.1) were mailed to Halton and Peel churches, libraries, recreation centres, long term care facilities & retirement homes. Alzheimer Services (Victorian Order of Nurses (VON), Halton Branch), which operates a Senior Day Program within SERC, sent letters and flyers to 100 of their caregivers & volunteers. Recruitment closed after one week due to an overwhelming response. Applicants who returned a completed consent form (Appendix D.2) to the SERC site were invited to attend one of four computer classes. Staff at the two satellite sites invited eligible residents to indicate their interest in joining the study.

3.2.2. Older Adult Profiles

3.2.2.1 SERC site. All recruits (N = 32, 19 females) completed a pre-training package which included demographic questions. They ranged in age from 61 and 88 (Mean age 76.3 years for 30 individuals; the remaining two, for which the exact year of birth was not available, gave their ages as between 75 and 79). Twenty-three were born in Canada (21) or the U.S. and the rest were born in the United Kingdom (3), the Netherlands (3), Portugal (1), Indonesia (1), and Germany (1).

Eighty-four percent (27) said they were retired; three did not respond to that item. The majority of the recruits had at least some secondary or high school education. One person indicated that they had no formal schooling, but also indicated that they

had some university education. Nine had completed university and five had attended graduate school. There was a wide variety of former occupations endorsed from the list given, such as executive (3) and professional (9), managerial, sales (2), clerical/secretarial (5) blue collar (3), homemaker (4). Some checked more than one category (e.g. homemaker and clerical/secretarial).

3.2.2.2 Off-Campus Sites. Participants at both sites were retired individuals in assisted living arrangements.

3.2.2.2.1 Oakville Site. There were six older adults, two men and four women between the ages of 83 and 93. Two were born in Canada, one in the U.S., two in England and one in South Africa. All listed English as their first language. One had had no formal schooling, one had some primary school, three had completed university and one had attended graduate school. Their occupations were reported as professional (3), para-professional (1), Homemaker (3), and clerical/secretarial (1). Two people checked more than one category. Two of the six had used a computer before, and one had a computer at home. Their reasons for not learning how to use a computer until now were lack of time (2), lack of interest or need (3), lack of regular technical support (2), no access (3), not knowing computer language(1), and low vision (1). Their overall goals for learning to use the computer were to “*serve my interests*”, “*being able to use it*”, “*learn the basics*”, “*to write letters*”, “*...explore the possibilities*”. (For further information on these participants, see *SERC Report Series - #17*).

3.2.2.2.2 Hamilton Site. These older adults were two men and two women. Three were born in Canada and one in Chile. All listed English as their first language. Two had some secondary or high school education, one had some post-secondary education and one had completed university. One reported being a former para-professional, one in a managerial, sales position and one was a homemaker. One did not indicate having had an occupation. Three of the four had used a computer before and one owned a computer. The reasons given for not learning how to use a computer until now were: lack of interest (3), lack of time (1), lack of regular technical support (2), hand dexterity (1), not knowing the computer language (1), fear (1), and no access (2). Because the Pre-training Computer Goals, Comfort and Proficiency questionnaire was inadvertently omitted for these participants, no data is available for those questions. (For further information on these participants, see Report #17).

3.2.3 Training Procedure⁵

Group computer classes at SERC (maximum 10, average 8 participants, each with a minimum of 2 tech tutors) were held twice weekly for one hour for six weeks. Two

⁵ For further information and an evaluation of the Elder Computer Training Experience refer to *SERC Report Series - # 16*.

classes were held in the morning, one was mid afternoon and one was held in the evening. At the first session, participants completed a Pre-Training Questionnaire Package (see Appendix D.3) which contained questions about their previous computer experience, their comfort and proficiency with the computer and their goals, their interests and the demographic questions.

Each person at the SERC site had access to an IBM desktop with Windows XP. Participants at the satellite sites had access to an IBM Thinkpad R51 with Windows XP. One participant at the Hamilton site used his own Macintosh desktop. All participants had access to a combination printer/scanner/photocopier. The laptop users had the choice of using a wireless mouse, trackpoint or touchpad. The desktop users had a basic wired 2 button mouse. The only other difference was the delivery. One of the satellite sites provided individual computer lessons in participant apartments while the other satellite site provided small group lessons (maximum 3 per group with one tech tutor) in the Activity Room of the retirement home.

The tech tutors followed a set curriculum (Appendix B) but created their own lessons and handouts depending on the needs and learning styles of their participants.

In an effort to respond to diverse learning styles, the computer training sessions were designed to provide a combination of PowerPoint presentations, short lectures; demonstrations projected on the screen, written instructions on the whiteboard (at the SERC site only), typed handouts with graphics, short practice exercises, and individual coaching. Participants were encouraged to keep logs of their computer use using a list of seven open-ended questions asking about their activities on the computer, their successes, challenges, their need for help (see Appendix D.4) and their feelings. They were also encouraged to practice between classes. Not all participants had access to a computer at home, which is one of the reasons why lessons were held twice per week. One of the recommendations from the participants in the SERC pilot study was to have lessons twice weekly to assist recall.

