Ageing Int (2011) 36:46–65
DOI 10.1007/s12126-010-9074-z

Technology and Aging Project: Training Outcomes and Efficacy from a Randomized Field Trial

Amanda T. Woodward · Paul P. Freddolino · Christina M. Blaschke-Thompson · Dona J. Wishart · Louanne Bakk · Rie Kobayashi · Caitlin Tupper

Published online: 28 September 2010

Abstract This study examined whether training provided to adults age 60+ would increase the use of information and communication technologies (ICTs), such as email and the Internet, and influence participants' social support and mental health. Participants were randomly assigned to an experimental (n=45) or a control group (n=38). The experimental group participated in a six-month training program. Data were collected before, during, and after training on outcomes related to computer use, social support, and mental health. Mixed regression models were used for multivariate analyses. Compared to the control group, the experimental group reported greater self-efficacy in executing computer-related tasks and used more ICTs, perceived greater social support from friends, and reported significantly higher quality of life. Computer self-efficacy had both a direct and indirect effect on ICT use, but not on other variables. With appropriate training, older adults want to and can learn the skills needed to use ICTs. Older adults with ICT skills can access online sources of information regarding Medicare Part D options and utilize patient portals associated with electronic medical records. Agencies may develop services that build upon this technology sophistication, but policies also will need to address issues of access to equipment and high-speed Internet service.

Keywords Gerontology · Information and communication technologies (ICTs) · Older adults · Computer training · Social support · Mental health

A. T. Woodward (✉) · P. P. Freddolino · C. M. Blaschke-Thompson · L. Bakk · C. Tupper
School of Social Work, Michigan State University, 254 Baker Hall, East Lansing, MI 48824, USA
e-mail: awoodwar@msu.edu

D. J. Wishart
Otsego County Commission on Aging, 120 Grandview Blvd., Gaylord, MI 49735, USA

R. Kobayashi
School of Social Work, Eastern Washington University, 121 Senior Hall, Cheney, WA 99004, USA

As the number of older adults in the population increases, the burden of loneliness and depression on older adults, their families, and our health care system may increase. Currently, about 40% of older adults experience loneliness (Weeks 1994) and 8% to 16% of older adults suffer from clinically significant depressive symptoms, with even higher rates among the very old (Alexopoulous 2005). Loneliness and depression can lead to poor eating habits, weight loss, mobility decline, drug and alchol abuse, and suicidal ideation (Blazer 2003; Fees et al. 1999). Research indicates that social support reduces loneliness and depression among older adults (Krause 2001), and recent literature illustrates the potential role of technology in building social support (Selwyn et al. 2003) and reducing loneliness (Deollos and Morris 2004). There are, however, no research-based intervention models to date that incorporate information and communication technologies (ICTs) in building social support networks for older adults. This study begins to fill this gap by testing an innovative model in a community-agency setting.

Literature Review

ICTs include computer-based applications that enhance communication between two or more people, regardless of physical distance. These applications include email, the World Wide Web (or Internet), online chat rooms and discussion groups, Internet-based support groups, and voice technology and Webcams (Blaschke et al. 2009). Email has the potential to improve communication with loved ones, including the strengthening of intergenerational bonds (Adler 2006; White and Weatherall 2000). The Internet can be used by older adults as a source of information, to assist in health management, and to provide tools for banking and shopping (Czaja et al. 2006), as well as to serve as a source for life-long learning, entertainment, and hobbies (Slegers et al. 2008). Internet-based chat rooms, discussion groups, and support groups can enhance communication and provide social support for a variety of issues older adults face (Novak 2006; Pfeil et al. 2009). These tools can also help older adults develop and sustain new friendships and provide a sense of community or belonging (Pfeil et al. 2009; Russell 1999). Voice technology and Webcams add audio and visual dimensions that enhance communication and support with family, friends, and professionals (Marziali and Donahue 2006; Rodriguez et al. 2009).

Rates of ICT utilization by older adults vary widely from one country to the next. Recent data from the Pew Internet and American Life Project show that rates of ICT use by older adults in the United States are increasing, from 15% in 2000 (Fox 2004) to 38% in 2009 (Fox 2010). According to the Commission of the European Communities (2007), only 10% of older adults in Europe use the Internet regularly, compared to nearly 50% of older adults in Japan (ABC News 2007). The best recent data (United Nations 2008) indicate "older people are much less likely to use the Internet, with rates of use dropping off sharply for the oldest group (those over 75)" (p. 75). This is not surprising, as many older adults today left the workforce and educational settings before ICT knowledge was essential (Hagberg 2004; Irizarry et al. 2002; Selwyn et al. 2003). A study conducted in 2008 found that 70% of Americans between 50 and 64 years of age are regular Internet users (Pew Internet and American Life Project 2008). ICT use among older adults, therefore, can be

expected to increase dramatically during the next decade as baby boomers enter older age (Adler 2006; Morgan 2005). Even so, given the speed with which technology is changing, this current cohort will find their skills quickly out of date once they leave the workplace where they may currently be receiving training.

Discussions about the potential of ICTs frequently point to a wide range of barriers to their use faced by older adults. One of the largest of these barriers is cost (Blaschke et al. 2009; Manna et al. 2005). A study comparing computer users and non-users over the age of 65 found that users are more likely to be younger, more educated, and have a higher average income than non-users (Carpenter and Bunday 2007). According to the latest "e-Readiness Rankings" (*The Economist* 2008), the cost of monthly DSL access amounts to 2.5% or less of the median household income (the point considered 'affordable') in only 44 out of the 70 nations studied. Wright and Hill (2009) found that income and education impact computer use and Internet access, with poorer older adults being the least likely to use a computer. For every year of education, older adults are three times more likely to use a computer and/or access the Internet.

Other common barriers mentioned in the literature include age-related issues, characteristics of the existing technology, attitudinal issues, and training and support issues. Physical changes brought on by age can affect the ability to use ICTs. Impaired vision, problems with manual dexterity and mobility, changes in memory and cognition, and activities of daily living (ADL) limitations can pose serious challenges (Czaja and Lee 2003; Fox 2004; Gilleard et al. 2007; Saunders 2004). Characteristics of existing technology such as complex screens and small print, the standard computer keyboard format, usability issues with system designs, computer jargon, and the reality that some technologies simply do not work well or easily can also be problematic for older users (Melenhorst et al. 2001; Osman et al. 2005). According to Saunders (2004), many older adults fear that computers will be quickly outdated. The increasing complexity of software can also be a barrier for many older adults (Wright and Hill 2009).

Some of these characteristics of the technology can contribute to attitudinal barriers. Many older adults report low confidence in their ability to handle computers. The absence of perceived benefit, the perception that technology is dangerous, too expensive, complicated and confusing, and that it is too difficult to learn can negatively impact ICT use by older adults (Eastman and Iyer 2004; Manna et al. 2005; Marquie et al. 2002; Morrell et al. 2000; Saunders 2004; Selwyn 2004). Older adults who have a positive perception of ICT usefulness, ease of use, and efficacy of the Internet or email use ICTs more often (Adams et al. 2005). According to Melenhorst et al. (2001), "increasing the perceived benefits of new communication methods may encourage their use by older adults" (p. 221–222). Family members can play an important role in this effort (Selwyn 2004).

