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Computer Anxiety and Computer Self-Efficacy of Older Adults

Elizabeth Diane Cooper-Gaiter
Walden University

Walden University

COLLEGE OF EDUCATION

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Elizabeth Cooper-Gaiter

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Dr. Daniel Baer, Committee Chairperson, Education Faculty
Dr. Calvin Lathan, Committee Member, Education Faculty
Dr. Heather Caldwell, University Reviewer, Education Faculty

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Eric Riedel, Ph.D.

Walden University
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MS, University of Maryland University College, 2004

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

Many older adults (aged 55 and older) need training to acquire computer knowledge and skills. Using computers and the Internet could provide access to vital resources for improving older adults' health and maintaining their connections with family and society. This study examined 2 psychological constructs—computer anxiety and computer self-efficacy—that have been shown to impact a person's successful use of computers and related technology. Guided by Bandura's self-efficacy theory, which emphasizes the importance of adult learners being motivated and taking charge of their learning, this study examined the impact of a computer knowledge and skills workshop on older adults' computer anxiety and computer self-efficacy. A concurrent, mixed-methods design was used to collect and analyze survey data and interview transcripts from a convenience sample of African American older adults ($N = 11$). Mobile technology (i.e., tablet PCs and portable hotspots) was used to access the Internet and e-mail. Data analyses included thematic coding of the interview notes and descriptive statistics to present the survey results. The themes that emerged from the interview data were learning opportunities, positive attitudes, and user-friendly tools and equipment for reducing computer anxiety and constructive attitude changes and learning environments for improving computer self-efficacy. The descriptive statistics indicated favorable changes for computer anxiety with scores averaging a decrease of -26.5% and computer self-efficacy with scores averaging an increase of 62.1%. This study illustrated the feasibility of a low-cost approach for establishing a mobile computer laboratory to help older persons become proficient in their use of computers, the Internet, and related technology.

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Dedication

I dedicate this dissertation to my husband, Dr. Schleurious LaVan Gaiter, for your example of academic excellence has been my tremendous source of inspiration and energy.

I also dedicate this doctoral study to my family and friends, providing your support and understanding helped me persist on this transformative journey.

Lastly, I dedicate this work to all who aspire to be scholars or seek to improve themselves, for steadfast perseverance and focused effort are necessary ingredients for achieving your goals.

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I am forever grateful to my community partners, Mr. Alvin Ely and Ms. Karen Ely, who made it possible for me to offer a computer workshop to older adult learners at the Mount Hermon Village in Portsmouth, Virginia. Study participants were ideal, for each person was eager to learn and greatly contributed to the success of my doctoral research.

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Section 1: The Problem

Introduction

The goal of this concurrent triangulation, mixed-methods study was to collect quantitative and qualitative data to examine two psychological constructs, namely, computer anxiety and computer self-efficacy, which have been shown to impact people's successful use of computers as well as information and communications technology (ICT) in general (Brown, 2008; Hauser, Paul, & Bradley, 2012; Khorrami-Arani, 2001; Saade & Kira, 2009). Emotional states such as anxiety, frustration, and confusion can adversely affect learners' productivity, learning, and overall well-being (Saade & Kira, 2009). Because computer anxiety has been postulated as being influenced by self-efficacy and attitudes toward using computers, its impact on learning is of primary importance in educational systems (Hauser et al., 2012; Saade & Kira, 2009). Moreover, computer self-efficacy (CSE) was noted as a useful mediator of the impact of anxiety, where improving CSE reduces the effect of anxiety on the use of technology and successful computer experiences (Hauser et al., 2012; Saade & Kira, 2009).

Definition of the Problem

Issues that prompted my interest in pursuing this study were two local situations involving heterogeneous groups of adults who lagged in their quest for gaining basic computer knowledge and skills. One group included adults employed at a multi-site child care and development center; the adults varied in age from the younger adults (18–29 year-olds) to young adults (30–49 year-olds) to middle-aged adults (50–64 year-olds). Another group of adult learners that lacked basic computer knowledge and skills were

middle-aged adults (50–64 year-olds) and older adults (65 years and over) who frequented local community centers. Both groups found themselves in an era that required confidence and savvy in using computer technology and being able to knowledgeably access and use information on the Internet (Ariyachandra, Crable, & Brodzinsi, 2009; Barton, 2010; Chandran, 2010; Grimes, Hough, Mazur, & Signorella, 2010; Ruchter, Klar, & Geiger, 2010; Wilkinson, 2006; Xie, 2012; Xie & Bugg, 2009; Xie & Jaeger, 2008).

The U.S. Census Bureau (2011) and Zickuhr and Madden (2012) reported that many older persons and senior citizens have limited computer access and use of the Internet as compared to other age groups. As reported in the U. S. Census Report for 2010, the two age groups that could benefit from increased access to computers and the Internet are adults aged 45 to 64 and older adults (aged 65 years and older).

The goal of this study was to gain insights into older adults' computer experiences that contribute to their successful completion of workshops on developing computer knowledge and skills. To that end, this study examined older persons' perspectives on computer anxiety and CSE after completing a computer knowledge and skills workshop at a community center. Study participants were afforded opportunities to enhance their computer competency. For this study, the computer literacy goal was a basic one: to empower a group of older adults to perform simple, basic computer or ICT operations.

Rationale

Evidence of the Problem at the Local Level

In many communities, there is a need for the provision of computer skills and knowledge training for older adults. Even though older adults' use of computers and the Internet could provide access to vital resources for improving their health and maintaining connectedness with family and society, the digital divide remains (Cresci & Jarosz, 2010). (Here, the digital divide (2010) refers to demographic and socioeconomic factors that impede individuals' use of computers, the Internet, and ICT). There is limited availability of research describing computer skills training and workshops designed to provide comfortable, purposeful selections of instructional elements to accommodate older adults. In the literature, several studies reported on various aspects and benefits of enhancing computer and technology use by the elderly. For example, Coppola (2012) presented an award-winning intergenerational service-learning project in which undergraduates were paired with older learners, resulting in a non-threatening learning atmosphere that stimulated older participants' cognitive functioning and improved their emotional and practical quality of life.

Choi & DiNitto (2013) investigated the digital divide experienced by low-income homebound seniors and explored methods for enhancing their computer and Internet use. They offered insights into ways to accommodate the older and/or disabled citizens: (a) ICT could be designed to be user-friendly, such as employing touch screens or voice activation; (b) persons with low self-efficacy about technology could be encouraged using demonstrations and education; (c) volunteers or salaried persons could be

employed to teach older adults to use e-mail, the Internet, or other ICT; and, (d) older adults should be informed of the myriad benefits of using computers, the Internet, and ICT, for example, living independently, reducing dependence on others or support resources, improving the quality of life, managing ones' health care, and maintaining social connections (p. 107).

Several studies have implications for examining computer literacy as a local problem. Ndahi & Gupta (2000) conducted research in the Hampton Roads, Virginia, area and focused on the provision of training for workforce development. In their study, adult learners were given opportunities to acquire computer knowledge and skills for enhancing their employment opportunities. Larkin-Lieffers (2000), Xie (2012), and Xie & Bugg (2009) examined older patrons' use of computers, the Internet, and web-based technology at public libraries. Vandenbroeck, Verschelden, & Boonaert (2008) noted personal factors, such as motivation and anxiety that may inhibit low-status female workers from acquiring computer skills and using e-learning resources. Chu, Huber, Mastel-Smith, & Cesario (2009) recommended the use of audience-appropriate interventions for adult learners in underserved communities to enhance citizens' access to vital health care information.

Lecture-based instruction and computer-based instruction were shown to be equally effective in improving the computer attitudes of adult learners (Varank, 2006). Harris, Harris, & Lambert (2011) showed that many variables in a study – demographic characteristics, personality, computer-related, and interaction variables – were useful in illuminating their explanatory power as predictors of learners' success in computer

literacy programs. Their study provided valuable information for what teachers should expect when setting up classrooms and identifying which students are likely to be successful in the introductory computer courses. In addition, several studies assessed computer literacy needs for workforce development, and addressing the needs of workers have been the foci of institutions and organizations providing educational programs for adult learners (Gupta & Ndahi, 2002; Landon & Ritz, 2012). Results of a recent (Landon & Ritz, 2012) study indicated that healthcare and technology skill training as the most needed occupational training for increasing employees' competitive skills. The authors noted that those skills would bridge the gap between reflection and action to provide impactful resources and spark economic progress. Gupta & Ndahi (2002) described the state of technology and computer skills in tutors and trainers of adult learning centers in Hampton Roads, noting that about 22% of the potential employees possessed the technology know-how required for 60% of the jobs. Their study indicated the need for additional computer training and improved access to technology. Public libraries and community centers are ideal and familiar settings where older members of the community can take advantage of opportunities to improve their communications and computer skills using e-mail, texting, and correspondence and to gain access to various media and information on the Internet (Hawthornthwaite & Kendall, 2010; Landon & Ritz, 2012; Xie & Bugg, 2009; Xie & Jaeger, 2008).