At the end of the 6 weeks of training, participants completed another questionnaire to assess their feelings of comfort and proficiency and their satisfaction with the training (see Appendix D.6). The training was followed by 12 weeks of ongoing technical support. Participants were encouraged to continue using the computer for 12 weeks, to document their successes and challenges and to record the nature of any technical support needed, how they received the help and whether it resolved the issue (See Appendix D.5). They were paired with one or more of the same tech tutors who provided their training or with one of the additional untrained student volunteers and were invited to contact the tech tutor by phone or email to ask for assistance as needed.

Open Lab times (8 hours per week) were also available at SERC on a drop-in basis. The Open Lab was set up especially for those who did not have a computer at home

but was available for anyone in the study. The tech tutors at all sites completed a call tracking form (Appendix C.5) for each tech help request.

4. Results⁶

SPSS (Statistical Package for the Social Sciences) was the software used to input the data from the Tech Tutor Profiles (Appendix C.3), Tracking of Help (Appendix C5), the Pre-training Questionnaires (Appendix D.3), all Computer Comfort and Proficiency and Satisfaction Questionnaires (Appendices D.6 and D.8). The tech tutor field notes (Appendix C.4) and the participant logs written during training (Appendix D.4) and during the 12 week follow up (Appendix D.5) were typed into Word documents and examined for a-priori and post hoc themes by three readers.

4.1 Participant Prior Computer Experience

Sixty-eight percent of the participants had used a computer before and the same number of individuals had a computer in their home with 56% of all participants having access to the internet at home. Of those with a home computer, seven reported having experience with email, while the rest had used the computer for a variety of other activities such as saving and printing pictures, games, and some data entry for accounting. Thirteen participants described prior attempts to learn the computer. They were generally dissatisfied with the experience, and cited various reasons such as “instruction done too fast”, “waste of time”, and “no hands on”. One individual had “forgotten it all!” and another had to drop out because of caregiving responsibilities. Participants in general indicated a low level of computer use. As computer users, they described themselves with such words and phrases as “low end”, “a long way to go”, “no skills”, “illiterate”, “a novice”, “very limited”.

When those who had no prior computer experience (N = 10) were asked why they had decided to learn now, five said they wanted to use the computer to communicate with family, while the others cited personal interest, and reasons such as “it was the right time to start”, and “better late than never”.

When participants were asked to indicate which reasons had kept them from learning the computer in the past, the most frequent were “do not know the computer language” (75%), “lack of regular technical support” (59.4%) “no access to a computer” (40.6%) and “lack of interest” (40.6%). Other reasons endorsed were “lack of time” (34.4%), “previous lessons at too fast a pace” (25%), and “too frustrating” (21.9%). No one endorsed low vision or hand dexterity limitations.

⁶ We remind the reader that the emphasis here is on the SERC site only. For the results from the satellite sites, see *SERC Report Series - # 17*.

4.2 Participant Interests and Learning Objectives

4.2.1 Computer Topics

The most common computer topics of interest to the participants were: searching the internet (93.8%), computer terminology (90.6%), email (84.4%) and scanning (71.9%). They also expressed interest, though less, in learning about word processing (65.6%), file management (62.5), printing (53.1%), and specialty software (46.9%) Interestingly, only five participants expressed any interest in writing their life story.

4.2.2 Internet Sites.

Travel and tourism (59.4%) was the most common type of internet site of interest to the participants. See Table 1 for the percentage of participants interested in each of the various sites listed.

4.2.3 Overall Goals.

The most common goal mentioned was to increase communication with family and friends either through email or “to understand what my family is talking about” (N = 16). Participants also expressed a desire to be more comfortable with the computer, to be efficient/proficient and to gain confidence. They indicated that attainment of these goals would lead to positive feelings of accomplishment and success, confidence, and happiness.

4.3 Participants’ Anticipated Learning Barriers and Facilitators

For anticipated barriers, the participants’ responses fell into two main categories: internal and external sources of difficulty. The internal sources were expectations of poor memory, inability to understand, lack of confidence, and physical ability. The one external barrier was lack of support, because of the number, quality and availability of instructors. The responses describing facilitators were less definitive, because some participants misinterpreted this question to be about the advantages of learning to use a computer. Those who did answer the question as intended stressed the quality and availability of instructors as an important factor as well as the importance of hands-on experience.

4.4 Participant Comfort and Proficiency

4.4.1 Prior to Training. The participants’ responses on the computer comfort and proficiency questionnaire (see Appendix D.3) prior to training supported the view that these individuals were indeed low-level computer users. On a seven–point scale where 1 indicated no proficiency and 7 indicated mastery, the mean ratings were 2.27 or lower for proficiency with using the mouse, email, searching the internet and engaging in specific computer activities such as games, creating greeting cards or bookkeeping. (Standard deviations ranged from .93 to 1.26 for these scores). Their mean comfort level was also only 2.25 (SD = 1.56). On the other hand, their mean confidence level ‘for learning new things about using the computer’ was relatively high at 5.52 (SD = 1.92).

4.4.2 Post Training. Following training, the participants were again given the computer comfort and proficiency questionnaire (see Appendix D.6) which was completed by 25 of the 32 trainees. Within sample t-tests were conducted to compare these scores with those prior to training. As expected, mean proficiency ratings after training for controlling the mouse, using the computer to contact family and friends, search the internet and engage in specific activities all increased significantly. The participants were also significantly more comfortable using the computer following training. In contrast, confidence in learning new things about the computer did not increase, most probably because of the already high confidence levels prior to training. See Table 2 for the mean ratings and *t* values. It is still useful to note, however, that even at post training, three of the six scores were still below the mid-point of the scale.