Older adults also face challenges in accessing appropriate training. These include financial barriers and the simple absence of training opportunities. Available training is often not provided in settings with sufficient numbers of sensitive, caring trainers needed to support the learning process for older adults (Czaja et al. 2006; Eastman and Iyer 2004; Irizarry et al. 2002; Osman et al. 2005; Xie 2007). According to Irizarry et al. (2002), an appropriate class size, an informal atmosphere in which students have the freedom to ask questions, the skill of the teacher, and the

availability of helpers are important factors in teaching older adults how to use ICTs. Equally important are teacher enthusiasm and a caring attitude (Osman et al. 2005). It is important for trainers to remember that teaching an older person requires extra time and effort (vanBerlo and vanValen 1998). Motivation to learn can also be enhanced by exploring with the older adults what they would like to do with the computer and adjusting the training to meet their interests (Osman et al. 2005). According to Czaja et al. (2006), it is important to use technology that allows older adults to experience success so that they build up confidence in their abilities. There is also a need to ensure that older adults are trained as individuals rather than as a group, and if group training does take place, then it is imperative that each person has access to a computer (Osman et al. 2005).

Contemporary literature offers many examples of the expected benefits of ICTs. For example, they have the potential to positively impact the quality of life for older adults (Czaja and Lee 2007; Eastman and Iyer 2004; Selwyn et al. 2003) by improving social support and psychosocial well-being (Carpenter and Bunday 2007; Pfeil et al. 2009; White et al. 1999). Carpenter and Bunday (2007) also found that computer users reported fewer depressive symptoms compared to nonusers. The Internet enhances communication between older adults and their loved ones (Adler 2006; Cutler and Hendricks 2001; Novak 2006; White et al. 2002) by allowing them to communicate frequently, easily, and inexpensively with family and friends regardless of the physical distance between them (Czaja and Lee 2003; Rodriguez et al. 2009). It also provides an outlet to meet new people who have similar interests (Blit-Cohen and Litwin 2004; White et al. 2002). For older adults who are homebound, Internet access allows them to feel like they are out of the house (Bradley and Poppen 2003), improves their connection with the outside world (Nahm and Resnick 2001; Selwyn et al. 2003; White et al. 2002), and helps them avoid or reduce feelings of social isolation (Blit-Cohen and Litwin 2004; Czaja et al. 2006; White et al. 1999).

A number of studies have examined various aspects of ICT-related training for older adults. Conclusions were generally positive. Older adults are capable of learning new technologies (Hickman et al. 2007), although this may involve additional practice and support (Nair et al. 2007; vanBerlo and vanValen 1998). Older adults felt less anxious about ICTs after training (Irizarry et al. 2002; Xie and Bugg 2009), saw potential advantages and uses of the technology (Campbell 2004), and reported an increased interest in computer use and efficacy (Xie and Bugg 2009). Older adults like learning online (Swindell 2000) and are eager to learn (Sherer 1997), feeling that mastery of new skills lets them keep in closer contact with family and friends (Namazi and McClintic 2003), and keeps them up-to-date in the modern world (Clark and Straka 2000). Although none of the studies utilized randomized clinical trials, taken together they dispel the notion that ICTs cannot offer positive potential applications and rewards for older adults, or that older adults are not open to learning how to use new technology.

The current project builds on this existing research using an experimental design to determine whether training provided to adults age 60 and older would increase participants' use of technology and whether increased use of technology would influence other areas of their lives. Specifically, we tested three hypotheses: 1) participants in the experimental group will report increases in computer-related

measures; 2) participants in the experimental group will report improvement in mental health and social support related measures; 3) computer self-efficacy will mediate the effect of the training on the use of ICTs and mental health and social support outcomes.

Methods

Sample and Procedures

Participants for the Technology and Aging Project (TAP) were drawn from 348 respondents to a community-based survey of technology use distributed to adults age 60 and older in Otsego County, a rural county in northern Michigan. Survey respondents who expressed interest in participating in future research on technology were contacted, and those who agreed to participate were randomly assigned into an experimental group (n=45) or a control group (n=38). The experimental group participated in a six-month training program developed and implemented in partnership with the Otsego County Commission on Aging, a community agency providing services to older adults throughout the county. Data were collected from both groups at baseline, 3 months, 6 months, and 9 months (3 months after the end of the training).

The main goals of the training were to increase participants' comfort with technology, increase awareness of and knowledge about safety and security issues related to the Internet, and introduce new tools for connecting with geographically dispersed family and friends. Participants were divided into beginner and intermediate groups depending on their baseline skill level and experience with computers. Baseline skill level was assessed in several ways: a measure of computer self-efficacy (described below), current use of ICTs, and participant's self-assessment. While the majority of participants were appropriately placed, there were some reassignments during the first few weeks based on reassessment of skill level. Arrangements were made for participants who needed computers, with costs based on ability to pay using the community agency's guidelines. Each group met every 2 weeks for a total of 11 classes, plus one additional tutorial session for beginners. Topics ranged from the basics of using a computer and mouse and keyboard skills, to blogging, manipulating photos, and using voice and video via the Internet (see Table 1 for complete class schedule). Classes were taught in a computer-lab setting by the project coordinator, as well as various volunteers from the community. Volunteers were also on hand during class periods to work with individual participants.

Measures

Three main groups of variables were examined in this pilot study: computer-related outcomes, social-support related outcomes, and mental-health related outcomes.

Computer-Related Outcomes

Computer self-efficacy (CSE) was measured using a scale based on 16 items adapted from Murphy et al. (1989). Respondents were asked to indicate how confident they

Table 1 Topic covered in TAP training

Week	Beginners	Intermediate
1	Basics of using a computer	Internet safety and security, evaluating information from the Internet
2	Using email & searching the Internet	Voice Operated Internet Protocols (Skype), Webcams, Instant Messaging
3	Additional tutorial session	Favorite senior sites
4	Review of Web browsing	Photo Shop and Photo Attachments
5	Evaluating information on the Internet	Genealogy
6	Voice Operated Internet Protocol (Skype), Webcams, Instant Messaging	Downloading music and books
7	Typing, storing data	Greeting cards (online and with software)
8	Internet safety and security	Online discussion groups, multi-person games
9	Email review, attachments	Personal/family Websites, blogs
10	Favorite senior sites	Commerce (banking, shopping)
11	Greeting cards (Internet & software)	Spreadsheet software
12	Downloading music and books	

felt completing certain tasks (e.g., escaping and exiting from software, sending and receiving email) without any assistance, on a scale from 1 = very little confidence to 5 = quite a lot of confidence. Item responses were summed for an overall score ranging from 16 to 80 (Cronbach's alpha=0.96), with a higher score indicating a greater level of self-efficacy. Participants also were asked to indicate how often they use the Internet, send or receive email, get news online, send instant messages, conduct banking online, play games, download music, download pictures, or gamble online. Responses ranged from 0 = never to 3 = daily and were summed to create a scale measuring *information and communication technology use* (range: 0 to 27, Cronbach's alpha=0.79). A higher score indicated more ICT use. Finally, respondents were asked, as part of the social network measures described below, to indicate how they communicated with each person in their social network and the number of people overall with whom they used email, instant messaging, or Skype were counted.