Evidence of the Problem from the Professional Literature

Improving adults' livelihoods and well-being can be accomplished by providing opportunities for empowering them to operate efficiently in the ever-advancing age of

information technology (Choi & DiNitto, 2013; Chu et al., 2009; Cresci & Jarosz, 2010). This means improving their computer literacy , in particular, adults aged 65 and over who have limited or restricted access to computers and the Internet (Chandra, 2010; Choi & DiNitto; Chu et al., 2009; Coppola, 2012; Gupta & Ndahi, 2002; Xie, 2012). Al-Alaoui et al. (2008) advised that a literacy program to improve reading, writing, and numeracy without including computer literacy did not do justice to its recipients because computer literacy is considered essential to function adequately in today's society.

Bean (2004) provided some enlightening statistics that illustrated how computers and related technology have become an integral part of everyday life. She explained that there is a noticeable gap in the number of people age 65 and older using computers as compared to younger people. Bean (2004) reported the following telling statistics taken from the *Pew Report on the Internet Use*, February 2004: (a) only 22% of people over 65 (i.e., the elderly or older adults) are accessing the Internet, (b) 58% of people aged 50—64 (i.e., middle-aged persons) are accessing the Internet, (c) 75% of 30—49 year-olds (i.e., young adults are accessing the Internet, and (d) 77% of 18—29 year-olds (i.e., younger adults) are accessing the Internet.

Eight years later, Zickuhr and Madden (2012) summarized information obtained from a Pew Research Center report issued in 2012: about 80% of U. S. adults aged 18 and above indicated they use the Internet and e-mail at least occasionally and 67% indicated daily; about 70% of seniors (up from 57% a year before) own a cellular phone; 53% of American adults over the age of 64 use the Internet or e-mail (up from 38% in 2008), and the higher daily users of the Internet and e-mail were reported by the younger

age groups (years 18—29 at 87%; years 30—49 at 86%, and years 50—64 at 76%). From these statistics, it is evident that improvements in computer literacy can be made in each age group, with a greater number of older adults standing to gain the most by practical computer literacy efforts.

Many factors could contribute to the problem of seniors not using computers nor accessing the Internet, among which might include training programs that are not flexible and adaptable for diverse groups of learners (Gagliardi, Mazzarini, Papa, Giuli, & Marcellini, 2008; Martin & Dunsworth, 2007; Martin, Klein, & Sullivan, 2007; Meurant, 2010), different skill levels among participants in computer literacy programs (Ng, 2008), and inadequate opportunities to acquire needed knowledge and skills (Choi & DiNitto, 2013; Chu et al., 2009; Duran, Duran, Ramirez, & Romero, 2004; Stanley, 2003; Xie, 2012).

Inadequate access to public resources or programs has also contributed to expanding groups of people who do not have a working knowledge of computers and web-based technologies (Chandra, 2010; Gupta & Ndahi, 2002; Xie, 2012). Individuals, including older adults, may lack computer literacy skills needed to succeed in everyday life, participate in their medical care and general upkeep, conduct day-to-day business using computers, or complete academic or training programs (Ariyachandra et al., 2009; Bean, 2004; Comber, Colley, Hargreaves, & Dorn, 1997; Cornett, 2001; Delaney, 2008; Enoch & Soker, 2006; Gurganus, Boudah, & Fred, 2003; McDonald, 2004; Xie, 2012).

Merriam, Courtenay, & Cervero (2006) pointed out that members of marginalized, non-dominant cultures are quite accustomed to the cultural bias and

insensitivity they experience in the delivery and limited availability of educational opportunities. The authors related, for example, that many women learners, because of gender and race, may find themselves doubly jeopardized because they function in the margin of two cultures. This lack of educational availability and opportunity also extends to becoming literate and computer literate (Ng, 2008; Rosenthal, 2008; Stanley, 2003; Vandenbroeck et al., 2008). Lack of computer literacy also extends beyond marginalized populations to others in the dominant culture due to economic, class, natural disasters, or some other characteristic or trait (Haythornthwaite & Kendal, 2010; Xie & Bugg, 2009). Merriam et al. added that adult basic education and literacy programs are just two of the many education and training vehicles that are used for "maintaining the power and privilege of those with structural access and cultural capital" (Merriam et al., p. 100 as cited in Cervero, Wilson, & Associates, 2001, p. 272).

Definitions

Special terms associated with this research study are defined in this section.

Adult learners: Adult learners are defined as persons beyond the level of secondary education (Petrina, Feng & Kim, 2008); the age levels for adult learners tend to vary from study to study (Broady, Chan, & Caputi, 2010), for example, younger adults (aged 18 to 29) (Bean, 2004); young adults (aged 30 to 49; Bean, 2004); middle-aged adults (age 50 to 64; Bean, 2004; Chu, 2010); older adults (aged 65 and older; Chu, 2010; Larkin-Lieffers, 2000); and elderly adults (aged 65 and over; Bean, 2004). For the purposes of this study, older adults were referred to as aged 55 and older.

Computer anxiety: Computer anxiety is a well-defined concept in computing and information technology that relates to the fear of or apprehension persons feel when they consider using or actually use computers. Computer anxiety is a term referring to an emotional fear of adverse outcomes such as being embarrassed or damaging files or equipment (Chu et al., 2009).

Computer confidence: Computer confidence is the ability to use or learn to use computers or technology systems (Chu et al., 2009).

Computer literacy: Possessing a rudimentary understanding of the nature of what a computer is and its use as a resource (Ololade & Veronica, 2009); the ability to use a computer or related technology, or the basic knowledge, skills, and attitudes needed by persons to deal effectively with computer technology in their daily lives (Dominick, Friedman, & Hoffman-Goetz, 2009); computer literacy is viewed as multi-faceted and dynamic, and, could be understood in terms of three paradigms: (a) as mastery of technique and knowledge of how a computer works, (b) as awareness of technology in its social and economic context, and (c) as access to tools such as for communication, information handling, and learning and inquiry (Ruthven, 1984).

Computer self-efficacy: This trait is identified as a key determinant for acquiring and using computer knowledge and skills; a term derived from the self-efficacy concept that refers to a person's perceived ability to successfully perform tasks using computers or technology and have strong intentions for use of technology (Chu et al., 2009).

Significance

Gardner (2010) pointed out that two major trends – population aging and the digital revolution – are greatly impacting how we individually and collectively interact in today's world. Here, population aging refers to an aging society accounting for the fastest growing segment of the U. S. population and the digital revolution refers to the persistent development, launching and use of ICT and the Internet. There is an ever-growing need for adults in all age groups to enhance their use of technology by acquiring computer literacy knowledge and skills (Duran et al., 2004; Petrina et al., 2008; Lagana, 2008; Saunders, 2004; Williamson & Asla, 2010; Willis, 2006). Older adults aged 65 and older were noted as belonging to the fastest growing population segment of users of computers and the Internet (Coppla, 2012; Mayhorn, Strong, McLaughlin, & Rogers, 2004; Williamson & Asla, 2010). Researchers also explored the importance of understanding how adults learn and how to utilize different training methods for facilitating their use of computers. Petrina et al. (2008) examined the relationship between how we learn and using technology as lifelong learners. Lagana (2008) showed how the use of different training styles could be employed for enhancing older adults' self-efficacy and attitudes toward using the Internet and technology.

Saunders (2004) investigated maximizing the use of technology at community centers for the elderly by increasing their knowledge about available services and improving their connectedness with family and others via e-mail. Williamson and Asla (2010) stressed the need for additional research on the large, diverse population of older persons (aged 65 and over) to understand their information needs and behaviors with

implications of increased use of technology and the Internet. Willis (2006) examined the role of technology for the future generations of elders (i.e., the early baby boomers who are aged 50 to 64). While previous studies (Census, 2011; Zickuhr & Madden, 2012) showed that persons over 65 rarely used the Internet, the majority of future elders (56%) reported that they have Internet access, use computers and the Internet in their daily and work lives, and would not look favorably on not having Internet access (Willis, 2006).

Improving the computer literacy of adult learners is not a new topic (Berg, 1991; Delaney, 2008; Gurganus et al., 2003; Jones & Pearson, 1996; Kryder, 1999; Lee, Chen, & Hewitt, 2011; Xie, 2011; Xie, 2012). In this age of rapidly developing technology and use of sophisticated touch screens and computer interfaces, kiosks for accessing the Internet, interactive portals, e-learning, e-mail, and online business transactions, every person, young and old, will need to embrace computer literacy in all aspects of their lives, including business, family, work, leisure, health, and education (Al-Alaoui et al., 2008; Boghikian-Whitby & Mortagy, 2008; Cornett, 2001; Milic & Skoric, 2010; Rosenthal, 2008; Wallace & Clariana, 2005). Martin and Dunsworth (2007) summarized computer literacy as both an understanding of computers' characteristics, capabilities, and applications, as well as the ability to implement that knowledge in the skillful, productive use of computer applications.

Previous studies also indicated that computer literacy is (a) deemed essential to both academic and career achievement, (b) a fundamental component of the school curriculum in this era, and (c) used by college and university students in most of the courses in their disciplines (Martin & Dunsworth, 2007). In addition to the academic

setting, technological advances have also prompted employers to reorganize to remain competitive, acquire the latest technical systems, and seek computer-literate employees (Gupta & Ndahi, 2002; Martin & Dunsworth, 2007; Themistocleous, Koumaditis, Mantzana, & Morabito, 2010).