After six weeks, participants were asked to complete the Computer Comfort and Proficiency Questionnaire again. Unfortunately, very few participants complied. The mean proficiency scores (N = 9) were: controlling the mouse, $M = 5.0$ ($SD = 0.71$); using the computer to contact family and friends, $M = 4.44$ ($SD = 1.13$); searching the internet, $M = 4.22$ ($SD = 1.72$); engaging in specific computer activities, $M = 2.33$ ($SD = 1.22$). The means (N = 8) for comfort and confidence were 4.87 ($SD = 1.36$) and 5.8 ($SD = 1.75$) respectively. Because of the small N, no statistical comparison with earlier scores was possible.

After 12 weeks, participants were asked to complete the Computer Comfort and Proficiency Questionnaire one more time. Again, only nine participants complied, five of whom had also completed the six week version. The mean proficiency scores were: Controlling the mouse, $M = 5.5$ ($SD = 1.12$); using the computer to contact family and friends, $M = 4.78$ ($SD = 1.99$); searching the internet, $M = 5.00$ ($SD = 1.41$); engaging in specific computer activities, $M = 2.67$ ($SD = 1.87$). For comfort using the computer, $M = 4.89$ ($SD = 1.62$); for confidence learning new things about using the computer, $M = 6.22$ ($SD = 1.30$). All of these means are numerically higher than those reported prior to and immediately after training, albeit based on a select few, who by continuing to complete the later questionnaires were perhaps indicating more engagement with the project than other participants.

4.5 Participant Satisfaction

Immediately following training, participants also rated their satisfaction with the training sessions in terms of content, organization, the tech tutors and the nature of the class materials (See Appendix D.6). All items were presented with a 5-point scale where 1 indicated 'very dissatisfied'. Between 23 and 27 of the participants completed the various items in this questionnaire. The mean ratings for satisfaction with content ranged from 3.50 to 4.07; for course organization, from 3.7 to 4.7; for the tech tutors, from 4.33 to 4.57 and for class materials, from 3.63 to 3.89. Although only 21 of the 32 participants responded to the item asking for an overall rating of the teaching, the mean rating was over the neutral point of the scale (3) at 3.67. In general, responses to this questionnaire suggested that the participants were quite satisfied with the training, giving ratings that were all above the neutral point. Data from the open-ended question

asking what the tech tutors did well and from the participants' logs supported this conclusion. Participants described the tech tutors with such adjectives as "great teachers", knowledgeable, patient, helpful, understanding, enthusiastic, and obliging. On the other hand, when asked how the tutors could improve, they suggested that there be more precise lesson planning, more individual attention, more practice and review, more time (i.e. "slow down!"). These types of suggestions also appeared in the logs written by the participants during training (see Table 3 for the frequencies of each suggestion from the logs). It should be noted that the suggested improvements were addressed more to the structure of the training rather than to the tech tutors themselves.

Twelve weeks following training, participants were asked to indicate, on a 5 point scale, their satisfaction with the post training support and the tech tutors (See Appendix D.8). Again, very few participants complied at this point in time. The means ranged from 3.86 ($SD = 0.69$, $N = 9$) for difficulty level of content, to 4.57 ($SD = 0.79$, $N = 7$) for ease of access to help and location. For the tech tutor component of the support, the participants gave the same satisfaction rating of 4.50 for the tutors' overall help, the tutors' knowledge of the subject, their preparation and for appropriateness of the examples used, and 4.67 for the tutor as a source of motivation. A separate question asking participants to rate overall tech help on a 5 point scale where 1 meant 'a bomb' and 5 meant 'fantastic', the mean of the seven participants who responded was 4.5 ($SD = 0.58$).

4.6 Tracking the Post Training Support Experience

A primary focus of this study was the process of providing ongoing technical support for twelve weeks following the end of the formal computer lessons. All participants were offered the availability of help through email, telephone or home visits. In addition, open lab sessions were held for eight hours a week at the SERC site.

Contrary to expectations, even when this free technical support was available from tech tutors known to the participants, only twelve of the 32 participants took advantage of the technical support offered. One man hired an older neighbour to provide individual technical help in his home. Another participant preferred to use computer books because he had "*trouble finding the words*" to describe what help he needed with the computer.

In all, there were 38 follow-up contacts made by the 12 participants. Two were by telephone; two were home visits, but none by email. The main preference of contact was through the open labs (31) showing that face to face assistance was preferred, in spite of reported comfort with sending and receiving emails. All of the contacts were made by those who had attended the Tuesday and Thursday training sessions, 24 by the morning group, 12 by the evening group and two from the afternoon group. The number of contacts per participant ranged from one to six. Sixteen tech tutors provided support, the ten student volunteers and six of the ten trained tech tutors. These tutors each helped from one to five times.

For each contact, the tech tutors were asked to complete a 'Tracking of Tech Help' form (see Appendix C.5), to indicate how contact was made, the length of contact, the reason(s) for the contact, the nature of the resolution of the issue, and the perceived emotional state of the participant before and after the interaction. Finally, they were asked to record any anecdotes or quotations that would help illustrate the nature of experience.

