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Technology Assistance and Evaluation Research: Comparing the Computer and the iPad in Technology Tutoring for Older Adults

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Technology assistance and evaluation research: Comparing the computer and the iPad in technology tutoring for older adults

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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

Creative and Performing Arts	Lifelong Learning	Civic Engagement	Human Communication	The Built Environment	Accessible Technology
Promotion of healthy aging

Strategies to increase participation | Addressing barriers to learning

Learning in retirement homes and long-term care | Volunteer work as non-traditional source of personal development | Solutions for older adults with hearing, vision, and cognitive impairments | What is the role of design in health, quality of life, and ability to age at home? | Supporting adult learners of new technology

Development of technology to benefit elders |

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This investigation compared the computer and the iPad in the context of a ten week technology tutoring program for older adults. Nineteen older adults between the ages of 60-84 were paired with nineteen tutors and met weekly for learning sessions during which they explored five learning modules. Participants' feelings, attitudes and beliefs were assessed pre and post intervention, and they provided evaluation of the devices after using them for each module. Initially, all older adult participants reported being more familiar with the computer than with the iPad. The results showed that the learning sessions increased participants' comfort and confidence when using the iPad and decreased their nervousness with the device. Interestingly, their beliefs about the usefulness and value of the iPad changed in an unexpected way. Despite some positive results with regard to the iPad, for most modules the computer appeared to be the preferred device. Overall, these findings suggest that novelty and familiarity influenced the tutoring experience. The implications for future technology training with older adults are discussed.

1. Introduction

1.1 Literature Review

As the global population ages, more research is required to document the specific experiences and needs of the aging demographic. As the demographic landscape changes, current models, policies, products and services may have to be adapted to meet changing needs. Research with older adults and Information and Communication Technologies (ICTs) explores the technology experiences and needs of older adults, what barriers they may face to using technology, how technology impacts their daily lives and quality of life, and their attitudes around learning and technology (Blaschke, Freddolino & Mullen, 2009; Charness & Boot, 2009). ICTs include computer-based communication devices and applications such as email, the Internet, voice technology and videoconferencing as well as computer games (Blaschke, Freddolino & Mullen, 2009). Some research has shown that ICT use may positively impact the quality of life of older adults (Eastman and Iyer, 2004 as cited in Blaschke, Freddolino & Mullen, 2009) by improving social support and psycho-social well-being (Adler, 2006; Czaja & Lee, 2003; White et al., 2002 as cited in Blaschke, Freddolino & Mullen, 2009).

Despite the potential benefits of ICTs, many older adults remain somewhat reluctant to adopt some types of new technology, especially when compared with younger cohorts (Charness & Boot, 2009). The Canadian Internet Use Survey (CIUS) in 2010 revealed that, in a similar pattern as in the U.S.A, use of the internet decreased sharply with increasing age (Statistics Canada, 2010; Charness & Boot, 2009). In 2010, while 94% of individuals between the ages of 16 and 44 were using the internet, 80% of those aged 45-64 were users, 51% of those aged 65-74 and only 27% of individuals over the age of 75 were using the internet (Statistics Canada). This age gap (or 'digital divide') appears to persist despite the fact that individuals over the age of 65 represent the fastest growing group of internet users (Statistics Canada, 2007). One possible way to interpret these trends is that older adults are willing to use ICTs but may experience various barriers to learning and using them. Investigating what these barriers might be and how they can be addressed might be vital in minimizing (or ultimately closing) the digital divide in the future.

Blaschke, Freddolino and Mullen (2009) conducted a literature review of empirical reports in the field of aging and technology focused on barriers to technology use. The most commonly cited barriers that they observed in the literature included: age-related issues (health, mobility, cognitive changes), characteristics of existing technologies, attitudinal issues, financial issues, and training and support issues (as cited in Blaschke, Freddolino & Mullen, 2009). Some researchers have found that addressing the barriers related to training (i.e. teaching computer skills to older adults in a manner that is tailored to their needs and interests) generally reveals that older adults are open to learning new ICT tools and perceive them as having positive benefits (Woodward, Freddolino, Blaschke-Thompson, Wishart, Bakk, Kobayashi & Tupper, 2011). By

providing ICT training appropriate for older adults, Woodward et al. (2011) found that their sample showed increased self-efficacy in executing computer-related tasks, increased ICT use, greater perceived social support and increased reported quality of life.