Boghikian-Whitby and Mortagy (2008) noted that computer skills and knowledge are especially important for students interested in online education, where their study revealed that the computer-based learning format enabled adult students to achieve higher performance scores than traditional age students even though their study reported the attainment of learning was not significantly different between online and face-to-face modalities or the student's age. Familiarity with the use of computers and technology is essential for reaping the benefits online education can offer adult learners, which may include scheduling flexibility in accomplishing their learning by accommodating their daily lives (Boghikian-Whitby & Mortagy).

Guiding Research Questions

In designing and facilitating programs for older adults, it is essential to understand the effect of psychosocial factors, such as computer anxiety and computer self-efficacy, which may improve or impede their active engagement in the learning environment. This study investigated the effect of a computer knowledge and skills workshop on computer anxiety and CSE among older adults. Albert Bandura's social learning theory postulated that psychological procedures can serve to create and strengthen individuals' expectations of personal effectiveness, where, for example, perceived self-efficacy can improve a person's coping efforts and persistence when facing obstacles (Bandura & Adams, 1977).

This study investigated the following two research questions, each with their subquestions:

Research Question 1 (RQ1): What is the effect of a computer knowledge and skills workshop on computer anxiety in older adults?

To investigate RQ1 on computer anxiety, the following subquestions were addressed during the data analysis process:

(1) What is the relationship between older persons' ages and their computer anxiety?
(2) What is the relationship between older persons' educational levels and their computer anxiety?
(3) What is the relationship between older persons' genders and their computer anxiety?
(4) What is the relationship between older persons' weekly usages of computers and their computer anxiety?
(5) What is the relationship between older persons' experiences with computers and their computer anxiety?
(6) What factors contribute to the elderly coping with computer anxiety?
(7) What factors exacerbate older persons' computer anxiety?

Research Question 2 (RQ2): What is the effect of a computer knowledge and skills workshop on computer self-efficacy in older adults?

To investigate RQ2 on computer self-efficacy, the following subquestions were addressed during the data analysis process:

(1) What is the relationship between older persons' ages and their computer self-efficacy?

(2) What is the relationship between older persons' genders and their computer self-efficacy?

(3) What is the relationship between older persons' educational levels and their computer self-efficacy?

(4) What is the relationship between older persons' weekly usages of computers and their computer self-efficacy?

(5) What is the relationship between older persons' experiences with computers and their computer self-efficacy?

(6) What factors contribute to improving older person's computer self-efficacy?

Review of the Literature

A review of the literature was conducted to highlight pertinent aspects of previous research, as well as to help shape and focus the aim of the study. The strategy employed for conducting the literature review to inform this doctoral study consisted of conducting Internet searches for scholarly articles using keywords, phrases, and references cited by peer-reviewed publications. Pertinent keywords and phrases utilize in the literature review included computer literacy of older adults, computer anxiety, computer self-efficacy (CSE), barriers and challenges of older persons using ICT, training programs for older adults, theoretical frameworks, and mobile technology. Published peer-reviewed articles were obtained via Internet searches and searches of online databases such as ERIC, ProQuest, Educational Research Complete, and SAGE Premier. Online queries

for pertinent articles were based on the authors, title of the article, title of the journal or book, or DOI number. The following topics were investigated in the review: theoretical and conceptual frameworks, insights into the historical underpinnings of the problem, scholarly perspectives on the issue of computer literacy, CSE and computer anxiety, Internet access and usage, strategies for addressing older persons' computer literacy, and steps to implement computer literacy training.

The age range for the term, *older adults* varies in the literature. Examples of the variety of descriptions for older adults are presented in Table 1.

Table 1

Examples of age ranges that describe older adults

Reference	Descriptor	Age range
Census Bureau (2011)	Older population	65 and older
Czaja & Sharit (2009)	Older population	65 and older
Dickson, Eisma, & Gregor (2011)	Older adults	55 and over
Gatta & Tak(2008)	Older adults	60 and over
Lee, Chen, & Hewitt (2011)	Pre-seniors or pre-retirees	50—64
	Young-old	65—74
	Old-old	75—84
	Oldest-old	85 and beyond
Rosenthal (2008)	Older women	54—81
Xie & Bugg (2009)	Older adults	54—89

With the constant evolution of ICT, designing and delivering effective computer training and skills training for older adults are more relevant than ever (Choi & DiNitto, 2013; Chu et al., 2009; Cresci & Jarosz, 2010; Sayago & Blat, 2011; Wagner, Hassanein,

& Head, 2010; Williamson & Asla, 2010). Examples of ICT are desktop computers, laptop computers, tablets, cellular phones, kiosks for accessing the Internet, and touch screens.

Theoretical and Conceptual Perspectives

Bandura's self-efficacy theory provides the theoretical framework for guiding this research effort, where learners would be engaged to be self-regulated and demonstrate self-beliefs in their abilities to be motivated, use cognitive reasoning, and take the necessary actions to pursue tasks for achieving their learning goals and objectives (Grant, Malloy, & Murphy, 2009; Guy & Lownes-Jackson, 2010). The theoretical concept for my proposed study focuses on both the learners and their learning environment. For adult learners, Bandura's concept of self-efficacy has been shown to be an effective self-assessment that influences how learners approach each other and new learning situations; behavior is a function of the interaction of students and the learning environment (Merriam, Cafferella, & Baumgartner, 2007).

According to Merriam et al. (2007), Bandura's theoretical approach was first presented as a social learning theory, but it is now known as social cognitive theory (SCT). SCT posits that observational learning can occur when learners regulate their performance in acquiring new knowledge and skills by visualizing the self-generated consequences (Merriam et al., 2007). This study collected and analyzed data to examine the effect of a computer knowledge and skills workshop on computer anxiety and CSE in older adults. Emotional states such as anxiety, frustration, and confusion can adversely affect learners' productivity, learning, and overall well-being (Saade & Kira, 2009).

According to Pajares (2002), SCT is based on the view that individuals are engaged in their own development and are fully aware that they can make things happen by their actions. Pajares explained that the individuals' economic situations, socioeconomic status, and educational and familial standings do not affect their behavior directly. Instead, he offered that those factors may have an impact on a person's aspirations, self-efficacy, personality, mindset and other self-regulated attributes. Many researchers have used aspects of SCT or the SCT model to guide their studies of older adults. For example, White, Wojcicki, and McAuley (2012) provided support for the use of a SCT model for positively altering the physical activity behavior of older adults, in which self-efficacy influenced their physical activities both directly and indirectly. Wagner et al. (2010) used SCT as a lens for organizing studies in older adults' computer use and behaviors. In addition, Winett, Williams, & Davy (2009) used SCT with a focus on older adults' self-regulation and response for initiating and maintaining resistance training programs.

Insights into the Historical Underpinnings of the Problem

While computer proficiency can be used to describe the skills needed to perform certain tasks, proficiency is not literacy but can be used as a measure to estimate computer literacy (Childers, 2003). For this study, computer literacy was defined as computer knowledge and skills needed by older adults to demonstrate basic competence in using computers and communications technology systems (Broady et al., 2010; Childers, 2003; Pierce, Lloyd, & Solak, 2001; Williams, 2002). Previous research has offered varying insights about older adults' use of computers and information technology.

For example, older adults' use of technology was reported as being directly influenced by the tools' usefulness in fulfilling specific needs in their lives (Hanson, 2010). Lee et al. (2011) described implications for effective interventions for older adults who may face a variety of barriers or dimensions of constraint (i.e., intrapersonal, interpersonal, structural, and functional limitations) at different age segments (i.e., pre-senior, young–old and older–old). Gerontechnology refers to the study of technology use in older adults, how age-related changes (e.g., cognition, perception, and motor function) affect their use of technology, and suggestions for improving the design of products that could improve older adults' independence and quality of life (Charness & Boot, 2009). Independent predictors of computer use among older adults were reported as "younger age, greater level of education, non-Hispanic ethnicity, behaviorally active coping style, general physical health, and role-related emotional health" (Werner, Carlson, Jordan-Marsh, & Clark, 2011, p. 431). Older persons have different needs and age-related natural physical and cognitive changes, such as declines in hearing, sight and motor skills, and diminishing attention span, memory, and spatial abilities, which indicate the need for larger fonts, selective use of sounds, a user-friendly mouse, and computer-human interfaces with minimum distractions, helpful memory cues, and simple guides (Wagner et al., 2010).

Childers (2003) related that achieving a target level of computer literacy is not a hard goal if one commits to accomplishing it. Also, achieving baseline computer literacy is only the beginning and should be followed by continuous training at higher proficiency levels to create a knowledgeable public and adaptable workforce (2003). Defining

computer literacy is not an easy task. As early as 1968, the National Science Foundation, at the urging of President Nixon, took a leadership role in adding computer science to college curricula in the United States (2003). After more than 40 years, Childers (p. 101) related that computer literacy has remained a problem and offered four possible reasons for the decline of computer literacy: (a) the definition of computer literacy is elusive for there is a constant conflict of what computer literacy actually means, (b) the public's loss of interest could be a backlash against incorporating the word literacy since the term was viewed as a negative connotation as there were no universally accepted meaning of essential or basic computer skills and expertise, (c) children took to computers much faster than educators had predicted; however, schools did not develop programs to challenge students' span of learning to use computers and technology, and (d) the nature of computers themselves for computer literacy programs seem to fall short in delivering meaningful knowledge and skills (due to the rapid technological developments that are continually changing the nature of computer-use skills on an almost annual basis).