Social-Support Related Outcomes

Social network data were collected using an adaptation of Antonucci's hierarchical mapping technique (Antonucci 1986). Respondents were asked to list the first names of individuals they would include in their network. For each person listed, data were gathered on the respondent's relationship with that person, how frequently they had contact with them, and what ICT tools were used to stay in contact with them. The total number of people in the respondent's network was a count of the number of people listed (range 1 to 20). The frequency of contact was measured on a 5-point scale ranging from 1 = irregularly to 5 = everyday. Frequency for each network member was used to calculate the mean frequency of contact across the network as a

whole. Perceived social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al. 1988). The MSPSS consisted of 12 statements to which respondents indicated how much they agreed on a scale ranging from 1 = very strongly disagree to 7 = very strongly agree. The total score ranged from 12 to 84 (Cronbach's alpha=.92), with a higher score indicating greater perceived support. The measure also included subscales for support from family, friends, and a significant other.

Mental-Health Related Outcomes

Loneliness was measured using a six-item scale (De Jong Gierveld and Van Tilburg 2006). Respondents were given a series of statements such as, "I experience a general sense of emptiness." and, "There are plenty of people I can rely on when I have problems." and asked to indicate the extent to which each statement applied to them (yes, more or less, no). Responses were summed with negative and positive statements reverse coded from one another (range 0 to 6, Cronbach's alpha=0.64). A higher score indicated more loneliness and subscales distinguished emotional from social loneliness. For quality of life, respondents were asked to indicate how satisfied they were with 16 areas of their life (e.g., material comforts, health, close friends) on a scale from 1 = terrible to 7 = delighted (Flanagan 1978). Responses were summed for a total score ranging from 16 to 112 (Cronbach's alpha=0.88), with a higher score indicating greater quality of life. Finally, *depressive symptoms* were measured using the Geriatric Depression Scale (GDS) (Yesavage et al. 1982). The GDS consists of 15 items. Respondents indicated by yes or no whether the statement applied to how they felt during the past week. Positive and negative items were reverse coded, and the number of responses indicating possible depression were counted, with higher scores indicating more depressive symptoms (range 0 to 15, Cronbach's alpha=0.71).

Data were also collected on age—measured in years (range 60–89)—and gender. Socioeconomic status was indicated by a three-category measure of education (high school or less, some college, two-year degree or higher), and a three-category measure of household income (less than $25,000, $25,000 to $49,999, $50,000 or higher). Dichotomous measures of marital status (married, not married) and living arrangement (live alone, live with others) were also included.

Analytic Strategy

Bivariate baseline comparisons were made across all measures to determine the extent to which the experimental and control group differed before the training. Mixed regression models (MRMs) were used for multivariate analyses to estimate change in outcomes over time and to compare the experimental and control groups. Mixed regression models are useful for this type of analysis for several reasons (Rabe-Hesketh and Skrondai 2005; West et al. 2006).

First, they do not require that subjects be measured on the same number of timepoints. This is important because, as is to be expected with any longitudinal study, there was some attrition in our sample. In particular, 76% of respondents completed all four data points. Of those who did not complete all interviews, 10%

missed only one data collection point and 5% missed two. Several of these were participants who went to warmer climates for the winter months. An additional 10% dropped out after the baseline data collection period. Most of these were in the experimental group and most of them left for health or other personal reasons.

Second, with MRMs, subjects do not have to be measured at exactly equal time intervals. Although every effort was made to interview participants at all time points, there was some variation due to difficulties in scheduling. Third, MRMs permit modeling of the effects of factors other than the treatment on the outcomes of interest. This includes time-invariant covariates such as gender, and time-varying covariates such as computer self-efficacy that was treated as both an outcome and a predictor for other outcomes. Finally, in providing an estimate of the average change over time in both experimental and control group subjects, MRMs can provide an estimate of change for each individual as well as deviations from group trends.

Analyses were conducted using the *xtmixed* commands in Stata 10.1 (StataCorp 2001). For each outcome, we first fit the null model with the dependent variable only to determine the level of between-person variance. Second, we ran the model including fixed effects for whether the participant was in the experimental or control group and time, as well as a random effect associated with the intercept for each participant and a residual associated with each observation. If hypotheses 1 and 2 are correct, we would expect not only a signficant coefficient for the variable indicating which group respondents were in, but we would also expect the residual to drop with the addition of this variable to the model. We then fit a third model including a second random effect with an unstructured covariance matrix that allowed each person to have a unique outcome at each time point. A likelihood-ratio test was performed to compare these last two models; the model with the best fit was retained. Thus, for some outcomes, time was reported as a fixed effect only, and other outcomes included time as a random effect as well. To test the mediating effect of computer self-efficacy (hypothesis 3), additional models were run for outcomes for which there were significant differences between the experimental and control groups, or a significant fixed effect for time with computer self-efficacy as a predictor. An alpha of.05 was used as the cutoff for determining statistical significance.

Results

Comparison of the experimental and control group participants show that there were no significant differences between the two groups at baseline (Table 2). Overall, the average age was 72 and the majority of participants (72%) were female. Almost half (46%) had a two-year degree or higher, while 28% had some college, and 26% had a high school degree or less. Roughly a third (34%) of participants had incomes less than $25,000, 38% had incomes between $25,000 and $49,999, and 28% had incomes of $50,000 or greater. Over half (62%) were married and 30% lived alone. On average, participants scored low on the loneliness and depression measures and high in quality of life and perceived social support. The average number of contacts in the social network was nine and the average frequency of contact was 3.8 on a scale ranging from 1 = never to 5 = daily, with a higher score indicating greater

Table 2 Baseline comparisons of experimental and control group participants on demographics and key dependent variables (n=83)