The length of the interactions varied from five minutes to two hours ($M = 45.5$ minutes, $SD = 28.9$). By far the most common issues of interest to the participants were accessing email (12) or otherwise using email (26) and accessing Google (17). Help was also required for managing the computer itself, e.g. turning it on or off, logging on, using the mouse (28), while word processing (4) file management (7) and printing (2) were indicated less frequently (note that often, more than one issue was checked for any one contact occurrence). Of the 38 contacts, 81.6% (31) were resolved, three were not, three were described as 'yes' and 'no', and one response was missing.

As noted earlier, the majority of issues were successfully resolved. The strategies successfully used by the tech tutors were:

- Demonstration/walking through step by step
"Showed where to look for the software if already there on the computer. If not, (I) showed her how to look for it and download it".
- Prompting /correcting
"...kept typing .. email address into the Explorer address bar. (He) needed prompting to recall".
"...was reminded of the steps and was asked to repeat them"
- Writing out instructions,
"We went through the steps and wrote out instructions."
- Explanation/clarification,
"...(resolved) through explanation and going through it over again till...understood."
- Encouragement,
"I stood by and gave 'encouragers' to ...while he started the computer."
- Help with reading
"She had sore eyes and blurry so I read the email for her and composed. She will do herself when her vision is better."

The issues not resolved were because of technical difficulties preventing access to email or the internet or because a participant mistakenly thought that email on a home computer could be read using an open lab computer.

To indicate their perceptions of the emotional states of the participants before and after each contact, the tech tutors were asked to check any of the following: 'problem solving approach', 'encouraged', 'frustrated', 'motivated', 'excited', 'comfortable', 'deflated', 'confident', 'feeling stupid or embarrassed' and 'impatient'. (See Table 4 for how often each perceived emotional state of a participant was endorsed by the tech tutors before and after the interaction). To further examine this data, all of the items except 'problem solving' and 'impatient' were labeled as positive or negative. ('Problem solving approach' and 'impatient' were not considered to be as relevant as the others in terms of states usually associated with learning or easily classified as positive or negative). For each contact, positive scores were computed, one before and one after the help had been received, by adding the endorsements given to the positive items ('encouraged', 'motivated', 'excited', 'comfortable', 'confident'). Similarly, negative scores before and afterwards, were computed by adding the negative item endorsements for each contact ('frustrated', 'deflated', 'stupid or embarrassed'). A sign test revealed no significant difference for either the positive ($Z = 1.14, p > .05$) or the negative scores ($Z = 1.46, p > .05$). However, there was a suggestion that the emotional state of the participants overall was improved after contact. The number of positive items checked increased numerically from before to afterwards, while the number of negative items endorsed decreased (See Figures 1 and 2 respectively).

The anecdotal information recorded by the tech tutors after contact revealed for the most part, a group of individuals who were very engaged in their computer learning. They showed curiosity and pleasure at finding resources and solutions: "*P was very happy and excited to have her [electronic file of] ThinkPad instruction manual*". Another "*is learning to dance and...found a web page with the dance steps*". Still another "*was excited to find a site where she could play golf*". Several spoke of plans to advance further by buying more equipment (e.g. a scanner) or by using online services from official organizations and governments. There was also evidence of appreciation for the availability of the open lab: "*I think this is great that you folks are opening this lab. I will come every week*". "*You are so patient*".

4.7 The Issue of Compliance

Of the 32 original participants, very few completed most or all of the comfort and proficiency and satisfaction questionnaires. Lack of compliance with the completion of logs and various questionnaires was an issue for this project so we examined the demographics, prior and current computer experience, goals and support seeking behaviour of the eight trainees who were the most compliant during this project. Of the eight, five were women and the age range was from 67 to 88 (Mean = 78.5 years (Mean age for all 32 = 76.3)). Six of these individuals had used a computer prior to training, five had a computer at home at the beginning of the project, seven had internet access either at home or elsewhere and six had other access to support beyond the post training help. Four were from the morning and three were from the evening Tuesday/Thursday classes, and one was from the Monday/Wednesday class.

The computer related goals of these eight individuals were either very general (“To enjoy it”; “To make it serve me”, “(to be) computer efficient”, “To become efficient and at home with the computer”, “To be able to use the computer”) or more specific in terms of communication through email with family and friends (“email, searching the web”, “To communicate with my family”, “email to contact family and friends”).

None of the above factors easily account for these individuals’ higher level of engagement in the project except that they may have already been ‘launched’ towards computer learning prior to arriving at the training sessions as evidenced by the level of their prior computer experience described above. It was discovered that four of these individuals were also taking part in the “Crystal Memories” project⁷, another SERC computer project being conducted during the post training follow up period. In addition, these four and two additional participants who completed the majority of the questionnaires accounted for 25 of the 38 support requests during the 12 weeks following training. It would be interesting to examine to what extent each of these experiences, prior and concurrent, contributed to these participants’ high level of compliance with the project’s objectives.