1.2 Current Research

The Elder Technology Assistance Group (ETAG) is a non-profit organization that addresses training-related barriers by providing a free, accessible, one-to-one technology assistance program specifically designed for older adults aged 55 or older (2011). ETAG has worked closely with SERC making technology assistance and evaluation research possible. The fundamental hypothesis of this work has been that with appropriate and effective training, many of the barriers to ICT adoption that older adults face (age-related, technology-based, attitudinal) may be eliminated or circumvented. The research initiative inspired by the partnership between ETAG and SERC has looked broadly at the technology needs of older adults, their attitudes about technology and the factors that drive successful technology training.

The current project was designed to investigate and compare the experience that older adults have while using two different ICT platforms (the desktop computer and the Apple iPad). Older adult participants in this project worked with their volunteer tutors to learn about five different learning modules and to complete each one on the desktop computer and then on the iPad. We were interested in comparing the computer and the iPad and determining if either device is preferred for certain tasks, and whether either device can facilitate the learning experience for older users.

Some of the questions that were posed at the start of this project were:

(1) How do older adults feel when interacting with each device?
(2) How did the learning sessions impact the attitudes of older adults towards technology, or learning to use it?
(3) Based on the data are there specific approaches that may improve the quality of learning for older adults in technology tutoring programs?

2. Methodology

2. 1 Sample and Procedure

For the duration of ten weeks nineteen older adult participants worked with their technology tutors to complete learning modules on the computer and the iPad and to evaluate their experiences on both devices.

2. 1. 1 Older Adults

To recruit older adult participants, individuals from the SERC research pool were contacted via email regarding this new research opportunity and the project information was posted on the SERC website. Twenty two older adults initially expressed interest in participating, however only nineteen of those individuals completed all the measures necessary to be included in the final data set. The mean

age of the older adult participants was 73.3 (minimum = 60; maximum = 84); eighteen participants were female and one was male. All except one of the participants owned a computer and most reported either being "familiar" with the computer or "a little bit familiar" (nine and seven out of nineteen respectively). In contrast, three participants reported owning an iPad and all nineteen of the older adult participants reported being "not very familiar" with the iPad at the beginning of this study. Beyond the computer and the iPad some other devices that participants reported being familiar with included cellphones and iPhones. When asked what types of technology they would like to learn more about participants identified cellphones (Smartphones, iPhones), tablets and iPads and social media applications such as Facebook and Twitter.

2. 1. 2 Tutors

The tutor participants for this study were recruited from the student body at Sheridan College via email. Volunteer tutors that had previously worked with ETAG were contacted as well. Twenty-three individuals initially expressed interest in volunteering as tutors for this study; complete data were received from nineteen tutor participants. The mean age of the tutors was 27.4 (minimum = 21; maximum = 42). Ten of the tutors were male, and nine were female. All the tutors reported owning a computer and they all reported being familiar with the computer. Although only one tutor owned an iPad, most of the tutors (eight out of nineteen) reported being "a little bit familiar" with the iPad, and an additional seven tutors reported being "familiar" with the iPad. Compared to the older adults, tutors reported more devices and applications that they were familiar with beyond the computer and iPad. Cellphones and Smartphones, iPods, laptops, Mac computers, printers, gaming consoles and audio/visual devices were some of the devices that tutors reported being familiar with. Some applications that they reported being familiar with included: programming languages, Microsoft Office, Adobe Creative Suite, Networking, Web development and multimedia software. Tutors responses indicated that they were interested in learning more about Andriod devices, Apple devices, the Linux Operating System and specific programs such as Photoshop, Maya and Autodesk.

Tables 1 and 2 below compare the familiarity of both participant groups with the computer and the iPad respectively.

Table 1. Number of participants familiar with the computer prior to learning sessions

Participants	Familiar	A little bit familiar	Not very familiar
Older adult	9/19 (47%)	7/19 (37%)	3/19 (16%)
Tutor	19/19 (100%)	0/19 (0%)	0/19 (0%)

Table 2. Number of participants of familiar with the iPad prior to learning sessions

Participants	Familiar	A little bit familiar	Not very familiar
Older adult	0/19 (0%)	0/19 (0%)	19/19 (100%)
Tutor	7/19 (37%)	8/19 (42)%	4/19 (21%)

2. 1. 3 Procedure

Tutors were selected by ETAG through an interview process and were then invited to attend a training session provided in collaboration with SERC. At this session tutors learned about their responsibilities, the structure of the tutoring sessions, and appropriate facilitation and communication strategies.