	Total		Experimental		Control		Test statistic[a]	
	n/M	%/SD	n/M	%/SD	n/M	%/SD		p
Demographics								
Age (range: 60–89)	71.85	7.09	72.1	7.51	71.6	6.66	0.32	0.747
Gender								
Male	23	28.1	12	27.3	11	29	0.03	0.866
Female	59	72.0	32	72.7	27.0	71.1		
Education								
High school or less	21	26.3	11	26.2	10	26.3	0.71	0.702
Some college	22	27.5	10	23.8	12	31.6		
2-yr degree or higher	37	46.3	21	50.0	16	42.1		
HH Income								
Less than $25,000	22	34.4	8	25.0	14	43.8	3.64	0.162
$25,000 to $49,999	24	37.5	12	37.5	12	37.5		
$50,000 or higher	18	28.13	12	37.5	6	18.8		
Marital status								
Married	42	61.8	22	62.9	20	60.6	0.04	0.849
Not married	26	38.24	13	37.14	13	39.4		
Lives alone								
Yes	21	30.4	9	25.0	12	36.4	1.05	0.305
No	48	69.6	27	75.0	21	63.6		
Loneliness (range: 0 to 6)	1.36	1.46	1.29	1.29	1.45	1.66	0.49	0.626
Depression (range: 0 to 15)	1.49	1.95	1.38	1.60	1.62	2.31	0.56	0.575
Quality of life (range: 16 to 112)	91.51	10.43	93.42	9.03	89.26	11.6	1.84	0.070
Perceived Social Support (range: 12 to 84)	70.82	10.36	72.4	8.54	68.95	12.02	1.52	0.131
Total # in social network (Range: 1 to 20)	9.13	4.81	9.2	4.01	9.05	5.67	0.14	0.890
Frequency of contact with network (range: 1 to 5)	3.78	0.50	3.76	0.48	3.80	0.53	0.37	0.711
Computer self-efficacy (range: 16 to 80)	53.17	20.13	55.09	19.21	50.89	21.20	0.95	0.347
Comfort learning technology								
Very uncomfortable/not very comfortable	11	13.3	7	15.6	4	10.50	0.45	0.501
Somewhat comfortable/very comfortable	72	86.8	38	84.4	34	89.50		
Self-rated knowledge								
Know nothing/a little	30	36.1	14	31.1	16	42.11	1.08	0.299
Somewhat/very knowledgeable	53	63.9	31	68.9	22	57.89		
ICT use (range: 0 to 36)	7.89	5.31	8.69	5.28	6.95	5.26	1.5	0.138
# of contacts communicated with by email, IM, Skype (range: 0 to 20)	3.45	3.53	3.62	3.20	3.24	3.91	0.49	0.623

[a] Two-tailed independent t-test for continuous variables and chi-square for categorical variables

frequency. Out of a possible 80 on an additive scale, the average computer self-efficacy score was 53. Most participants felt somewhat or very comfortable learning new technology (87%) and over half (64%) reported that they were somewhat or very knowledgeable about computer technology. The average ICT use was 7.89 at the start of the program (out of a possible 27), and on average participants communicated with about three network members using email, instant messaging, or Skype.

Table 3 shows mixed regression models for computer-related outcomes. Compared to the control group, the experimental group had significantly greater computer self-efficacy and used more ICTs. Furthermore, computer self-efficacy and ICT use increased significantly over time for both groups. Although the residual decreased for the use of email, instant messaging, or Skype with the addition of the experimental vs. control group variable, there was no significant difference between the two groups for this outcome. Use of these communication tools did, however, increase significantly over time for both groups.

In terms of social support outcomes, there was no significant difference between the experimental and control groups in the number of people in their social network or in frequency of contact with their network (Table 4). There was a trend-level difference between the experimental and control groups in perceived social support. Analysis of the subscales for this variable suggest that this was driven by a difference in perceived support from friends; however, there was no signficant difference in this variable over time. The number of people in the social network did significantly increase over time, and the drop in the residual with the addition of group membership and time to the model suggests that the program may have some influence on the number of people within each participant's social network.

There was no significant difference between the experimental and control groups in terms of loneliness or depressive symptoms (Table 5). The experimental group reported significantly higher quality of life compared to the control group, and the residual dropped compared to the null model, but there was no significant change over time.

Table 6 shows results of models including computer self-efficacy as a mediating variable for those outcomes for which there were significant differences between the experimental and control groups or a significant change over time. Computer self-efficacy had both a direct and indirect effect on ICT use, that is, greater computer self-efficacy increased ICT use and accounted for some of the difference between the experimental and control groups. Furthermore, the increase in ICT use over time is no longer significant. Computer self-efficacy significantly increased the number of network members communicated with by email, instant messaging, or Skype, but it did not affect the significant increase in the use of these tools over time. Computer self-efficacy was also not related to perceived support from friends or quality of life; although the coefficients for these variables decreased, there is still a significant difference between the experimental and control groups. Furthermore, computer self-efficacy did not have a direct affect on perceived support or quality of life. This suggests that participating in the training itself, rather than the skills or knowledge gained from the training, may have contributed to these outcomes. Figures 1, 2, 3, 4, 5, and 6 depict the change over time for these variables and suggest that for several of these outcomes, there is a drop off after the training ended (T4).

Table 3 Mixed regression models for computer-related outcomes

	Computer self-efficacy		ICT use		# of contacts communicated with by email, IM, Skype	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Fixed effects						
Intercept	56.43***	47.10***	8.58***	6.48***	4.29***	2.25***
Exp vs. Ctrl	–	8.94*		2.41*		0.95
Time	–	2.01***		.35***		.64***
Random effects						
Intercept	335.72	413.49	24.54	22.84	12.32	11.29
Time		5.54				1.70
Residual	37.36	23.44	3.13	2.97	6.7	3.21

*p<.05 **p<.01 ***p<.001

Discussion

The analyses presented above indicate partial support for the study hypotheses. To the extent that computer self-efficacy and actual utilization of ICTs are worthy objectives on their own, the data show that the ICT training received by experimental group participants did indeed have an effect. Those who participated reported increased competence with ICTs, which in turn led to increased use of ICTs.

This pilot project also showed that when ICT training incorporates strategies and tools that reflect the needs and desires of older adults, they are willing to learn computer skills and *can* learn these skills, despite stereotypes to the contrary. To be effective, such training should incorporate a number of features.

First, hands-on learning for the trainees, with adequate opportunities for supervised practice, enhances the ability of older adults to retain information and

Table 4 Mixed regression models for social support outcomes

	# in social network		Frequency of contact		Perceived social support		Perceived support from friends	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Fixed effects								
Intercept	10.05****	8.35****	3.77****	3.80****	71.92****	69.34****	23.53****	22.58****
Exp vs. Ctrl		0.23		−0.06		3.5*		1.51**
Time		.67***		−0.002		0.3		0.06
Random effects								
Intercept	10.08	15.48	0.12	0.29	67.65	65.15	8.3	7.79
Time		1.15		0.02				
Residual	10.46	7.88	0.09	0.06	20.66	20.64	3.63	3.65

*p<.10. **p<.05. ***p<.01. ****p<.001

Table 5 Mixed regression models for mental health related outcomes

	Loneliness		Quality of life		Depressive symptoms	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Fixed effects						
Intercept	1.37**	1.46**	92.09**	88.19**	1.37**	1.61**
Exp vs. Ctrl		−0.08		4.99*		−0.12
Time		−0.02		0.51		−0.07
Random effects						
Intercept	1.21	1.22	87.10	73.24	1.91	1.93
Time				4.53		
Residual	0.73	0.73	39.68	32	1.33	1.33

*p<.05. **p<.001

successfully practice on their own at home. Second, one-to-one help with peers or other volunteers available in the classroom provides additional help to those who might otherwise fall behind the rest of the class. Third, it is essential to create a learning environment where students feel comfortable stopping the presenter and asking questions. This has the added advantage of slowing down the pace, which also helps increase student learning. Informal conversations with participants revealed that, in previous mixed-age classes they had taken, they were too intimidated to ask questions and then fell behind the rest of the class. Fourth, clear, step-by-step handouts that participants can take home and practice with facilitates learning between classes. It is important, however, that handouts are not exhaustive, but focus only on the key components of the lesson; too much information can overwhelm older learners and keep them from practicing. Finally, dividing older adults into groups with comparable levels of previous knowledge improves the classroom dynamic. Of particular importance, true beginners should learn with other beginners because the pace of their learning will be significantly different.