Scholarly Perspectives on the Problem of Computer Literacy

With the aging population, both in the United States and abroad, the acceptance and utilization of computers and technology by older persons are necessary (Broady et al., 2010). While there are both similarities and differences in the attitudes and use of technology for younger persons and the elderly, provision of computer skills training to older students must incorporate sufficient time for learning new skills and must treat them with active and valued manners (2010). Christ (2008) noted that information technology is infused in nearly every aspect of our society. For persons with disabilities,

assistive technology is seen as one of the few options that can reduce the unwarranted public and workplace disabling agents such as negative attitudes, stigma, and misperceptions that can create hostile environments. Acquiring computer skills and knowledge will provide older citizens, including persons with disabilities, "opportunities for interactive living, gainful employment, and successful education" (Christ, p. 26). Emiliani, Stephanidis, and Verheiden (2011) discussed emerging information and communication technology that could contribute to the inclusion of persons with disabilities, where new products, services, applications, and assistive technology would be available for individuals with activity limitations (i.e., impaired sight, hearing, reading, writing, and cognitive skills).

Various terminologies and definitions have been used to describe improvements in persons' use of technology and computers including labels such as computer literacy, computer savvy, computer and/or technology proficiency, and computer skills development, to name only a few of such terms (Brock & Thomsen, 1992; Dominick et al., 2009; Kubiatko, 2007; Milic & Skoric, 2010; Ruthven, 1984; Seals, Clanton, Agarwal, Doswell, & Thomas, 2008; Seals, Moses, Nyagwencha, Martin, Clanton, Thomas, & Doswell, 2008). For this study, the term computer literacy was used to denote any of the current and possible future variations that may be employed to describe various knowledge, skills, and proficiency levels in the use of computers, information and communications technology (ICT), and e-mail (Al-Alaoui et al., 2008; Bailey & Ngwenyama, 2010; Milic & Skoric, 2010; Seals et al., 2008), disability-related assistive technology (Christ, 2008), health information portals and other computer interfaces

(Chou, Nagykaldi, Aspy, & Mold, 2010; Dominick et al., 2000), and Internet-use, e-learning, and computer-based learning (Boghikian-Whitby & Mortagy, 2008; Chu, 2010; Chu et al., 2009; Enoch & Soker, 2006; Kubiatko; Lagana, 2008; Martin, Klein & Sullivan, 2007; Resch, 2008; Seok, 2008; Shapira, Barak, & Gal, 2007; Vandenbroeck et al., 2008).

Computer Anxiety and Self-Efficacy

Previous studies have reported on the examination of psychosocial constructs that are helpful in evaluating the effectiveness of interventions and practices. Two of those constructs are computer anxiety and CSE (Bunz, 2009; Jung, Peng, Moran, Jin, McLaughlin, Cody, Jordan-Marsh, Albright, & Silverstein, 2010; Koblik, Kidd, Goldberg, & Losier, 2009; Saade & Kira, 2009; Simsek, 2011). Other related constructs that may be used by researchers include computer attitude (Burnett, Mitzer, Rogers, & Fisk, 2009; Gonzalez, Ramirez, & Viadel, 2012; Lagana, 2008; Xie, 2012), computer confidence (Chu & Mastel-Smith, 2010; Chu et al., 2009), Internet self-efficacy (Chu, 2010), and web-based learning and self-efficacy (Nahm & Resni, 2008).

This study examined the psychosocial constructs of computer anxiety and CSE using preestablished quantitative instruments. To aid in establishing evidence-based practices to assist persons in accessing and evaluating online health information, Chu et al. (2009) recognized the importance of understanding the factors of computer confidence, computer anxiety, and computer self-efficacy. They examined how adults residing in low socio-economic communities were motivated to use the Internet and computer systems for accessing critical health information. Participants in the

intervention group showed less anxiety, higher self-efficacy and higher confidence toward the computer skills training and in using computers. Program facilitators employed a combination of patience, perseverance, and peer-to-peer or instructor-student interactions to reduce the learners' stress and anxiety and raise their self-efficacy and confidence (Chu et al., 2009).

Campbell & Wabby (2003) reported a reduction in computer anxiety and increased levels of self-efficacy after receiving 10 hours of training conducted over a 5-week period. Karavidas, Lim, and Katsikas (2005) reported increased self-efficacy and decreased anxiety, resulting in improved quality of life for older adults participating in computer training. Koblik, Kidd, Goldberg, and Losier (2009) examined computer education conducted for psychiatric rehabilitation patients, with benefits to participants described as improvements in self-esteem and self-efficacy and social inclusion identified as an importance source of motivation. Simsek (2011) reported how increased self-efficacy and moderate levels of anxiety produced preferences for ease of Internet learning whereas very high or very low levels of anxiety have been shown to be detrimental to performance in learning environments.

Implications

The intent of this study is to complement the existing body of work on computer anxiety and CSE of older adults and the use of interventions for improving older adults' utilization and knowledge of ICTs, computers, and the Internet. Specifically, a concurrent triangulation mixed-methods research design was utilized to explore the psychosocial factors of computer anxiety and CSE and obtain rich, thick descriptions of older adults'

experiences after they completed a computer knowledge and skills workshop. The qualitative data collected using semi-structured interviews and quantitative data gathered using a survey questionnaire were compared and contrasted to determine whether the two types of data were convergent, complementary, or divergent and whether the results supported current theoretical positions on CSE and anxiety in older adults. In addition, insights gained from the study may be helpful in designing and implementing effective ICT interventions for older adults.

Werner et al. (2011) conducted a study with a large ($N = 460$) ethnically-diverse sample and analyzed demographic characteristics, psychosocial variables, and health-related factors, with results indicating that younger age, higher education, non-Hispanic ethnicity, active coping lifestyle, healthy disposition, and positive emotional outlook predicted ones use of computers. Potential applications of the findings in the study by Werner et al. include future research on educational interventions, human-computer interfaces, and user-friendly software for older adults. Xie (2003) described two types of human factors remedies that are addressed in the literature: (a) designing software and interfaces for older adults and (b) preparing age-appropriate educational materials and interventions.

Xie recommended that future research and interventions are needed to accommodate older persons' decline of cognitive, perceptual, and physical abilities that adversely impact their ability to learn new software, and navigate and obtain information using portals, the Internet, and ICTs. Saunders (2004) reported how previous researchers found that all levels of adults' life satisfaction and meaning were enhanced when the

individuals felt control, self-esteem, and self-efficacy, where use of computers and the Internet allow older adults to improve their psychological health, purpose in life, personal growth, self-belief, and enhance relationships with others. Xie and Bugg (2009) also expressed the need for additional educational interventions for older adults, especially training to teach older adults how to use the Internet to access high-quality health information and help manage their medical and health care. Xie (2012), in conducting a computer-based health information intervention for older adults ($N = 218$) at public libraries, showed that after completing the intervention, the participants' computer attitudes improved from pre- and post-intervention, computer anxiety was markedly decreased, and interest and efficacy increased.

Findings from previous research indicated participants' willingness to take part in computer and Internet interventions to improve their self-care and health knowledge and showed how those educational interventions had substantial personal, social, and economic implications for communities and older adults (Choi & DiNitto, 2013; Haythornthwaite & Kendall, 2010; Jensen, King, Davis, & Guntzviller, 2010; Xie & Bugg, 2009; Xie & Jaeger, 2008). Wouters, Paas, and van Merrienboer (2008) proposed three sets of design guidelines for optimizing older adults' learning from animated models: (a) strive to manage the complexity of training and materials; (b) prevent activities and poor design features that may impede learning; and, (c) engage learners in active and participatory lessons of relevant subjects.

Wouters et al. provided a helpful table containing guidelines, descriptions, and examples for using animated models. To further enhance older adults' use of computers,

it is essential that interventions include training on risks and hazards of using computers and the Internet (Barton, 2010). Grimes et al. (2010) reported that older adults are likely to be less knowledgeable about risks using the computer and the Internet than younger persons. The authors recommended future studies to determine the best approach for educating inexperienced older learners in security and other hazards in computer and Internet use.

To enhance the students' learning experiences, Al-Alaouri et al. (2008) suggested infusing the directed computer literacy training with everyday scenarios, formative assessments to adjust the on-going programs, easy-to-follow instructions, and appealing graphics. Addressing inequities seen in access and utilization of marginalized populations (e.g., low-income adults and older adults) will aid in sustaining the widening population of elders who are endeavoring to become computer knowledgeable and literate in the use of technology (Jensen et al., 2010).

Another approach to sustaining the effectiveness of computer literacy programs was explained by Jiaya & Eastman (2008) in their use of cooperative learning strategies in a computer literacy course. The strategies can serve to (a) motivate student learning, (b) add flexible elements in aiding classroom dynamics and avoiding problems of missing group members by allowing students to migrate from one group to another, and (c) provide convenient, flexible means for educators to fit methods into different teaching and learning circumstances (2008).