4.8 The Narrative Data: Themes and Observations

A number of common themes were revealed in the narrative data of both the elders and the students. These were clustered into four categories: social inclusion; the teaching and learning experience; expanding horizons; and expressions of self-efficacy. The following excerpt from one of the participants at the end of the seventh class captures the essence of these themes.

“...a small crack finally opened in the huge door... I traveled to Europe today. I feel happy and enjoyed learning from (name of tech tutor) today.

Until this entry the participant had reported learning nothing from the classes.

4.8.1 Social inclusion

An inclusive society⁸ fosters equality of access, the ability to participate fully within our families, our communities and our society, and the supports needed to facilitate these goals. The aspect of social inclusion most relevant to this study is on the micro level but the findings have implications for both macro (society) and micro (individual) dimensions.

⁷For further information about this project see Hart, R. (2006). *SERC Report Series - # 13*.

⁸ Designated in the *United Nations Principles for Older Persons* as one of the basic rights of older persons.

For most of the participants social support networks were created or enhanced through the experience of learning to use the computer, as illustrated by the following comments:

“I enjoyed going to the classes and being with the other students.”

“I like the feeling of knowing that I am a click away from friends in the Cayman Islands, family in south west Ontario and my daughter in Florida. There is a closeness that was not there before.”

“I will now send an e mail where I would not have picked up the phone. Being able to connect with people quickly when it is not necessary to phone.”

“- it helps close the generation gap. It’s good to be a part of what is going on.”

When asked about his learning from teaching the computer lessons one of the tech tutors wrote: *“I want to do ergonomic design. This program...showed me how important inclusion is to keep people involved.”*

Although most of the participants in this study initially described global goals for joining the study, such as *“to learn what I could do with the computer”*, *“become more familiar with the possibilities”*, and *“finding out what the computer could be used for”*, a specific motivation for many was to learn email in order to communicate more often with family and friends especially when they lived at a distance. One participant wanted to connect by email with his son in Afghanistan stating that regular mail was slow and unreliable.

A few participants acknowledged their children had persuaded them to learn the computer so they could exchange emails and they, in fact, were reluctant to take the time needed to learn the computer. Yet, the majority of these somewhat reluctant learners became eager learners once they saw the possibilities.

A secondary goal of many was to understand computers in order to feel *‘part of society’*. Goal statements by participants revealed that they felt excluded from everyday activities and interactions. One person stated: *“I want to get familiar with all the abbreviations that the youngsters use when they are on the c.p (sic).”*

During the beginning lessons there were many comments about being *‘out of touch’* with today’s world because they did not know how to access the *‘www’* sites listed in magazines, newspapers and on television. By the end of the computer training the participants’ logs indicated a shift in this area as evidenced by the following

statements: *“I recognize references to computer lingo on TV, mags etc. more quickly and I have a better understanding of what they mean.”* In a similar vein, another participant said: *“I feel good that I am now able to speak the language to some extent.”* And *“I can now understand better what my grandchildren are talking about.”* When describing their greatest achievement at the end of the training, several participants exclaimed that they felt they had *“come into the 21st century.”*

4.8.2 The teaching and learning experience

The intergenerational interactions were not the main focus of this study but, for the most part, the elders in this study liked being taught by young adults and it was evident that positive relationships developed quickly among the tutors and their elder students. One of the student tech tutors described the reciprocal nature of his relationship with the elders:

“It was like nothing I’ve ever done before. It was a totally different type of friendship. Their lives, their stories. They put everything in perspective. The experience builds a person, who is more like a mentor, not a teacher or student. We were all students, and all teachers. I learned from them and they learned from me.”

Care was taken to simplify the teaching materials with clear steps and definitions of computer language and to teach only one or two new concepts or skills each class. In spite of this, most participants indicated they would like the material to be taught at a slower pace and to have handouts in even more detail. Recurring challenges were related to the unfamiliar terminology and icons, mouse navigation, not anchoring the cursor before typing, clicking on the wrong spot or the wrong button.

In the beginning the tech tutors needed support to recognize that the participants were making progress, even if in small increments. It was helpful to review the value of ‘going at the learner’s pace’ and reminding the tech tutors that the terminology is completely foreign to those who have not grown up with technology. Several of the elder participants exclaimed that this was *‘like learning a whole new language.’*

When the teaching focused primarily on the computer task rather than on the learning and teaching process both tutors and elders reported an increased frustration. When the tech tutors listened to how the elders were experiencing the computer they developed creative ways to adapt their teaching to better meet the elders’ needs. It became apparent that few, if any, of the participants demonstrated a working conceptual model of the computer system, the Internet and the World Wide Web. Tutors who used analogies and metaphors to explain the computer task in a familiar context found a positive shift in the learning and an increase in problem solving skills. One tutor explained that the typing of the ‘url’ in the web browser was like dialing the phone number on the telephone. It also helped to reframe the difficulties faced by the

elders in the context of the normal learning process. Participants reported less frustration after being told they in fact had to ‘unlearn’ a number of things (e.g. traditional grammatical structures such as leaving a space after ‘www’ and new meanings for everyday words such as desktop) before progressing and that this did not mean they were slow or stupid.