Table 6 Mediating effect of computer self-efficacy on ICT use, # of contacts communicated with by email, instant messaging, and Skype, # in social network, perceived support from friends, and quality of life

	ICT use	# of contacts communicated with by email, IM, Skype	# in social network	Perceived support from friends	Quality of life
Fixed effects					
Intercept	0.02	−1.26	7.22***	21.50***	84.79***
Exp vs. Ctrl	1.52*	0.63	0.09	1.34*	4.56*
Time	0.1	.51**	.62**	0.02	0.37
Computer self-efficacy	.13***	.07***	0.02	0.02	0.07
Random effects					
Intercept	11.02	9.4	16.13	7.68	74.43
Time		1.63	1.14		4.53
Residual	2.99	3.25	7.85	3.65	31.86

*p<.05. **p<.01. ***p<.001

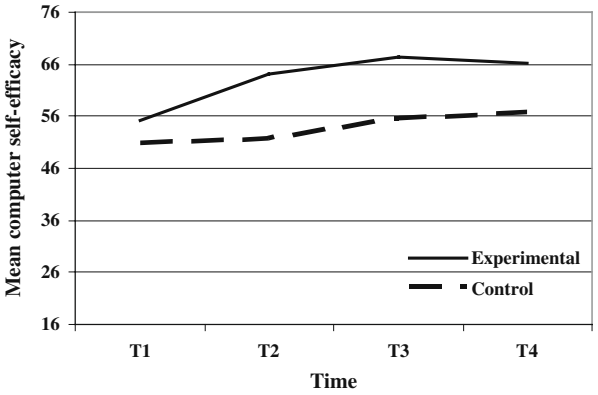

Fig. 1 Computer self-efficacy

The results related to specific tools were interesting. For example, a greater number of participants communicated by IM after the training, but the numbers are very small and not reliable. Although the quantitative analysis showed no statistically significant differences between the groups related to use of email, instant messaging, or Skype, focus group and interview data present a different picture. Based on respondents' replies, it appears that participants placed a great value on using Skype, especially for communicating with grandchildren through Webcams.

Given the project's intent to give participants tools to expand their social network and improve other significant areas of life, the results of the project are decidedly mixed. The study reports increased perceived support, particularly from friends, and improvements in perceived quality of life. At the same time, there were no statistically significant improvements in other social support measures or in loneliness or depression. It may be that improvement in these outcomes will take longer to appear. It is also possible that the ceiling effect resulting from the relatively positive mental health for this group means no effects may be feasible.

For perceived social support and quality of life, the lack of either a direct or a mediating effect of computer self-efficacy suggests that this increase can be attributed to participation in the training itself. After the training ended, perceived social support from friends declined. This finding suggests that at some level there

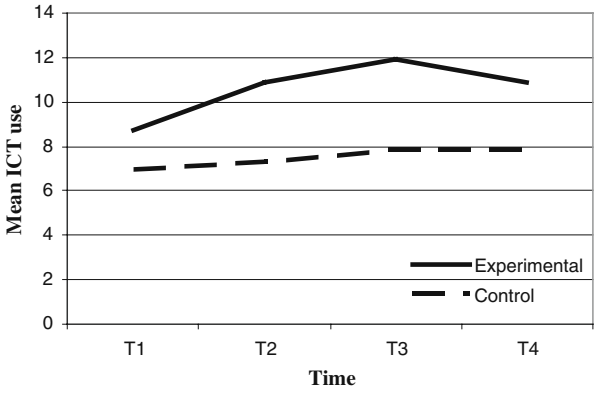

Fig. 2 ICT use

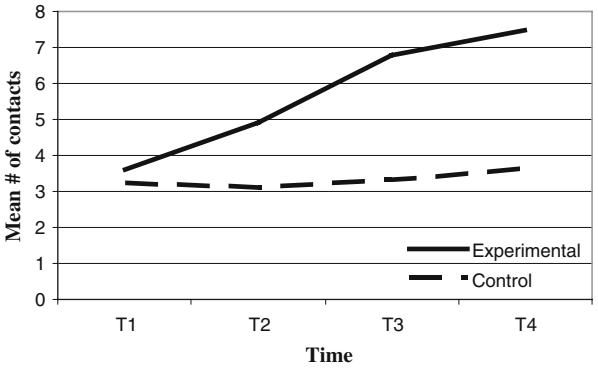

Fig. 3 Contacts communicated with by email, IM, or Skype

will be benefits from providing a forum for older adults to get together with others who have similar interests, regardless of the topic. At the same time, tax preparation and submission, Medicare Part D enrollment, and patient access to electronic medical record systems with email-address requirements exemplify areas of life where ICT use is important. For this reason, making technology the focus of these face-to-face gatherings brings added benefits by reducing the digital divide for this demographic group. With many commercial and government organizations using ICTs for communication with stakeholders, training for older adults helps sustain their capacity to participate in contemporary life.

Limitations

Although participants were randomly assigned into the experimental and control groups, they were drawn from a convenience sample of community-survey respondents who indicated an interest in participating and agreed to the possibility of being assigned to the control group. Thus, the sample clearly consists of older adults who self-selected as participants for the project. Comparisons of available data from the community survey indicate that those who participated in TAP were younger, had more education, and were already more frequent users of ICTs than the survey sample as a whole.