In the first week of the study, participants from both groups met with researchers to be briefed about the project and to complete all pertinent paperwork. Following this, all participants were asked to complete the Pre Intervention Questionnaire (See appendix A) which provided baseline data about their experience, feelings, attitudes and beliefs concerning technology. At this time, the older adult participants were paired with tutors based on their shared availability and the pairs scheduled the day and time that they would meet weekly for their learning sessions. Each pair of tutor and older adult had ten scheduled sessions during the ten weeks of the study; with five sessions for selected modules and five sessions for pre and post intervention measures and open sessions (during which the training material was selected by the older adult). Finally, older adult participants were asked to select the five modules that they were most interested in learning about in their sessions.

The list from which modules were chosen was a compilation of the ten most requested learning subjects provided by ETAG; it represented a range of computer applications from communication/social media to information gathering and entertainment. For the purposes of this study each module was split into several functional components to guide the learning process. For example, for the Email module, participants were asked to compose a new message, attach a photo, and send a message (For the list and a detailed description of the modules, please see Appendix B). Each component had to be completed by the older adult with the help of their tutor, before the next module could be started. All the modules assumed that older adult participants had the necessary background understanding to complete the tasks (i.e. an understanding of web-browsing). If an older participant did not have this requisite knowledge tutors were asked to use the first week to assist with these basic skills.

Between weeks 2 and 6, every tutor and older adult pair completed one module per meeting. They were asked to complete the module components on the computer, followed by the Computer Module Assessment (See Appendix C); and then on the iPad, followed by the iPad Module Assessment (See Appendix C). The order of which device was used first each week was counterbalanced across sessions.

In week 7 participants completed the Post Intervention Questionnaire (See Appendix A), which was used to re-assess participants feelings, attitudes and beliefs after the learning session intervention.

During weeks 8 – 10 and upon completion of their selected five learning modules participants were encouraged to explore the other modules, but these were not evaluated or included in the data set.

2. 2 Measures

Data were collected from older adults and tutors separately both pre and post intervention and after the completion of every module on each device.

2. 2. 1 Pre and Post Intervention Questionnaire

The pre and post intervention data were collected through a pencil-and-paper questionnaire which was completed by participants before the learning sessions began and again after all sessions were completed. Both the tutor and the older adult participants completed these questionnaires, and they responded to the same questions. The first section of the questionnaire was used to gather demographic data and asked participants about their familiarity with computers. The next section was adapted from Jay and Willis' (1992) 'Attitudes Towards Computer/Mobile Devices Questionnaire'. Participants were asked to indicate their response to twenty-six statements about attitudes and beliefs concerning computer technology, by selecting one of four possible responses: "agree", "sometimes", "disagree" or "unsure".

Where applicable, the same statement was made for the computer and the iPad in order to allow direct comparisons between responses. For example, the statement "computers make me nervous" could be paired with the statement "iPads make me nervous" for comparison. The three themes reflected in this questionnaire included: feelings while interacting with technological devices (i.e. "confident", "nervous"), attitudes towards learning to use devices (i.e. "learning about computers is a worthwhile and necessary subject"), and general beliefs about technological devices (i.e. "computers and mobile devices control too much of our world today")

2. 2. 2 Module Evaluation

The Module Evaluation form was a pencil-and-paper questionnaire created in partnership by ETAG and SERC. Participants were required to reflect on their experience with the specified device and respond to several items by selecting from the four response categories: "agree" "sometimes", "disagree" or "unsure".

On their Module Evaluation older adults were asked to respond to seven statements by reflecting on how confident they felt in their new skills, how easy it was to understand what to do, how easy the interface was to understand, how intuitive the task was, how worried they were about doing something wrong, how much they enjoyed using the device, and how well their tutor explained the necessary

information. The same questions were answered for each module after it was completed on the computer and once more after it was completed on the iPad.

The Module Evaluation for tutors was slightly different in that it required tutors to reflect on their partners' experience rather than on their own. The items on the tutors' Module Evaluation related to how well their partner seemed to have learned the module components, how physically and emotionally comfortable they appeared, and how well they could accomplish the tasks independently.

3. Results

3. 1 Older Adult Pre and Post Intervention Data

The primary goal of this data analysis was to compare post intervention responses to baseline responses and to extract any meaningful changes or patterns. To achieve this, the responses that older adults made on the Pre Intervention and Post Intervention Questionnaires were averaged across each item and the mean difference (post intervention mean – pre intervention mean) was calculated to obtain numerical difference in average response and the direction (positive or negative) of change. A positive difference meant that the participants agreed more with the statement, and a negative difference meant the participants agreed less. The cases in which participants selected "unsure" as a response were excluded from the mean response calculation, because of the ambiguity of this response category. The remaining qualitative response categories were transformed into numerical values (i.e. "agree" = 3, "sometimes" = 2, "disagree" = 1) for the purposes of this analysis.