When the participants were asked to describe the factors that facilitated their learning, the most frequent answer was patience. Repetition and ‘*doing it on their own*’ were identified as crucial for long term recall. Other factors were the positive environment, support and encouragement, note taking, and handouts with visual cues. A few identified that the process of being asked questions helped them figure it out on their own. “*I felt I was learning techniques for future problems.*”

4.8.3 Expanding horizons

One of the greatest challenges identified in this study may be how to educate elder non users of the benefits of getting online. A number of the participants in this study fit Adler’s view that many older adults are late adopters because they have yet to see the need for computer literacy (Adler, 2002). The participants alternated between feeling frustrated that they were not learning quickly enough and being completely amazed, enthralled and delighted as they discovered the many possibilities open to them in using the computer and the Internet as evidenced by the following:

“I had no idea this was all here, and it’s free!”

“...it’s mind boggling.”

“This has opened up a whole new world!”

The elders were not alone in experiencing new discoveries. In a debriefing focus group after the computer training, the student tech tutors reported that they learned more than they could have imagined from the experience of teaching the elder participants. “*It was an amazing learning opportunity. A way to broaden skills, learn teaching skills*”. “*It was good to have interactions with seniors...there will be a lot of them in the future.*”

All the tech tutors described an enhanced respect and empathy for the elders in the study. Several commented on the elders’ perseverance at the computer in spite of feeling intimidated, and in spite of various physical challenges. Other students reported they developed greater patience and honed their planning and problem solving skills. Two students referred to this experience as a ‘defining moment’ in their education. One of them described it this way:

"One day, a few weeks into the training, I went home and it honestly just hit me that this was something I would want to get into."

4.8.4 Expressions of self-efficacy

"I feel I have reached the point at which I now know what questions I want to ask."

"...very positive, made me feel smart and competent."

"... continue to be faced with trying to solve problems each time I use the computer but now I 'enjoy it' rather than being frustrated or waiting to have someone show me."

"Used the internet to produce a copy of one of my favourite poems - Good to feel successful. Have looked over handouts - beginning to make some sense of them."

Participating in this study was a transformative experience for both the elders and tech tutors. When asked about their learning from being tech tutors in this study, several said they had not expected to develop teaching skills that they could now apply in other settings. Several reported that it increased their confidence to be taken seriously by those older than their parents. One tech tutor explained: *"I felt good to have older adults listen to me and convey that I had something of value to teach them. It was a real boost to my confidence."*

Most of the participants in this study were initially self-conscious about being computer illiterate and feared they would never learn the common computer language and terminology that they were now hearing on every news report and reading in every magazine. They were curious about the computer in spite of their apprehensions and were motivated by being able to *"show their families and friends they were not as stupid as they felt."* Towards the end of the classes, several participants joked about impressing their grandchildren that they know how to 'Google' and most everyone had a favourite activity from finding waltz steps, reading an overseas newspaper; to checking the weather. Several identified new goals they wanted to pursue on their own. One person announced: *"I feel I must learn the chat line in case I become totally deaf."*

The participants who continued to report progress during the post training period were very proud of their accomplishments and showed creativity in achieving their goals as evidenced in the following:

"I set up the slide projector and screen. Set up digital camera on a tripod. I took pictures of the slides from the screen. Transferred pictures to memory card to

computer. Printed pictures. I had to read a lot and practice a lot. My best challenge was transferring the pictures to the computer.”

“Learned how to record and let record into Audacity on the computer. And then burned onto the cd. My grandson helped with the burning.”

Several expressed how rewarding it was to contribute to the body of knowledge about teaching older adults and to help young people learn and grow. *“I’m so pleased, I’m teaching (name of tech tutor) to teach.”*

5. Limitations

- The participants were primarily white, educated, middle socio-economic English speaking older adults. The results may not be representative of all elders.
- Data from the participants about their progress and feelings must be viewed in the context of a research study.
- This was not a controlled experimental study so causality cannot be attributed.
- There were not adequate resources to assess participant skill level prior to the beginning of the computer lessons. Several participants had never turned a computer on and others had some beginning skills.
- Data collection for this study was dependent on the participants returning their completed logs and questionnaires over the 12 weeks following the computer training. Resources were not available to facilitate this. As a result the types of analysis possible were limited by the missing data.

6. Implications for Policy, Education, and Research

The results of this study provide the basis for a number of recommendations for further investigation. These recommendations fall within five main clusters: Social Inclusion; Teaching, Learning and Research; Technology and Design Challenges; Industry, Government and Marketplace Opportunities; and Systemic Ageism. Within these themes, the recommendations relate to Public Policy (PP), Education (E), Design (D), Research (R), and Practice (P).