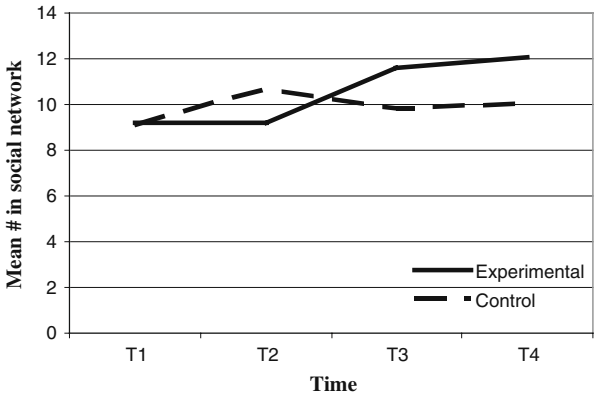

Fig. 4 # in social network

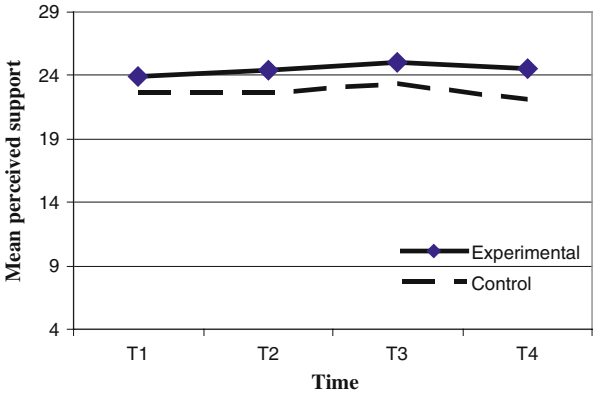

Fig. 5 Perceived support from friends

This raises the challenge of how to engage those individuals who might benefit from the training but who are not interested or not comfortable participating for any of the reasons noted in the literature. People who are homebound, those with low reading skills or visual handicaps, and other similar groups may in fact receive greater benefit from the connections to information and social support that result from developing ICT skills. Residents in the county have been expressing an interest in participating in future ICT training because of local media coverage and word-of-mouth. It will be interesting to see if this publicity, particularly from older adult peers, entices a broader range of potential participants.

Another limitation that resulted from this self-selection of a somewhat homogeneous pool of participants is the ceiling effect on many of the dependent variables. At baseline, both experimental and control group participants all scored relatively low on depression and high on quality of life, and reported relatively robust social networks. This limited the extent to which positive change was possible, and thus perhaps understates the potential impact of the program on a broader range of participants.

Implications for Policy and Practice

Any effort to implement a project aimed at improving ICT skills of older adults must confront the reality that for many people in the target audience, access to high-speed

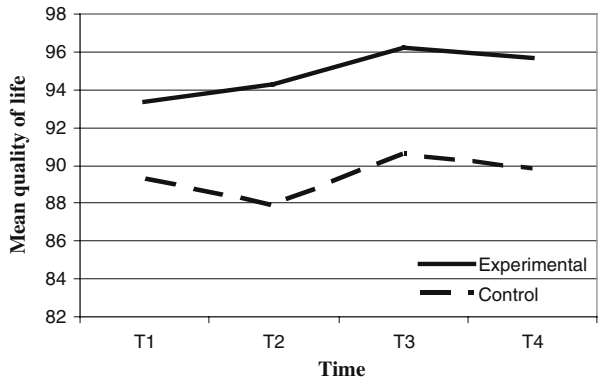

Fig. 6 Quality of life

Internet service at home may be either unavailable or unaffordable, even for those who own a computer. Without such access at home, participants will be unable to utilize many of the ICT applications they will learn about in the training, making the new information close to useless. Thus, in addition to the content of the ICT training itself, program developers need to consider locating resources to cover both the cost of computers and high-speed Internet access, when available. At the policy level, this issue points to the question of advocating for improved access to affordable, high-speed Internet service throughout our communities.

An additional financial issue related to establishing a program designed to address larger numbers of participants is cost of the model as implemented. It was very expensive to have a salaried, competent staff person design, coordinate, and deliver the type of ICT curriculum presented to this small pilot group of 45 participants, and the cost of expanding the model to cover larger numbers would be prohibitive for most non-profit agencies. Given the positive outcomes described above, alternative models for delivery will have to be developed and tested. One such alternative, currently being tested by the authors, uses volunteer peer tutors to deliver most of the training.

The results detailed above show that with age-appropriate training approaches, older adults can and will learn a wide range of ICT skills that can be incorporated into the services provided to them. As human-service agencies begin to recognize the benefits of this integration and the associated need to provide appropriate training and resources to clients, it is reasonable to expect that services building upon this new technology sophistication will be developed. For example, an older adult audience with ICT skills can receive training in using reputable online sources of information regarding Medicare Part D options. Older adults with Web and social media skills can be enrolled in programs that use Web-based tools to enhance communication and joint decision-making with physicians, case managers, and caregivers. It is already the case that emerging electronic medical records programs require an email address as the starting point of entry for use of the program. Older adults without ICT skills are essentially denied use of this potentially powerful tool.

To bring about some of these changes, it will inevitably be necessary to change some aspects of the culture of health and social service delivery. Certain behaviors of older adults and service professionals will also need to be modified. All groups will require additional training in using ICT tools, along with a shift in thinking about how services are provided and reimbursed. For example, physicians are not currently reimbursed for time spent communicating with a client via email about blood sugar levels recorded online. Using ICTs to record and transmit these levels, and then using other ICTs to permit direct conversations between patients and physicians without arranging a face-to-face meeting, would seem to be very cost-effective uses of existing technology tools. How these tools are perceived, and ultimately how their use is reimbursed, will greatly influence their future utilization in the lives of older adults.

All of these developments are not without their challenges. One of the most serious is the tension over how best to spend ever-more-limited agency resources. Can an agency director justify using staff resources to direct and supervise a group of peer tutors who are training other older adults in ICTs? Is it worth the opportunity cost in terms of other work that the staff and volunteers could be doing? Do

programmatic cost savings result from providing older adults with the skills necessary to access virtual resources? There are no easy answers, but further research will shed light on this important issue of technology's role in addressing loneliness, depression, and other needs of older adults.

Acknowledgements This project was funded by the Michigan State University Families and Communities Together initiative. The authors would like to thank all of the participants as well as Eileen Godek and the other staff at the Otsego County Commission on Aging. Many thanks to UC Gaylord and the Michigan State University Extension for their ongoing support and to the many other community agencies, businesses, and individuals who contributed time, resources, and expertise to the project. Last, but not least, our undying gratitude to Mary Fox. Without her stellar coordination, enthusiasm, and dedication this project would not have become a reality.

References

ABCNews. (2007). *Japanese grannies go high-tech*. Available at http://www.abc.net.au/news/stories/2007/08/13/2003066.htm. Cited 30 August 2008.

Adams, N., Stubbs, D., & Woods, V. (2005). Psychological barriers to Internet usage among older adults in the UK. *Medical Informatics and the Internet in Medicine, 30*(1), 3–17. doi:10.1080/14639230500066876.

Adler R. (2006) Older Americans, broadband and the future of the Net. Available via *SeniorNet.* http://www.seniornet.org/research/SeniorNetNNPaper060606.pdf. Cited 30 August 2008.

Alexopoulous, G. S. (2005). Depression in the elderly. *Lancet, 365*(9475), 1961–1970. doi:10.1016/S0140-6736(05)66665-2.

Antonucci, T. C. (1986). Social support networks: hierarchical mapping technique. *Generations, 10*, 10–12.

Blaschke, C. M., Freddolino, P. P., & Mullen, E. E. (2009). Ageing and technology: A review of the research literature. *British Journal of Social Work, 39*(4), 641–656. doi:10.1093/bjsw/bcp025.