Summary

This section presented a description of the social issue to be explored, workable actions, and possible strategies for designing and implementing effective computer knowledge and literacy programs for older adults. When designing the computer literacy programs, several factors must be taken into account. Designers and teachers must address the cognitive and physical abilities that would enable the older learners to complete the computer knowledge and literacy training. Three considerations that can be used to implement an adaptable learning viable program may include: using interactivity, self-paced learning, and learning through leisure via game-like or fun lessons (Al-Alaoui et al., 2008).

The next section presents the methodology for the study, which includes the research design and approach, research problem statement and questions, data management, data collections and analyses, research strategies, reliability and validity measures, data presentation, ethical considerations, and protection of participants' rights.

Section 2: The Methodology

Introduction

This section describes the methodology for conducting a concurrent triangulation, mixed-methods study to obtain insights on computer anxiety and the CSE of older adults before and after completing a workshop (educational intervention). The educational intervention used mobile, wireless technology for Internet and communications connections. The mobile, wireless technology feature allowed training at facilities that did not have the necessary hardware, computer, and Internet resources (Meurant, 2010; Ruchter, Klar, & Geiger, 2010; Thinyane, Slay, Terzoli, & Clayton, 2006).

In ICT, *mobile technology* refers to a variety of devices that allow e-mail, telephone, computer capability, and Internet access (Chadran, 2010; Sandars & Dearnley, 2009; Ruchter et al., 2010). People using mobile technology must understand and, when possible, mitigate vulnerabilities with security (e.g., divulging passwords and personal information) and Internet access (Barton, 2010; Sandars & Dearnley, 2009). This methodology section will include the research design and approach; setting and sample; instrumentation and materials; data collection and analysis; assumptions, limitations, scope, and delimitations; protection of participants' rights; and a summary.

Mixed-Methods Research Design and Approach

A mixed-methods research design is well suited for gaining in-depth, multifaceted insights on complex issues, events, or phenomena (Plano Clark, Huddleston-Cases, Churchill, Green, & Garrett, 2008). Further, a mixed-methods study entails the concurrent or sequential collection of both quantitative and qualitative data and

integration of the data may take place in one or more stages in the research, where one data type may be given a priority (Borrego, Douglas, & Hamelin, 2009; Ostlund, Kidd, Wengstrom, & Rowa-Dewar, 2011). For this research, a mixed-methods study with a concurrent triangulation design examined computer anxiety and the CSE of older adults.

The concurrent triangulation approach involved collecting quantitative and qualitative data during the same stage, and analyzing each type of data separately, with the ultimate goal of more accurately defining the relationships among the selected variables (Castro, Kellison, Boyd, & Kopak, 2010). This approach is appropriate for this research study, because its use allowed the asking of both confirmatory and exploratory questions (Teddlie & Tashakkori, 2006).

Figure 1 is a diagram of the concurrent triangulation, mixed-methods design for the study. It was modeled after one of the four primary mixed-methods designs proposed by Plano Clark et al. (2008). Quantitative data were obtained using a survey questionnaire (Appendix B), which was administered before and after the workshop. Qualitative data was collected by audio-taping semistructured interviews conducted after the workshop. Using procedures for analyzing qualitative data described by Creswell and Plano Clark (2011), the audio recorded interviews were transcribed then analyzed.

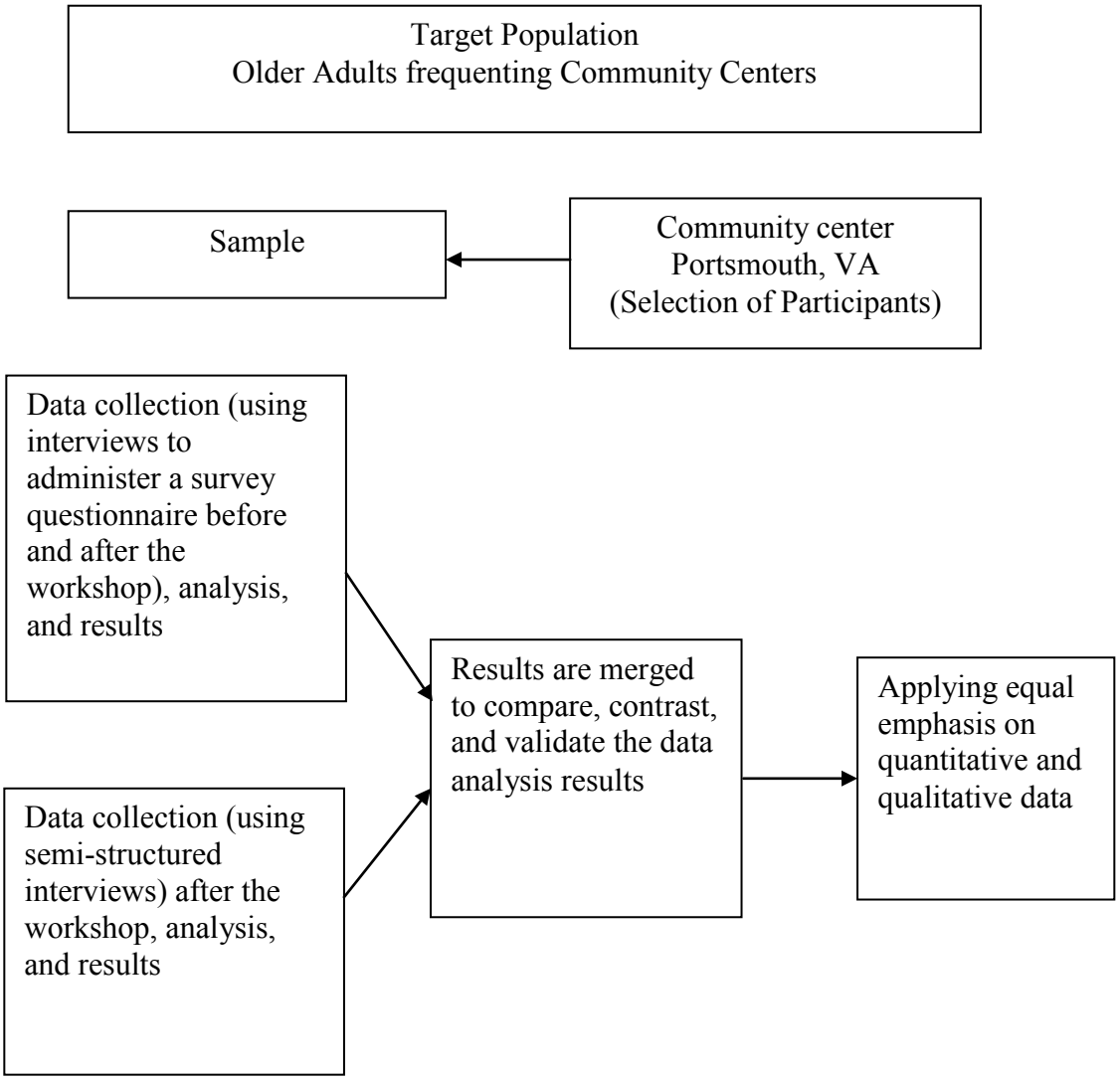

Figure 1. Mixed methods research using concurrent triangulation.

Understanding attributes of older adult learners provided insights for teachers and administrators on possible factors that should be considered when designing and facilitating training workshops at learning institutions, training facilities, libraries, and community centers. The computer knowledge and skills workshop was conducted at a local community center and included facilitator-led discussions supplemented with computer-based modules that incorporated the

following instructional elements: (a) objectives, (b) information, (c) feedback, (d) examples, and (e) review. A social benefit of this study is that it may be used as a guide for examining attributes and factors that would facilitate conducting effective computer training programs that meet the needs of participating older adults. Jick (1979), one of the pioneering researchers credited with the initial introduction of using triangulation in mixed methods, provided the following explanation of triangulation as a viable research approach:

> Triangulation is a strategy that may not be suitable for all research purposes. Various constraints (e.g., time, costs) may prevent its effective use. Nevertheless, triangulation has vital strengths and encourages productive research. It heightens qualitative methods to their deserved prominence and at the same time, demonstrates that quantitative methods can and should be utilized in a complementary fashion. Above all, triangulation demands creativity from its user – ingenuity in collecting data and insightful interpretation of data. (p. 610)

Using a concurrent triangulation mixed-methods design enabled the collection and analysis of both quantitative and qualitative data to more accurately examine the study's variables of interest, where the researcher can generate or confirm a theory by simultaneously asking confirmatory and exploratory questions (Castro et al., 2010; Teddlie & Tashakkori, 2006). Researchers are advised that the concurrent mixed methods designs are robust yet challenging due to the expertise needed to examine the phenomena with quantitative and qualitative data and integrate the rich, thick narratives with the

quantitative statistical reports (Bronstein & Kovacs, 2013; Teddlie & Tashakkori, 2006). Examples of studies that employed the concurrent triangulation mixed methods design include research by López and Tashakkori (2006), Rao and Woolcock (2003), and Bronstein and Kovacs (2013).

Data collections occurred at the onset and conclusion of a computer knowledge and skills workshop at a community center. Questionnaires were administered to study participants before and after a computer workshop. In addition, after the workshop was concluded, the researcher interviewed each workshop participant. Data analyses commenced after the workshop and interviews were completed. Table 2 provides an outline of the data collection and analysis procedure.