Social Inclusion

1. Educate the ‘late adopter’ cohort of elders, of the multiple benefits of ‘getting online’. (E)
2. Develop strategies to involve a diverse population of elders in technology training and design with a focus on accessibility and navigation features. (E, D)
3. Further studies to evaluate the impact of intergenerational interactions between older adults and younger adult tech tutors. (R)
4. Establish a ‘tech pals’ network between Sheridan students and elders in retirement homes and long term care facilities. (P)

Teaching, Learning and Research

5. Further research on elder computer users' motivation for asking or not asking for technical help with the intent of implementing a face to face and virtual Elders' Helpdesk through SERC. (R)
6. Further studies to examine the impact of Internet use on elders' quality of life. (R)
7. Explore the role of conceptual models in the acquisition of computer skills for older adults. (R)
8. Further research to explore the factors that facilitate compliance with research objectives. (R)
9. Develop lessons with self-paced modules and tutorials that incorporate the latest research on lifelong learning and instruction with elders. (D)
10. Disseminate successful learning strategies and teaching resources by posting on the SERC website. (E)
11. Explore strategies and resources to ensure a higher return rate of research data from elder research participants living in the community. (R)
12. Examine the findings in relation to access to e-learning opportunities for elders. (E)

Technology and Design Challenges

13. Design better self-diagnosing systems that can provide easier ways of identifying and fixing technical problems. (D)
14. Create more 'one button' features to eliminate some of the current navigation challenges that exist in even the most basic tasks, i.e. design an alternative for going to 'Start' to shut off the computer. (D)
15. Replicate the study with Macintosh users and Mac tech tutors. (R)
16. Develop age appropriate software and computer simulations that hold an elder's interest, are user friendly and involve older adults in the testing of prototype games and simulations. (D)

Industry and Marketplace Opportunities

17. Advocate for government, foundations and other groups for funding to expand programs that currently assist elders in acquiring computer skills and develop new programs for diverse ethnic groups. (PP)
18. Advise government departments and service industries to utilize the Internet as a complementing media until the majority of elders are online. (PP)
19. Encourage industry to create and market computer packages geared for users who do not want all the 'high tech' options. (PP)
20. Explore incentives for service providers, software and hardware companies to provide elder discounts. (E)

Systemic Ageism

21. Continue to combat ageism by educating the public, social and government services of the insidious impact of ageing stereotypes, especially in relation to the adoption of innovative technologies. (PP)

7. Conclusion

The Internet has the potential to provide a lifeline for elders by providing access to information, support, services, entertainment, commerce, and lifelong learning opportunities. This study mirrors the results of other studies in that it revealed multiple benefits of computer literacy for elders. Through written questionnaires and logs, and informal conversations, this study captured the participants' experiences in becoming computer users. Not only did they feel closer with family and friends, they described much satisfaction and pride in their learning and were thrilled that their experience of the world expanded in ways they never could have imagined. Their anecdotal information revealed many expressions of empowerment and self-efficacy as a result of using the computer and Internet. One of the greatest challenges identified in this study may be how to convey the many benefits of getting online to elder non users. Although efforts were made in this study to customize the teaching based on recommendations from previous studies, the elders and the tech tutors experienced many of the same challenges documented in these other studies, often more a result of interface challenges than from being an elder learner. Industry stakeholders still appear to be primarily focused on 'high tech' users and may not be fully aware of the enormous potential marketplace of the elder consumer. Greater efforts must be made by designers, governments and industry to make technology less complicated with improved accessibility features to enable access by the growing numbers of elders. At the same time, educators can do more to develop innovative teaching strategies and resources that acknowledge the specific learning styles and needs of elder learners. When the needs of elders are taken into consideration, the end product will be better for everyone.

A primary focus of this study was the process of providing ongoing technical support following the end of the formal computer lessons. Even though participants were using email by the end of the training the majority who sought ongoing technical support had a strong preference for face-to-face assistance. Further studies are needed to explore how to provide ongoing technical support to this cohort.

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9. Appendices⁹

A. SERC 'Senior Tech Tutor Training'

1. Training Modules
2. Learning Outcomes

B. Computer Training Curriculum

1. Participant Topical Outline
2. Tech Tutor Topical Outline & Guide for Teaching the Curriculum
3. Script for Initial Start-up

C. Record of Tech Tutor Data

1. Tech Tutor Recruitment Flyer
2. Tech Tutor Volunteer Contract Letter
3. Tech Tutor Profile (previous experience, reasons for joining the study)
4. Tech Tutor Field Notes
5. Tracking of Tech Help (during follow-up period)

D. Record of Participant Data

1. Participant Recruitment Flyer
2. Participant Consents
3. Pre-Training Questionnaires: Participant Data Package
 - Previous Computer Experience
 - Computer Goals, Comfort and Proficiency
 - Computer Interests
 - Demographic Profile
4. Participant Logs of Computer Use during computer training
5. Participant Logs of Computer Use during 12 week follow-up
6. End of Training Questionnaires
 - Computer Comfort and Proficiency Questionnaire
 - Participant Satisfaction Questionnaire (with computer training)
7. End of 6 Week Follow-up Period
 - Computer Comfort and Proficiency Questionnaire
 - Participant Satisfaction Questionnaire (with tech help)
8. End of 12 Week Follow-up Period
 - Computer Comfort and Proficiency Questionnaire
 - Participant Satisfaction Questionnaire (with tech help)

E. Table 1: Internet Sites and Percentage of Participants Expressing Interest

F. Table 2: Mean Ratings for Proficiency of Computer Use, Comfort and Confidence
Prior To and Immediately Following Training

G. Table 3: Suggestions for Teaching/Curriculum

⁹ Contact SERC to receive a copy of any or all of the documents listed.

H. Table 4: Frequency of Endorsement of Perceived Emotional State Before/After Contact

I. Figure 1: Positive Emotions Endorsed Before and After Contact

J. Figure 2: Negative Emotions Endorsed Before and After Contact

Table 1. Internet Sites and Percentage of Participants Expressing Interest.