Although the sample was too small to conduct formal tests of significance, those response means that showed a response category change (i.e. from "sometimes" on the Pre Intervention Questionnaire to "agree" on the Post Intervention Questionnaire) were considered to reflect some meaningful change and will be discussed below. There were seven questionnaire items, summarized in Table 3, which showed these meaningful changes. All the response changes were seen in items that referred specifically to the iPad, the corresponding items referring to the computer did not show comparable response changes. Each one of the general themes from the Questionnaire was represented in the list of seven items indicting that changes occurred in participants' feelings when using devices, attitudes towards learning, and beliefs about technology. Under these three themes, further response breakdown and analysis were conducted.

Table 3. Survey items with meaningful changes in response mean

Item	Theme	Pre-intervention Mean	Post-intervention Mean	Mean Difference (Post – Pre)
I feel comfortable with iPads	Feelings	1.13 (Disagree) (n=8)	2.06 (Sometimes)(n=17)	0.93
Learning about iPads is a worthwhile and necessary subject	Learning	3 (Agree) (n=12)	2.56 (Sometimes)(n=16)	-0.44
I think if I worked hard to learn about the iPad I could do well	Learning	3 (Agree) (n=14)	2.58 (Sometimes)(n=19)	-0.42
iPads make me nervous	Feelings	2 (Sometimes) (n=11)	1.68 (Disagree)(n=19)	-0.32
iPads are confusing	Beliefs	2 (Sometimes) (n=8)	1.79 (Disagree)(n=19)	-0.21
iPads are too fast	Beliefs	2.13 (Sometimes) (n=8)	1.53 (Disagree) (n=17)	-0.60
I don't feel confident about my ability to use an iPad	Feelings	2.11 (Sometimes) (n=9)	1.72 (Disagree) (n=18)	-0.39

Note: 'unsure' responses were excluded from this calculation

3. 2. 1 Feelings when using devices
The items that fit into this theme include three types of feelings experienced while using a device: comfort, nervousness and confidence.

3. 2. 1. 1 Comfort. As summarized in Table 3, seven out of eight responses (excluding ten "unsure" responses) indicated that on average participants felt uncomfortable using the iPad prior to learning sessions. The post intervention surveys showed a response change that may be indicative of one of the major outcomes of the learning sessions; the majority of responses (twelve out of seventeen) indicated that participants now felt comfortable with the iPad some of the time. At this point only two participants remained unsure about their comfort levels, and another two continued to feel uncomfortable with the iPad. It appears that overall as participants became more familiar with the device their discomfort decreased.

3. 2. 1. 3 Confidence. A similar response pattern was seen in feelings of confidence when using the iPad. On average, confidence in using the iPad was lower at the start of the study than at the end. Further analysis of baseline measures indicated that four out of nine participants sometimes agreed with the statement "I don't feel confident about my ability to use an iPad" (excluding nine "unsure" responses). Upon completion of the learning sessions the majority of

participants (nine out of eighteen) reported that they now felt confident using the iPad and the number of participants that responded "unsure" to this item, dropped to one.

3. 2. 1. 2 Nervousness. The item "iPads make me nervous" also showed a meaningful change after the learning session intervention. The mean response changed from "sometimes" to "disagree", suggesting that participants no longer felt nervous about using the iPad after ten weeks of learning sessions with their tutor. A breakdown of responses by category showed that initially, four responses expressed agreement with this item and four responses expressed disagreement (excluding seven "unsure" responses). This polarity of responding was not seen in the post intervention data. After their learning sessions the majority of older adult participants (eleven out of nineteen) indicated they felt nervous with the iPad some of the time and seven out of nineteen indicated that they did not feel nervous using the iPad. Taken together these results suggest that while for a few participants nervousness may have increased, on average the 10 week technology tutoring program decreased the nervousness felt when using the iPad.

3. 2. 2 Attitudes toward learning
The learning theme was reflected by two Questionnaire items; one that assessed individuals' attitudes toward learning about the computer and the iPad, and the other asked respondents to reflect on how well they thought they could learn each of these devices. Interestingly, the mean response to both of these items with regard to iPad was higher at the beginning of the study than after the learning sessions.

The pre-intervention questionnaire showed that all the responding older adult participants (twelve out of twelve responses; excluding six 'unsure' responses) agreed that learning about the iPad is a worthwhile and necessary subject; and that they could succeed at learning to use it (fourteen out of fourteen responses, excluding five "unsure"). After the ten week intervention period, the number of people who agreed that learning the iPad is worthwhile dropped to ten out of sixteen (excluding three "unsure"); and the number of participants who agreed that they could successfully learn to use the device changed to twelve out of nineteen (zero "unsure").