Table 2

Outline of the data collection and analysis procedure

Step	Time frame	Actions (Data collection, analysis, report preparation)
1	Week 1	Preworkshop: For each participant, obtain written informed consent and complete a 3-part quantitative questionnaire using the interview process
2	Week 3	Postworkshop: For each participant, complete a 3-part quantitative questionnaire using the interview process
3	Week 3	Postworkshop: For a convenient sampling of the participants, complete the qualitative semi-structured interviews using interview protocol (Appendix D)
4	Post-study	Calculate individuals' scores for CSE and computer anxiety (CA) questionnaires completed in Step 1. Use descriptive statistics to report results, percentages, and scores in high, medium, and low ranges for CSE and CA.
5	Post-study	Calculate individuals' scores for CSE and CA questionnaires completed in Step 2. Use descriptive statistics to report results, percentages, and scores in high, medium, and low ranges for CSE and CA.
6	Post-study	Compare Step 4 and Step 5 results and report findings (e.g., overall, and for each demographic and computer use variable). Use descriptive statistics to report results, percentages, and scores in high, medium, and low ranges for CSE and CA. Use results to address RQ1 subquestions 1 through 5 and RQ2 subquestions 1 through 5.
7	Post-study	Analyze the qualitative data (obtained from the interviews in Step 3) using thematic analysis, which will involve coding and segregating the collected data for additional analysis in search for patterns, categories, and themes. Use results to address RQ1 subquestions 6 and 7 and RQ2 subquestion 6.
8	Post-study	Compare and contrast the quantitative data (Steps 4, 5, and 6) and the qualitative data (Step 7) to determine whether the two types of data are convergent, complementary, or divergent and whether the results support current theoretical positions on CSE and CA in older adults. Summarize the findings in the results section of the dissertation.
9	Post-study	Prepare dissertation, abstract, and report.
10	Post-study	Prepare a 1- or 2-page summary to present to the community partner.

Setting and Sample

This section describes the population from which the sample was drawn, the sampling methods, sample sizes, eligibility criteria for study participants, and characteristics of the selected sample. The setting and site for the study comprised a community center in Portsmouth, Virginia, where all data collections (e.g., assessing and interviewing) took place. A small sample was utilized to facilitate delivery of a computer literacy workshop for older adults interested in improving their computer knowledge and skills. Approximately 20 members were accepted for participation in the study from the available population of older adult learners who elected to take part in a workshop held and coordinated by the host community center.

The participants of the study included older adults of varying demographics, personal and professional traits, and social and work status. The eligibility criteria for study participants were: (a) be aged 55 or older, preferably 65 years or older; (b) be able to read and understand English (c) be able to turn on the power of a computer and use a computer mouse, and (d) have the ability to perform simple typing on a computer keyboard. In addition, using convenience sampling, the host community center advertised the offering of the computer knowledge and skills workshop for older adults who were willing to travel to the training site and were motivated to learn how to use a computer or to improve existing basic computer knowledge and skills.

Context and Concurrent Strategies

After receiving the necessary permissions from the Institutional Review Board (IRB), proprietors of pre-established instruments, and from the research site's administrators, the

next step entailed gaining access to lists of potential participants from the population of interest. Walden University's approval number for this study is 03-18-14-0083475, and the approval expires on March 17, 2015. Managers at the prospective research site were engaged to provide a list of persons that signed up as participants in the computer knowledge and skills workshop. The collection of research data involved engaging in five interrelated steps, which will include selecting study participants from the available pool of persons, obtaining various permissions, selecting the types of quantitative and qualitative data to be collected, deciding which guides and instruments to use, and administering the data-collection process.

Both qualitative data and quantitative data were gathered during the study using semi-structured interviews and quantitative questionnaires. The questionnaire items were read aloud to participants, and individuals recorded their responses to each item on questionnaire sheets. To facilitate the comparison of individuals' preworkshop and postworkshop scores for computer anxiety and self-efficacy, participants recorded their initials on the first page of the questionnaire form. To perform the semistructured interviews, the researcher followed an interview protocol (Jacob & Furgerson, 2012). In addition, the researcher took brief notes during the audio taped semistructured interviews. The notes and recordings were transcribed prior to qualitative data analysis.

Qualitative Sequence

Qualitative data were collected through semi-structured interviews. Written permission to access the participants was obtained from the selected community center before any contact was made with potential study participants. A consent letter was used

to describe the nature and intent of the study and to document participants' voluntary participation in the concurrent triangulation mixed-methods study. Appendix B provides the survey questionnaire. Appendix C provided the signed letter of cooperation from the community partner. The target number of study participants was 20 members; eleven students completed the workshop and participated in data collections. Each participant was asked to take part in semi-structured interviews lasting 10 to 15 minutes each. The interview protocol (Appendix D) listed the questions that were used to obtain participants' perspectives regarding computer anxiety and computer self-efficacy. Examples of questions in the interview protocol included:

1. Before you completed the computer workshop, what were your feelings toward using computers and the Internet?
2. How often did you use computers before the workshop?
3. Before the workshop, how would you rate your skills using the computer and the Internet?
4. What motivated you to participate in the computer workshop?
5. What challenges or barriers did you encounter during the workshop?

During the first weekly session of the workshop, the researcher-participant working relationship was established. The researcher had no previous contact with the community center or its patrons. The researcher had experience as a college instructor of adults but had limited experience teaching older adults. The researcher's curriculum vitae summarizes my experience and qualification and is provided following the appendices in this report.

Quantitative Sequence

On two occasions, a survey questionnaire (Appendix B) was utilized to collect quantitative data from study participants. The survey was administered to participants before and after they completed a computer knowledge and skills workshop. Approximately 20 minutes were required to complete the survey form. The researcher read aloud each survey question, and participants recorded their responses on the survey forms. The questionnaire survey consisted of (a) Part 1 – Demographic Information (Categories: age, gender, race/ethnicity, disability status, level of education, computer ownership, computer skill level, computer experience, and weekly computer usage), (b) Part 2 – CSE Measure, and (c) Part 3 – Computer Anxiety Rating Scale (CARS). Documentation of permissions granted to utilize the CSE and CARS in this study are provided in Appendices E and F, respectively. The raw quantitative data is provided as Appendix I (Survey Questionnaire Data).

To measure participants' computer self-efficacy, the CSE Measure, a five-item Likert scale described as Murphy's CSE Scale, was utilized. The CSE met the purposes of this study and was reported as appropriate for use with older adults (Brown, 2008). The CSE includes items from a scale developed by Murphy et al. (1989). It contains 29 items as listed in Appendix B, with each item prefaced with the phrase "I feel confident", which is a notation utilized by Sam et al. (2005) in their study of computer attitudes of adult learners. Acceptable reliability using Cronbach's alpha value was reported as 0.9049 for the CSE scale (Sam et al., 2005). To measure computer anxiety, a pre-

established instrument, the CARS was utilized. The CARS was developed and validated by Heinssen, Glass, and Knight (1987); high internal consistency was reported for the CARS, with Cronbach's alpha coefficient equal to 0.87 (Bunz, 2009; Heinssen et al., 1987). Preintervention and postintervention survey data were tabulated and reported as descriptive statistics. The third section of the survey includes 19 items from the computer anxiety scale that was designed and validated by Heinssen et al. (1987).

Each item on the CSE scale and computer anxiety scale used a five-point Likert scale to indicate participants' responses. The Likert scale utilized the following notations: 5 = *strongly agree*, 4 = *somewhat agree*, 3 = *neutral*, 2 = *somewhat disagree*, and 1 = *strongly disagree*. Total possible scores for the CSE scale (N = 29 items) could range from 29 to 145, with higher scores indicating individuals with increased confidence in using computers (Sam et al., 2005). Total scores for the computer anxiety scale (N = 19 items) could range from 19 to 95, with higher scores indicating worsening states of stress or distress with regards to utilizing computers and information technology. To accommodate updates in terminology and technology, the wording of two items on the computer anxiety scale (Heinssen et al., 1987) were modified as follows:

1. Item 1 (shown as item 3.1 in Appendix B) was changed from "I feel insecure about my ability to interpret a computer printout" to read "I feel insecure about my ability to print documents using a computer".
2. Item 3 (shown as item 3.3 in Appendix B) was changed from "I would be able to learn a computer programming language" to read "I would be able to use computer software applications".

After study participants had completed the CARS and the CSE in the questionnaire survey, the data were analyzed per the following steps:

1. The CARS contained 19 items and nine of those items (e.g., items 2, 4, 5, 6, 7, 9, 10, 17, and 19) were worded in the active tense and required reverse scoring, with values of "1" indicating *strongly agree* to "5" indicating *strongly disagree* (Shah, Hassan, & Embi, 2011).
2. The CARS scores were calculated for each of the participants that completed Section 3 of Appendix B.
3. From the participants' CARS scores, the maximum score and minimum score were determined.
4. Using an approach described by Shah et al. (2011), the participants' CARS scores were grouped into three distinct categories: (a) assigned the lower range of scores as "No Anxiety", (b) assigned the mid-range scores as "Low Anxiety", and assigned the higher range of scores as "Moderate/High Anxiety". For example, if the range of scores obtained after the participants completed the CARS is from 19 to 95, then dividing the range of 76 (95 minus 19) by three equals 25; so the lower range of scores ("No Anxiety") becomes 19–44, mid-range ("Low Anxiety") becomes 45–69, and the higher range ("Moderate/High Anxiety") becomes 70–95.
5. The CSE contains 29 items, with scoring assigned as "5" for *strongly agree* to "1" for *strongly disagree*. The CSE scores were calculated for each of the participants that completed Section 2 of Appendix B.