Blazer, D. G. (2003). Depression in late life: Review and commentary. *Journals of Gerontology Series B-Psychological Sciences and Social Sciences, 58A*(3), 249–265.

Blit-Cohen, E., & Litwin, H. (2004). Elder participation in cyberspace: a qualitative analysis of Israeli retirees. *Journal of Aging Studies, 18*, 385–398.

Bradley, N., & Poppen, W. (2003). Assistive technology, computers and Internet may decrease sense of isolation for homebound elderly and disabled persons. *Technology and Disability, 15*, 19–25.

Campbell, R. J. (2004). Older women and the Internet. *Journal of Women & Aging, 16*(1/2), 161–174. doi:10.1300/J074v16n01_11.

Carpenter, B. D., & Bunday, S. (2007). Computer use among older adults in a naturally occurring retirement community. *Computers in Human Behavior, 23*(6), 3012–3024. doi:10.1016/j.chb.2006.08.015.

Clark, F., & Straka, S. M. (2000) Internet access for frail seniors: The Connections experience. Available via *McGill Centre for Studies in Aging.* http://aging.mcgill.ca/pdf/conn_rep_e.pdf. Cited 30 August 2008.

Commission of the European Communities (EU). (2007). *Ageing Well in the Information Society.* Available from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0332:FIN:EN:PDF. Cited 30 August 2008.

Cutler, S. J., & Hendricks, J. (2001). Emerging social trends: The information revolution. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (5th ed.). San Diego: Academic.

Czaja, S. J., Charness, N., Fisk, A. D., Hertzog, C., Nair, S. N., Rogers, W. A., et al. (2006). Factors predicting the use of technology: findings from the Center for Research and Education on Aging and Technology Enhancement (CREATE). *Psychology and Aging, 21*(2), 333–352. doi:10.1037/0882-7974.21.2.333.

Czaja, S. J., & Lee, C. C. (2003). The impact of the Internet on older adults. In N. Charness & K. W. Schaie (Eds.), *The impact of technology on successful aging*. New York: Springer.

Czaja, S. J., & Lee, C. C. (2007). The impact of aging on access to technology. *Universal Access in the Information Society, 5*(4), 341–349. doi:10.1007/s10209-006-0060-x.

De Jong Gierveld, J., & Van Tilburg, T. (2006). A 6-item scale for overall, emotional, and social loneliness: confirmatory tests on survey data. *Research on Aging, 28*(5), 582–598.
Deollos, I., & Morris, D. (2004). The impact of ownership, use of attitudes toward PC's on older adults' feelings of loneliness. *Gerontologist, 44*(1), 526.
Eastman, J. K., & Iyer, R. (2004). The elderly's use and attitude towards the Internet. *Journal of Consumer Marketing, 21*(3), 208–220. doi:10.1108/07363760410534759.
Fees, B. S., Martin, P., & Poon, L. W. (1999). A model of loneliness in older adults. *Journals of Gerontology Series B-Psychological Sciences and Social Sciences, 54B*(4), 231–238.
Flanagan, J. C. (1978). A research approach to improving our quality of life. *The American Psychologist, 33*(2), 138–147. doi:10.1037/0003-066X.33.2.138.
Fox, S. (2004), Older Americans and the Internet. Available from Pew Internet & American Life Project http://www.pewInternet.org/pdfs/PIP_Seniors_Online_2004.pdf. Cited 30 August 2008.
Fox, S. (2010) Four in ten seniors go online. Available from Pew Internet & American Life Project http://www.pewInternet.org/Commentary/2010/January/38-of-adults-age-65-go-online.aspx. Cited 30 August 2008.
Gilleard, C., Hyde, M., & Higgs, P. (2007). Community and communication in the third age: the impact of Internet and cell phone use on attachment to place in later life in England. *Journals of Gerontology Series B-Psychological Sciences and Social Sciences, 62B*(4), S276–S283.
Hagberg, J. E. (2004). Old people, new and old artefacts—technology for later life. In B. Oberg, A. L. Narvanen, E. Nasman, & E. Olsson (Eds.), *Changing worlds and the ageing subject: Dimensions in the study of ageing and later life*. England: Ashgate.
Hickman, J. M., Rogers, W. A., & Fisk, A. D. (2007). Training older adults to use new technology. *Journals of Gerontology Series B-Psychological Sciences and Social Sciences, 62B*, 77–84.
Irizarry, C., Downing, A., & West, D. (2002). Promoting modern technology and Internet access for under-represented older populations. *Journal of Technology in Human Services, 19*(4), 13–30. doi:10.1300/J017v19v04_02.
Krause, N. (2001). Social support. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (5th ed., pp. 272–294). San Diego: Academic.
Manna, W. C., Belchior, P., Tomita, M. R., & Kemp, B. J. (2005). Computer use by middle-aged and older adults with disabilities. *Technology and Disability, 17*(1), 1–9.
Marquie, J. C., Jourdan-Boddaert, L., & Huet, N. (2002). Do older adults underestimate their actual computer knowledge? *Behaviour & Information Technology, 21*(4), 273–280. doi:10.1080/0144929021000020998.
Marziali, E., & Donahue, P. (2006). Caring for others: Internet video-conferencing group intervention for family caregivers of older adults with neurogenerative disease. *Gerontologist, 46*(3), 398–403.
Melenhorst, A. S., Rogers, W. A., & Caylor, E. C. (2001). The use of communication technologies by older adults: exploring the benefits from the user's perspective. Paper presented at the Human Factors and Ergonomics Society, 45th Annual Meeting.
Morgan, R. E. (2005). Technology meets the age wave. *Gerontologist, 45*(5), 704–710.
Morrell, R. W., Mayhorn, C. B., & Bennett, J. (2000). A survey of world wide web use in middle-aged and older adults. *Human Factors, 42*(2), 175–182. doi:10.1518/001872000779656444.
Murphy, C. A., Coover, D., & Owens, S. V. (1989). Development and validation of the Computer Self-Efficacy Scale. *Educational and Psychological Measurement, 49*, 893–899. doi:10.1177/001316448904900412.
Nahm, E., & Resnick, B. (2001). Homebound older adults' experiences with the Internet and e-mail. *Computers in Nursing, 19*(6), 257–263.
Nair, S. N., Czaja, S. J., & Sharit, J. (2007). A multilevel modeling approach to examining individual differences in skill acquisition for a computer-based task. *Journals of Gerontology Series B-Psychological Sciences and Social Sciences, 62B*, 85–96.
Namazi, K. H., & McClintic, M. (2003). Computer use among elderly persons in long-term care facilities. *Educational Gerontology, 29*(6), 535–550. doi:10.1080/713844391.
Novak, M. (2006). *Issues in aging*. Boston: Pearson.
Osman, A., Poulson, D., & Nicolle, C. (2005). Introducing computers and the Internet to older users: findings from the Care OnLine project. *Universal Access in the Information Society, 4*(1), 16–23. doi:10.1007/s10209-005-0111-8.
Pew Internet and American Life Project. (2008). Demographics of Internet Users. Available from http://www.pewInternet.org/trends/User_Demo_4.26.06.htm. Cited 30 August 2008.