After learning about this device, response means indicated that most older adult participants agreed less strongly with the importance of learning about the iPad and their ability to learn about it. In contrast, for the same two items with regard to the computer responses stayed relatively stable between pre and post measures with most responses remaining in the "sometimes" category.

<u>3. 2. 3 Beliefs about technology</u>
Included in this category were items that expressed device-specific beliefs ("computers are confusing") and more general beliefs about technology ("computers and mobile devices control too much of our world today"). While the general beliefs remained relatively unchanged by our intervention, the device-specific beliefs pertaining to the iPad, showed a meaningful change. The two items that showed this change were: "iPads are confusing" and "iPads are too fast".

Initially there was an even number of people that agreed and disagreed with the item "iPads are confusing" (three out of eight in both cases, excluding ten "unsure"). Afterwards, on the post-intervention surveys the majority of participants (nine out of nineteen) responded "sometimes". Together these results indicate that most participants changed their beliefs about the iPad after more experience with it. Depending on what their initial belief was, for some participants this change meant believing that the iPad was more confusing after 10 weeks, however, for most the change was in the opposite direction (believing the device was less confusing). In contrast to these changing beliefs about the iPad, the corresponding item for the computer ("computers are confusing") showed more stable responses. Most people disagreed with this item before and after the learning sessions.

In a similar pattern, before having much experience with the device three out of eight participants agreed with the item "iPads are too fast" and the same number selected "sometimes" as their response (excluding nine "unsure"). After the learning sessions and experience using the iPad, ten out of seventeen participants (excluding two "unsure") disagreed with the belief that "iPads are too fast", indicating that for most older adult participants this device-specific belief was altered by interaction with the device as well.

3. 3 Module Evaluation Data
The main goal of gathering these data was to see if there were any identifiable differences between the computer and the iPad when they were used for the same module. All participants selected the five modules of their choice; the most commonly selected module was the Youtube module (with sixteen evaluations), and the least selected and evaluated module was the Twitter module (with two evaluations). As with the pre and post-intervention data, the items that are reported below are those in which a meaningful response category change was seen between the device evaluations of the same module.

Of the ten learning modules; eight showed some meaningful difference in responding between the devices (the two modules with the smallest numbers of participants n=2 for Twitter, n=4 for LinkedIn were not included in this data set; a third module, Find Information Online (Google), was not included because the mean difference between devices (0.08) was too small to be considered meaningful). Summarized in Table 4 below, are the remaining five modules that showed meaningful changes between the device conditions. For four of these modules the computer was the device that received

more positive evaluations overall; for one module, Video and Music Playback, the evaluation results suggested that the iPad was the preferred device.

Table 4. Meaningful differences between computer and iPad module evaluations

Module	Item(s)	Theme	Mean Response for Computer Evaluation	Mean Response for iPad Evaluation
YouTube (n=16)	"I was worried about doing something wrong"	Worry	1.85 (Disagree)	2 (Sometimes)
Google Maps (n=6)	"layout and interface were easy to understand" "task made sense and was intuitive"	Ease	3 (Agree)	2.75 (Sometimes)
Skype (n=11)	"I enjoyed using this device"	Enjoyment	3 (Agree)	2.82 (Sometimes)
Video/Music Playback (n=7)	"It was easy to understand the task" "layout and interface were easy to understand"	Ease	2.55 (Sometimes)	3 (Agree)
	"I enjoyed using this device"	Enjoyment	2.8 (Sometimes)	3 (Agree)
Local Media (Global/CTV) (n=7)	"tutor effectively explained task"	Teaching	3 (Agree)	2.86 (Sometimes)

3. 3. 1 Module Evaluations: Computer Preferred
For the Youtube module the mean response indicated that the computer was preferred over the iPad because participants felt less worried about doing something wrong on the computer. When participants rated their experience using the iPad for the Youtube module, more participants agreed or selected "sometimes" in response to the item "I was worried about doing something wrong".

Participants also rated the computer more positively for the Google Maps module during their learning sessions. The items that showed a difference in responding in this module were two items that referred to the ease of completing the tasks and the ease of understanding the layout and interface. The mean responses indicated that most participants agreed that task completion and understanding of layout and interface were easy on the computer; however, when participants completed the Google Maps module on the iPad they agreed less with these items.