6. From the participants' CSE scores, the maximum score and minimum score were determined.
7. Similar to the approach used for categorizing the CARS scores, the participants' CSE scores were grouped into three distinct categories: (a) assigned the lower range of scores as "Low Self-efficacy", (b) assigned the mid-range scores as "Moderate Self-efficacy", and assigned the higher range of scores as "High Self-efficacy". For example, if the range of scores obtained after the participants completed the CSE is from 29 to 145, then dividing the range of 116 (145 minus 29) by three equals 38; so the lower range of scores ("Low Self-efficacy") becomes 29–67, mid-range ("Moderate Self-efficacy") becomes 68–106, and the higher range ("Moderate/High Self-efficacy") becomes 107–145.
8. The processes described above were repeated for both the preworkshop and postworkshop administrations of the CARS and CSE.
9. Individuals' preworkshop and postworkshop CARS scores and CSE scores were compared to determine whether there were improvements or declines in computer anxiety and computer self-efficacy.

Data Analysis and Validation Procedures

The primary objective of the study's data analysis was to derive meaningful conclusions from the data (Runeson & Host, 2009). Runeson and Host advised the importance of keeping a clear chain of evidence by using flexible, systematic analysis techniques and by providing sufficient research details and information to allow readers to follow the data, results, and conclusions.

To ensure the integrity and validity of the collected data and information, the research could develop and implement a data management plan (Schmitt & Burchinal, 2011). Coulehan and Wells (2005) explained, "collecting valid data ensures that when the research is evaluated, it will be deemed good science – meaning that the research is both precise and honest" (p. 11). Coulehan and Wells offered insights on data management techniques that could be implemented; those practices and fundamental concepts may include:

1. Understanding that data are any information or observations that are associated with the research site and participants.
2. Data ownership refers to control and rights of the data and data management.
3. Appropriate data collection techniques must be employed, with reliable data collection relating to using consistent and comprehensive techniques and documentation throughout the research study.
4. Recordkeeping, regardless of its form (e.g., electronic or written), must be diligent, thorough and safeguarded.
5. Data storage must provide a means to safeguard the data and information, store the information in multiple locations and formats, control access to the data, and carefully weigh the benefits versus risks of sharing or distributing the study's data.
6. Data analysis techniques must be appropriate to the study's particular needs.

Data collections and data analysis occurred before, during, and after the computer knowledge and skills workshop was conducted for older adults at a community center. In

particular, when qualitative data collections and analysis occur simultaneously, the researchers can make their work more relevant, focused, and profound – by consistently reflecting on, organizing, and interpreting data as it is collected and transcribed – rather than waiting to analyze data in one discrete step following data collections (Glesne, 2011). Glesne added that concurrent collecting and analyzing data obtained from interviews and observations may be accomplished by writing memoranda, organizing data into files or categories, applying coding schemes, and preparing weekly or monthly reports.

The quantitative data collected using scales from pre-established instruments were analyzed using statistical procedures such as describing trends, making comparisons, and relating variables (Creswell, 2008). The qualitative data were analyzed using thematic analysis, which involved coding and segregating the collected data for additional analysis in search for patterns, categories, and themes (Glesne, 2011). It has been noted that the onset of data analysis starts with annotating segments of the data (i.e., coding) that may be relevant and provide potential answers to the research questions (Merriam, 2009).

Ethical Considerations

After the design of the study and the research sites were selected, the researcher determined the permissions that were needed to access the research participants and data to be collected. Creswell (2008) emphasized that permissions may be required from the following sources: (a) the community center or institution or organization, (b) the study's participants and other actors, (c) proprietors of pre-established instruments that may be utilized in the study, and (d) the institutional review boards (IRB) of the researcher's

campus or college. The researcher provided assurances to the research site and its key persons (e.g., administrators and gatekeepers) by guaranteeing provisions for privacy, confidentiality, informing all participants of the purposes of the study, and respecting the site and the participants (Creswell, 2008).

Ethical considerations for protecting the rights of participants included obtaining informed consent, maintaining confidentiality, protecting all participants from harm (where the focus was the researcher's involvement instead of a harmful situation) (Lodico, Spaulding, & Voegtle, 2010), obtaining IRB approval, and obtaining different types of permission from affected organizations (Creswell, 2008). In addition, the researcher frequently confirmed throughout the research process the importance of remaining unbiased and objective. To protect the participants' rights, the following actions were performed: (a) stated and provided in writing the study's objectives so that participants fully understood the purpose of the study, (b) obtained written consent from participants, (c) filed the necessary research application forms with institutional review boards, (d) informed the participants of all data collection methods, (e) considered the participants' rights, interests and wishes before data was reported, and (f) insisted that the final decision regarding a participant's anonymity would rest with the participant (Creswell, 2009). To ensure standardization and implementation of ethical practices, procedures and instructions were utilized during the administration of the data collection and management processes. In addition, efforts were taken to protect participants' anonymity, treat data as confidential, and respect the wishes of participants and non-participants. Permissions were obtained before collecting data from the individual

participants (including signed consent forms). In addition, permissions were obtained from the community partner, administrators, institutional review board, and the creators or owners of the pre-established instruments and tools that were used in their entirety or modified before use.

To protect participants from harm, the researcher, the IRB, and the research committee carefully assessed the risks and benefits of the study and also considered the following factors: (a) determined that the benefits of conducting the study outweigh the risks, (b) ensured that risks and benefits are adequately disclosed and are reflected in the informed consent, (c) monitored the data collection process and maintain privacy and confidentiality, (d) reviewed and conducted risk-versus-benefit analysis during the research process at predetermined intervals, (e) ensured informed consent and (f) utilized practices to ensure benevolence, fidelity, integrity, responsibility, justice, and respect for each person's rights (Lodico et al., 2010; Troup-Leasure, Brooks, & Wilt, 2004).

Assumptions, Limitations, Scope and Delimitations

In this subsection of the study, the following assumptions, limitations, and delimitations were made. Assumptions can refer to those qualities and attributes about the study that the researcher believes to be true and can also refer to tendencies that the researcher should be aware of to avoid introducing biases into the study (Lodico et al., 2010). The following assumptions were made: (a) honesty of effort and responses from participants, (b) the participants had general knowledge of the basics of computer systems and were comfortable with improving their computer literacy, (c) accuracy of the chosen instruments, (d) appropriateness of the chosen instruments for the proposed study,

and (e) participants' gender or other demographic characteristic would not significantly affect their use of technology.

The limitations of a study were those aspects of design or methodology that set the criteria for instruments and measures or interpretation of the research results (Cline & Clark, 2000). In this study, the following limitations applied: (a) participants were volunteers who could have withdrawn from the study at any time, (b) shortage of information or studies regarding computer literacy and older adults in the local geographical area of the study, and (c) sample might be too small in comparison to the population and might limit the ability to generalize the results.

The delimitations of a study consist of characteristics that bound the study or limit its scope (Cline & Clark, 2000). This study was restricted: (a) to older adult learners, (b) only persons who are current employees or patrons of the chosen community center were considered for inclusion in the study, and (c) the results were be obtained from individuals using specific data collection tools and instruments and teaching techniques.

Findings

This concurrent triangulation mixed-methods study aimed to examine changes in computer anxiety and CSE after older adults completed a computer knowledge and skills workshop in which mobile technology was utilized. A community center known to the researcher was chosen as a possible site for conducting a computer workshop. The community partner agreed to sponsor a workshop and assist in obtaining participants by advertising the workshop to residents living in the community complex located in Portsmouth, Virginia. Older persons signing up for the computer workshop were asked if

they would be willing to take part in a research project that involved completing a survey questionnaire and participating in semi-structured interviews with the researcher. Out of the 20 persons I originally wanted to interview, 13 persons signed up for the computer workshop; however, only 12 individuals signed consent forms, which indicated agreement to take part in a research study conducted in conjunction with the workshop. Of the 12 persons signing up, 11 completed the preworkshop and postworkshop surveys and the semistructured interviews with the researcher.

This section presents the results of the data analysis. Two research questions were proposed to examine changes in computer anxiety and CSE in the older adults. To examine RQ1 on computer anxiety, seven subquestions were addressed during the data analysis process. Similarly, to examine RQ2 on computer self-efficacy, six subquestions were addressed during the data analysis process. A survey questionnaire was used to collect demographic and computer experience information. In addition, the survey contained elements of two preestablished instruments that were used to examine computer anxiety and computer self-efficacy. Transcribed interviews were used to address subquestions relating to factors that contribute to older persons' computer anxiety and factors that contribute to improving their computer self-efficacy.

This section also presents the demographics and computer experience information for the research participants and includes the results of data analysis conducted to address the two research questions and the accompanying 13 subquestions.