Internet Site	Percentage of Participants Expressing Interest
Travel and Tourism	59.4
Historical Sites	43.8
Health and Social Service Information	50.0
Online Shopping	12.5
Online Banking	18.8
Music	25.0
Astrology	15.6
Online Games (Solitaire, Puzzles, etc.)	43.8
Online Chat	28.1
Art Galleries and Museums	28.1
Online Newspapers and Radio Stations	34.4
Fitness	15.6
Gardening	37.5
Other	12.5 (e.g. Bridge)

Table 2. Mean Ratings for Proficiency of Computer Use, Comfort and Confidence Prior To and Immediately Following Training (7- point scale; SD in parentheses)

	Before	Immediately Following	t value (df)
Proficiency			
Controlling mouse	2.36 (1.29)	4.50 (0.91)	9.45* (24)
Emailing family/friends	1.69 (1.16)	3.08 (1.76)	4.63* (25)
Searching Internet	1.32 (0.69)	2.92 (1.58)	5.54* (24)
Specific (e.g. games)	1.43 (0.95)	2.52 (1.50)	4.48* (22)
Comfort	2.33 (1.61)	3.83 (1.39)	4.25* (25)
Confidence	5.62 (1.86)	5.92 (1.41)	0.803 (25)

* $p < 0.001$

*Table 3. Suggestions for Teaching/Curriculum, (from participant logs during training).
(Number in parentheses gives number of participants)*

- Class too short / need more time (5) - (versus too tired (1), eyes get too tired (1))
 - Slow down (6)
 - Speed up (2)
- One-on-one or more instructors (7)
- More practice (more homework + hands on) (10)
 - More repetition and review (9)
- Cue sheet or handouts (2)
- More quiet – less talking (2)
 - Don't share completing of the forms – too much chatter (1)
- More use of icons and subsequent choices (1)
- Large print (1)
- More of the basics (1)
- More mouse training (1)
- Explain use of cursor (1)
- Teach use of windows separately (1)
- More computer terminology (1)
- Don't need to know why (1)
- No coffee at the end of of evening class (1)
- Use overheads and laser pointer (1)
- Need advice on getting a computer (1)

Table 4. Frequency of Endorsement of Perceived Emotional State Before and After Contact

Perceived Emotional State	Before	After
Problem solving approach	5	2
Encouraged	9	17
Frustrated	13	5
Motivated	22	16
Excited	9	15
Comfortable	12	17
Deflated	3	1
Confident	8	9
Feeling 'stupid or embarrassed'	5	2
Impatient	4	2

Figure 1. Positive Emotions Endorsed Before and After Contact

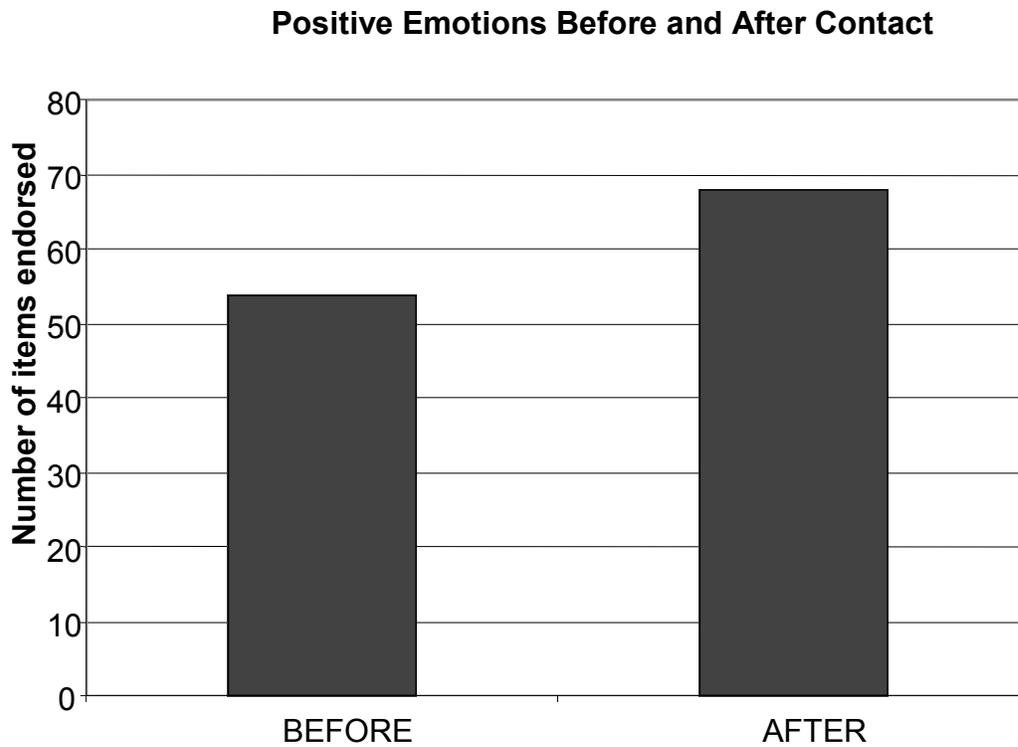


Figure 2. Negative Emotions Endorsed Before and After Contact