For the Skype module, enjoyment was the theme that revealed a difference between the computer and the iPad. The item related to enjoyment on the module evaluation was "I enjoyed using this device". Similarly to other modules, when participants

accessed Skype using both devices the mean responses revealed that on average participants agreed with this statement more after using the computer than the iPad.

Quality of teaching was another theme that showed a meaningful difference between devices in the Local Media (Global/CTV) module. Again, the computer appeared to be preferred over the iPad, because on average participants felt that their tutors explained the task more effectively on the computer than on the iPad.

3. 3. 2. Module Evaluations: iPad Preferred
After participants completed the Video /Music Playback module on the computer and on the iPad, their evaluation responses showed a meaningful difference on items relating to ease and to enjoyment. For this module the preferred device appeared to be the iPad because the average responses to three items indicated that most participants agreed that on the iPad the tasks in this module were easy to understand, the layout and interface were easy to understand and that they enjoyed using the device. On the computer the mean response to the same three items was "sometimes".

3. 4 Qualitative Data
Qualitative data were gathered through the questionnaires by the inclusion of several open-ended questions/areas for comments. On the pre-intervention survey participants were asked to report their anticipated challenges going into sessions. Participants reported anticipated challenges such as learning the terminology or 'lingo', understanding how to use the iPad, limited experience (with the computer and the iPad), remembering new information and being able to apply it. Upon completion of the training modules, participants were asked to comment on the actual challenges they experienced. Interestingly, the actual challenges mirrored the anticipated challenges, suggesting that the older adults were able to successfully gauge their level of technological proficiency and predict how it would affect their training. Some reported challenges included: physically handling the iPad (i.e. how much pressure to apply to the screen), learning how to use the iPad and remembering the information, steps and 'lingo', navigating the different applications, and not being able to practice the iPad at home.

3. 5 Limitations
One limitation of this study is that the small sample size did not allow for formal statistical analysis. This made it difficult to determine how significant our results were and may have limited our view of trends in the data.

4. Discussion

In this examination of two ICT devices, all of the meaningful changes, or learning related outcomes were seen when participants were using the iPad. The older adult participants in this study reported increased comfort, increased confidence, decreased nervousness, changes in attitude towards learning and changes in device-related beliefs after using the

iPad for ten learning sessions. Interestingly, the same level of change was not seen with the computer; responses on pre and post measures with this device were quite stable. Perhaps this pattern occurred because participants were more proficient with the computer from the onset and as such their feelings, attitudes and beliefs were either already at ceiling levels or were not affected as much by this learning intervention. While the iPad appeared to be the device that generated more changes and learning outcomes, the computer was the preferred device for most modules. Two factors that may explain these findings are novelty of the iPad and familiarity with the computer.

The iPad was a novel device to all the participants in this study, as such there was a high use of the "unsure" response category on the Pre Intervention Questionnaire. Participants may have felt unable to answer many of the questions that were asked if they had no experience with the device. Upon gaining this experience their responses changed, indicating that the participants felt less "unsure" and that the learning intervention was an effective one. Although the learning sessions were effective at producing changes in several domains, they may not have been as effective at convincing participants about the value and utility of the iPad. On post measures and module evaluations many participants continued to express uncertainty about the novel device by responding using the "sometimes" category at a higher rate than the distinct "agree/disagree" options. This illustrates that although the novelty of a device might allow for greater learning potential it can also be met with higher levels of uncertainty and special steps might have to be taken to address individuals' uncertainty if they are to adopt a novel device. The qualitative data may further explain this phenomenon and suggest one approach to managing uncertainty. One of the most frequently reported comments on the questionnaires was that participants felt they needed more practice using the iPad. Although the novelty of the iPad in this study created steep learning curves for participants and meaningful changes in the data, their learning may have not been sustainable given the limited time they received with the device per week and the lack of practice opportunities at home. This is an indication that a novel device might require more learning time than this study allowed in order to maximize experience and minimize individual uncertainty.

In addition, familiarity with the computer might have led participants to rate this device more favourably on the module evaluations. Perhaps the tasks felt easier, more enjoyable and less worrisome because participants felt more familiar with the device and didn't have to focus as much on the operation of the device. Alternatively, the iPad may have been rated less favourably on the module evaluations because it was novel and the device learning compounded with the module learning may have resulted in feelings of increased difficulty, increased worry and decreased enjoyment; particularly if the module required a lot of input and navigation by the participant. The module evaluation data appear to corroborate this assumption. In this study, Google Maps and Video and Music Playback were the two modules that showed difference between the devices based on ease of understanding and use. For the Google Maps module the computer was the preferred device and the Video and Music Playback module was the one module for which the iPad was preferred. What might have differentiated these modules was the amount of input and navigation required. Navigating Google Maps on the computer may have been easier because it required familiar