Pfeil, U., Zaphiris, P., & Wilson, S. (2009). Older adults' perceptions and experiences of online social support. *Interacting with Computers, 21*(3), 159–172. doi:10.1016/j.intcom.2008.12.001.

Rabe-Hesketh, S., & Skrondai, A. (2005). *Multilevel and longitudinal modeling using stata*. College Station: Stata.

Rodriguez, M. D., Gonzalez, V. M., Favela, J., & Santana, P. C. (2009). Home-based communication system for older adults and their remote family. *Computers in Human Behavior, 25*(3), 609–618. doi:10.1016/j.chb.2008.08.017.

Russell, M. (1999). Online learning communities: implications for adult learning. *Adult Learning, 10*(4), 28–31.

Saunders, E. J. (2004). Maximizing computer use among the elderly in rural senior centers. *Educational Gerontology, 30*, 573–585. doi:10.1080/03601270490466967.

Selwyn, N. (2004). The information aged: a qualitative study of older adults' use of information and communications technology. *Journal of Aging Studies, 18*(4), 369–384. doi:10.1016/j.jaging.2004.06.008.

Selwyn, N., Gorard, S., Furlong, J., & Madden, L. (2003). Older adults' use of information and communications technology in everyday life. *Ageing Society, 23*, 561–582. doi:10.1017/S0144686X03001302.

Sherer, M. (1997). Introducing computers to frail residents of homes for the aged. *Educational Gerontology, 23*(4), 345–358. doi:10.1080/0360127970230404.

Slegers, K., van Boxtel, M. P. J., & Jolles, J. (2008). Effects of computer training and Internet usage on the well-being and quality of life of older adults: a randomized, controlled study. *Journals of Gerontology Series B-Psychological Sciences and Social Sciences, 63B*(3), 176–184.

StataCorp. (2001). *Statistical software: release 10.1*. College Station: Stata Corporation.

Swindell, R. (2000). A U3A without walls: using the Internet to reach out to isolated older people. *Education and Ageing, 15*(2), 251–263.

The Economist. (2008). E-readiness rankings 2008: Maintaining momentum. Available from http://a330.g.akamai.net/7/330/25828/20080331202303/graphics.eiu.com/upload/ibm_ereadiness_2008.pdf. Cited 30 August 2008.

United Nations. (2008). The global information society: A statistical view. Available from http://www.uis.unesco.org/template/pdf/cscl/ICT/LCW190_en.pdf. Cited 30 August 2008.

vanBerlo, A., & vanValen, C. (1998). First experiences in using e-mail and Internet by elderly living in sheltered housing. In J. Graafmans, V. Taipale, & N. Charness (Eds.), *Gerontechnology: A sustainable investment in the future*. Amsterdam: IOS.

Weeks, D. J. (1994). A review of loneliness concepts with particular reference to old age. *International Journal of Geriatric PsychiatryInt J Geriatr Psych, 9*(5), 345–355. doi:10.1002/gps.930090502.

West, B., Welch, K. B., & Galecki, A. T. (2006). *Linear mixed models: A practical guide using statistical software*. Boca Raton: Chapman & Hall/CRC.

White, H., McConnell, E., Clipp, E., Branch, L. G., Sloane, R., Pieper, C., et al. (2002). A randomized controlled trial of the psychosocial impact of providing Internet training and access to older adults. *Aging & Mental Health, 6*(3), 213–221. doi:10.1080/13607860220142422.

White, H., McConnell, E., Clipp, E., Bynum, L., Teague, C., Navas, L., et al. (1999). Surfing the Net in later life: a review of the literature and pilot study of computer use and quality of life. *Journal of Applied Gerontology, 18*(3), 358–378.

White, J., & Weatherall, A. (2000). A grounded theory analysis of older adults and information technology. *Educational Gerontology, 26*, 371–386.

Wright, D., & Hill, T. (2009). Prescription for trouble: Medicare Part D and patterns of computer and Internet access among the elderly. *Journal of Aging & Social Policy, 21*(2), 172–186. doi:10.1080/08959420902732514.

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

Xie, B., & Bugg, J. M. (2009). Public library computer training for older adults to access high-quality Internet health information. *Library & Information Science Research, 31*(3), 155–162. doi:10.1016/j.lisr.2009.03.004.

Yesavage, J. A., Brink, T. L., Rose, T. L., Lum, O., Huang, V., Adey, M., et al. (1982). Development and validation of a geriatric depression screening scale: a preliminary report. *Journal of Psychiatric Research, 17*(1), 37–49. doi:10.1016/0022-3956(82)90033-4.

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment, 52*(1), 30–41. doi:10.1207/s15327752jpa5201_2.

Amanda T. Woodward, PhD is Assistant Professor of Social Work at Michigan State University. Dr. Woodward completed her A.M. in Social Service Administration at the University of Chicago and her PhD in Social Work and Sociology at University of Michigan where she was a Hartford Doctoral Fellow. Her research interests include mental health and aging and racial and ethnic disparities in mental health service use, with a particular focus on the intersection of professional services and informal support.

Paul P. Freddolino, M.Div., Ph.D. is Professor of Social Work at Michigan State University. He has been involved in social work distance education activities since 1979, as evaluator, administrator, instructor, and marketing director. He teaches courses in quantitative and qualitative research methods, evaluation practice, and administrative practice. In addition to distance education, his research and publications have also included mental health services research and substance abuse services. His most recent research is in the field of technology applications in human service delivery systems, particularly involving services for older adults.

Christina M. Blaschke-Thompson, LMSW is a Clinical Instructor and the Assistant Coordinator of Distance Education for the School of Social Work at Michigan State University. She teaches courses in social welfare policy, policy analysis, and policy advocacy.

Dona J. Wishart is the Executive Director of the Otsego County Commission on Aging, where she has served in an administrative capacity since 1993. A 1979 graduate of Michigan State University, her Bachelor of Science degree in Education launched both her career and interest in the non-profit world of business. With concern for people and program development, she has been instrumental in developing partnerships that have provided unique opportunities for older adults and family caregivers. A former Commissioner with the Michigan Office of Services to the Aging, she is dedicated to promoting independence and well-being for older adults through home and community based care.

Louanne Bakk, MSW is a Hartford Doctoral Fellow in Geriatric Social Work and Clinical Instructor for the School of Social Work at Michigan State University. Her research interests include the impact of public policy initiatives designed to assist older adults, with a particular focus on racial and gender disparities in medication adherence under Medicare Part D.

Rie Kobayashi, Ph.D. LMSW is Assistant Professor of Social Work at Eastern Washington University. She has been working in the field of aging for the last 12 years as a hospice social worker. Her research interests include healthy aging, end-of-life care, and interdisciplinary collaboration.

Caitlin Tupper is a senior in the Social Work program at Michigan State. She plans on pursuing a MSW in order to achieve her goal of becoming a couple's counselor.