point and click gestures on a familiar interface; navigating the same application on the iPad however, required new gestures and understanding of a new interface and may have therefore been rated less favourably. The Video and Music Playback module might have shown the opposite result with the iPad because it was an easy task, requiring minimal input from the user and therefore even though the device was new, the situation overall was not overwhelming. This brings to light some important application factors that may influence device preference for novice users. The amount of input required by the user, the navigation required and the interface may be factors that differentiate an easier and more enjoyable application from a more complicated one. Furthermore, these factors might impact how readily novice users adopt a new technology and how much they like it.

Apart from documenting some learning related outcomes our investigation also highlighted a significant barrier to technology adoption, and how technology tutoring can address this barrier. Before the learning intervention participants expressed some preconceived notions about the iPad, including that it was confusing and too fast. Our post-intervention data showed that these beliefs were changed by the increased interaction with the device gained from the learning sessions. Personal beliefs about certain technological devices might become barriers to adoption of those devices if older adults do not have the opportunity to 'reality check' those beliefs in a supportive learning environment. The older adults in our sample, for example, may have continued to believe that the iPad is confusing and too fast if they had not participated in the learning sessions, and this might have decreased their likelihood of using the device at all. By providing ongoing experience and support technology tutoring programs can serve this vital belief-checking function, and aid in addressing false device-related beliefs.

Despite the fact that meaningful learning with the iPad occurred, the participants in this study did not appear eager to adopt the iPad as a useful tool for their daily lives. While participants believed more in the value of learning computers after ten weeks of tutoring, the opposite was seen with regards to the iPad. On average participants responded less positively to items asking about the importance of learning about the iPad, after the learning sessions than they did before. This result might suggest that these older adult participants were not convinced of the utility of the iPad, despite having used it for communication, information gathering and entertainment purposes. As discussed above, there might be several reasons that the iPad was not adopted by these older adults and there are several ways that the training program may have been improved to facilitate adoption. These improvements are noteworthy because mobile technology is the way of the future, and if older adults are not convinced of its utility, they risk a self-perpetuation of the digital divide.

5. Conclusion and Recommendations

This investigation helped us to identify some differences in user experience and device functionality between the computer and iPad as evaluated by a sample of older adults. One thing that became clear was that these participants learned a lot about the iPad, but because the device was new to them they probably required more specialized and structured instruction. Perhaps the best approach for future technology tutoring initiatives would be to

involve the unique perspective of the older adults who will be involved in the program; asking them in more detail about their familiarity with devices and their anticipated challenges might allow for the appropriate measures to be taken to optimize the learning sessions. A useful recommendation might be to use an assessment tool such as a survey, to measure individuals' familiarity with various devices and to use this information in order to appropriately address individual differences in knowledge, skill and ability. For example and based on our data, for iPad novices it might be most beneficial to begin with the 'device basics' (i.e. navigation and touch gestures, icons, terminology), and then to move onto using specific programs and applications. There should be more frequent sessions with technical terminology explained, use of memory aids and opportunity for plenty of practice. In addition to device familiarity, another type of information that can be obtained from participating older adults at the onset of a program is the challenges that they anticipate. Our sample of older adults anticipated what challenges they would encounter quite accurately. Based on our data, difficulties with the technical terminology, remembering steps and procedures, and more practice required with novel devices are three factors that we would consider if we created and implemented another technology training program for these older adults.

The structure of this study may not have allowed for as much specialized instruction as was necessary for these novice iPad users and this may have resulted in participants not feeling as strongly about the utility and value of the iPad. This can be circumvented in future programs by ensuring that there are tools in place to assess individual needs and expectations, and to tailor individual tutoring sessions accordingly. Overall, our findings highlight the fact that technology training and support programs have the potential to address some of the barriers contributing to the digital divide, however, if care is not taken to address individual needs and differences the programs themselves might become barriers to technology adoption.

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7. Appendix A

Sheridan Elder Research Centre (SERC)
Technology assistance and evaluation research (January 2012)
Participant Code:_____   Pre-Modules   Post-Modules
What is your year of birth?_____
What is your gender?_____
How familiar are you with computers? Familiar   A little bit familiar   Not very familiar
How familiar are you with the iPad?   Familiar   A little bit familiar   Not very familiar
Do you own a computer?   Yes   No
Do you own an iPad?   Yes   No
Do you own another mobile device (i.e. tablet, smartphone)?   Yes   No
What other kinds of technologies/programs are you familiar with? Are there any you wish you could learn about or acquire? (Please be specific).

_____
If you are at the beginning of the modules, answer the following question:
(If not, please skip to the next question)
What do you anticipate to be a challenge about this project?

_____
Was there anything that was challenging about this project?

_____

Attitudes Towards Computer/Mobile Devices Questionnaire

(Adapted from Jay and Willis, 1992, Journal of Gerontology, 47 (4), pg 250-257)

Please read the following statements and check off your response in the boxes provided.

	Agree	Sometimes	Disagree	Unsure
I feel comfortable with computers.				
I feel comfortable with iPads.				
Learning about computers is a worthwhile and necessary subject.				
Learning about iPads is a worthwhile and necessary subject.				
I think that if I worked hard to learn about computers, I could do well.				
I think that if I worked hard to learn about the iPad, I could do well.				
Computers make me nervous.				
iPads make me nervous.				

Computers are confusing.				
iPads are confusing.				
Computers are too fast.				
iPads are too fast.				
I don't feel confident about my ability to use a computer.				
I don't feel confident about my ability to use an iPad.				
Computers would be (are) fun to use.				
iPads would be (are) fun to use.				
Computers make the work done by people more difficult.				
iPads make the work done by people more difficult.				
Everyone could get along just fine without computers and mobile devices.				
The use of computers and mobile devices is lowering our standard of living.				
Computers and mobile devices control too much of our world today.				
Computers and mobile devices will never replace the need for working human beings.				
Soon our lives will be controlled by computers and mobile devices.				
Our world will never be completely run by computers and mobile devices.				
Older adults are more likely to have difficulties with computers and mobile devices.				
I believe older adults are capable of learning how to use computers or mobile devices quickly.				

8. Appendix B

Description of Modules

Module Title	Components
Email	-compose a new message -attach a photo (which will be pre-saved on the device) -send message
Facebook	-view personal profile -post on own wall -add SERC/ETAG as a group -send a private message to yourself or a friend
YouTube	-search for and view a video -skip to 1:00 into the video and adjust the volume -add the video to a playlist -search for another video and also add it to a playlist -start the playlist and run it until the second video starts
Google Maps	-locate Sheridan College in Oakville, ON -view the map in 'satellite' mode -get direction from Sheridan College Oakvile to Sheridan College Brampton -choose an alternative route, and then return to the default suggestion
Find Information Online (Google)	-search for SERC/ETAG and find the main website for each organization and 'bookmark' them -return to search and find an image of your chouse -save the image you found to the device you're using (PC or iPad)
Skype	-add a new contact -make a Skype call to the new contact added (voice only) -edit personal profile details ('about me') -'instant message' new contact
Twitter	-post a 'tweet' -find and follow a 'friend' or person of interest (celebrity) -set or change your profile picture -search for a '#hashtag' and follow (#SERClab, #Sheridancollege)
LinkedIn	-add someone to your network -send a contact a private message -join a group -comment on an existing user's post
Video/Music Playback	-open video or music from device (PC or iPad) -skip halfway through the video or song -add 3 files to a playlist -save the playlist, close the program and open the playlist again (skip through it)
Local Media (Global/CTV)	-locate the TV schedule and determine what's on at 9pm Fridays -find the last episode of Survivor and start playing the video online

9. Appendix C

Sheridan Elder Research Centre (SERC)
Technology assistance and evaluation research (January 2012)

Module Evaluation Form: Older Adult   Participant Code:_____
Which week of the tutoring is this?_____
What is the title of the module?_____

Thinking about your experience with the desktop computer, please read the following statements and check off your response in the boxes provided.

	Agree	Sometimes	Disagree	Unsure
Now that I've been shown what to do, I think I could do the same things on my own, without my tutor present.				
It was easy to understand what I had to do.				
The layout and interface were easy to understand.				
What I was doing made sense and was intuitive.				
I was worried about doing something wrong on the computer.				
I enjoyed using the computer.				
I think my tutor was able to effectively explain the information needed to accomplish the module.				

Thinking about your experience with the iPad, please read the following statements and check off your response in the boxes provided.

	Agree	Sometimes	Disagree	Unsure
Now that I've been shown what to do, I think I could do the same things on my own, without my tutor present.				
It was easy to understand what I had to do.				
The layout and interface were easy to understand.				
What I was doing made sense and was intuitive.				
I was worried about doing something wrong on the iPad.				
I enjoyed using the iPad.				
I think my tutor was able to effectively explain the information needed to accomplish the module.				

Do you have any other comments about this module?

_____