Demographics and Computer Experience Information

Table 3 presents the demographics and computer experience information for the 11 research participants who agreed to participate in the study. Only one male signed up for the workshop and agreed to participate in the study. Study participants' age groups ranged from 54 years and younger to 75 years and older. The goal was to study older adults aged 55 and over. Two persons in the 54 years and younger age group had signed up for the computer workshop and agreed to participate in the research study. One participant was in the 55 years to 64 years age group; five participants were in the 65 years to 74 years age group; and, three persons were in the 75 years and older age group. Even though the pool of older persons eligible for participation in the offered workshop represented diverse racial and ethnic heritages, all of the research participants were African American. Of the 11 participants, five had not completed high school, one had earned a high school diploma, and five had completed some college with one of the five having received a two-year degree. The majority of the participants self-rated themselves as having no computer knowledge and skills ($N = 7$ or 63.6%), having less than one year of computer experience ($N = 8$ or 72.7%), and having less than one hour of weekly computer usage ($N = 9$ or 81.8%).

Table 3

Demographics and computer experience

Category	*N*	%
Overall	11	100
Age		
54 and younger	2	18.2
55 to 64	1	9.1
65 to 74	5	45.5
75 or older	3	27.3
65 and older	8	72.7
Gender		
Male	1	9.1
Female	10	90.9
Ethnicity		
Hispanic	0	0
Not Hispanic	11	100
Race		
Black	11	100
White	0	0
Education level		
Some high school	5	45.5
GED or high school Diploma	1	9.1
Some college	4	36.4
Associate's degree	1	9.1
Owns a computer		
Yes	4	36.4
No	7	63.6
Level of computer knowledge		
No knowledge or skills	7	63.6
Little knowledge and skills	2	18.2
Knowledgeable with skills	2	18.2
Computer experience		
Less than 1 year	8	72.7
1 to 2 years	2	18.2
2 to 4 years	1	9.1
Weekly computer usage		
Less than 1 hour	9	81.8
1 to 4 hours	1	9.1
More than 5 hours	1	9.1

Research Questions

The collected data – both quantitative data and qualitative data – were analyzed to address two research questions, which included obtaining insights on the relationships between participants' computer anxiety and computer self-efficacy. Information on motivating elders to use computers and related technology would be especially useful in designing education and training programs for older adults (Lodico et al., 2010; MacKinnon, Han, & Case, 2008; Wilkinson, 2006). Research areas of focus included examining participants' anxiety, self-efficacy, motivations, barriers, and challenges in their pursuit of self-improvement of their ICT skills.

Data analyses were conducted using qualitative thematic coding and descriptive statistics. The integration or mixing of the qualitative and quantitative results, which occurred after the data sets were independently analyzed, allowed the research questions to be addressed to shed insights on computer anxiety and CSE in older adults (Borrego et al., 2009). The outcome from the mixing of the quantitative and qualitative date could be (a) convergent, where the qualitative results lead to the same conclusion as the quantitative results; (b) complementary, where the qualitative and quantitative results supplement each other; and, (c) divergent, where the qualitative and quantitative findings are different or contradictory (Ostlund, Kidd, Wengstrom, & Rowa-Dewar, 2011).

De Winter (2013) emphasized the highly cited earlier works in the statistics literature by Siegel; Siegel pointed out that "traditional parametric tests (e.g., *t* tests) should not be used with extremely small samples, because these tests have several strong

assumptions underlying their use" (p. 2). For a two-sample *t* test, those assumptions include observations are drawn from a normally distributed population, and the two populations have equal variances (de Winter, 2013). Unless the natures of the two populations' distributions are known precisely, nonparametric statistics alternatives should be used (de Winter, 2013; Whitley & Ball, 2002).

However in more recent statistics literature, de Winter (2013) presented a review of the literature that showed the feasibility of using a paired samples *t* test with a small sample size, "provided that the population effect size is very large" (p. 4). The paired samples *t* test (or dependent means *t* test or matched pairs *t* test) is useful for comparing the means of two sets of scores that are directly related to each other, such as comparing the before and after scores of research participants after they complete an intervention (Stangroom, 2014). When the sample population cannot be assumed to be normally distributed or exhibits skewness or outliers, the Wilcoxon signed-rank test is a nonparametric statistical test that can be substituted for use instead of the paired samples *t* test (McDonald, 2014; Stangroom, 2014). Q-Q plots and histograms will be presented for each of those before and after scorings of computer anxiety and CSE. The figures will aid readers of this study in making determinations of normality and skewness of the population data. Mukaka (2012) described two main types of correlation coefficients—Pearson product moment correlation coefficient and Spearman's rank correlation coefficient, where "the correct usage of the correlation type depends on the types of variables being studied" (p. 69). Using the Spearman's correlation coefficient is

appropriate when “one or both variables are skewed or ordinal and is robust when extreme values are present” (Mukaka, 2012, p. 69).

Research Question 1. What is the effect of a computer knowledge and skills workshop on computer anxiety in older adults?

Survey questionnaire data were collected from research participants before they completed a computer knowledge and skills workshop and after completing the workshop. Table 4 presents participants’ computer-anxiety scores obtained from the preworkshop and postworkshop administration of the survey questionnaire. The following convention was used: scores from 19 to 44 represent no anxiety, scores from 45 to 60 represent low anxiety, and scores from 61 to 95 represent high anxiety (Shah et al., 2011). The postworkshop results indicated that all participants scored in the no anxiety range, and the preworkshop results showed two participants scored as no anxiety and nine participants scored as low anxiety. The data show that the percentage decreases in score changes ranged from -15.4% to -39.6%, where the largest change occurred for one of the oldest participants (aged 75 and older) and the smallest change occurred for two of the youngest members (age 54 and younger) with one self-reporting as having some computer experience with moderate computer knowledge and skills.

Table 4

Participants' scores using the Computer Anxiety Scale (CARS)

Participant	Preworkshop CARS	Postworkshop CARS	Percent change (%)
1	52	44	-15.4
2	56	37	-33.9
3	47	35	-25.5
4	43	36	-16.3
5	53	32	-39.6
6	38	32	-15.8
7	45	34	-24.4
8	47	35	-25.5
9	48	35	-27.1
10	49	34	-30.6
11	47	32	-31.9

Figures 2 and 4 provide normal q-q plots to aid in visually examining the normality of the computer anxiety scores collected before and after the computer workshop. Figures 3 and 5 provide histograms fitted with normal density lines, which provide opportunities to visually examine whether the populations were normally distributed. For the preworkshop computer anxiety scores, Figures 2 and 4 show that the population appears to be normally distributed. On the other hand and as expected, Figures 3 and 5 show that the postworkshop computer anxiety scores are skewed to the left (indicating lowered computer anxiety scores after completing the workshop) and the distribution deviates from normality.

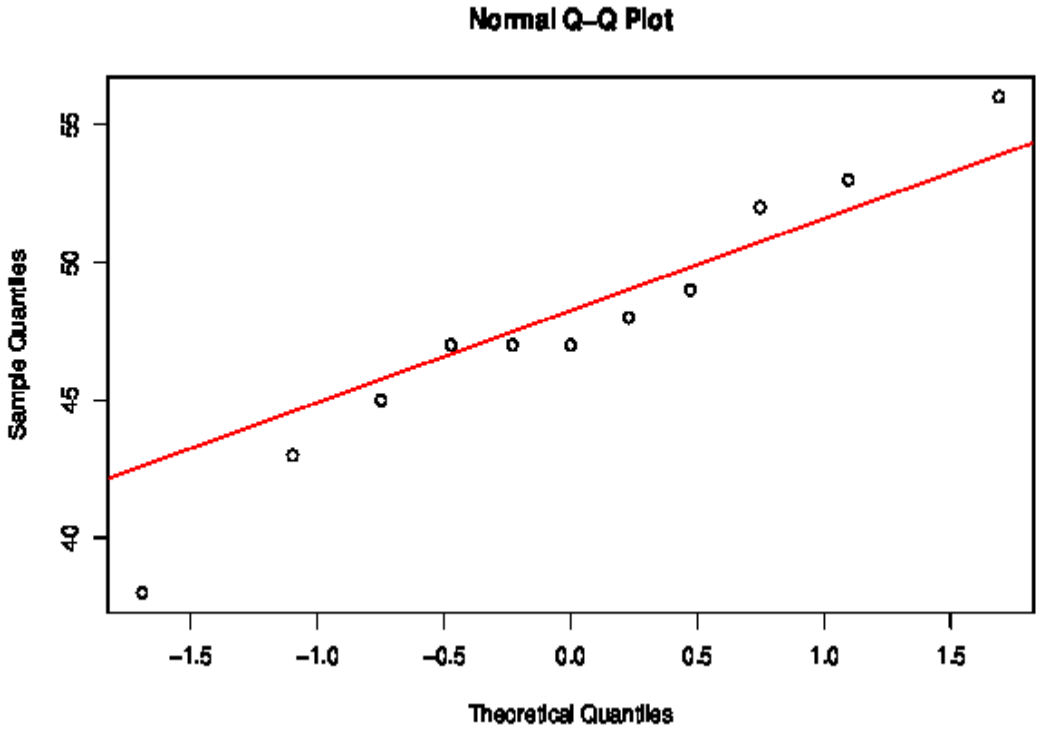

Figure 2. Normal quantile plot for preworkshop computer anxiety scores.

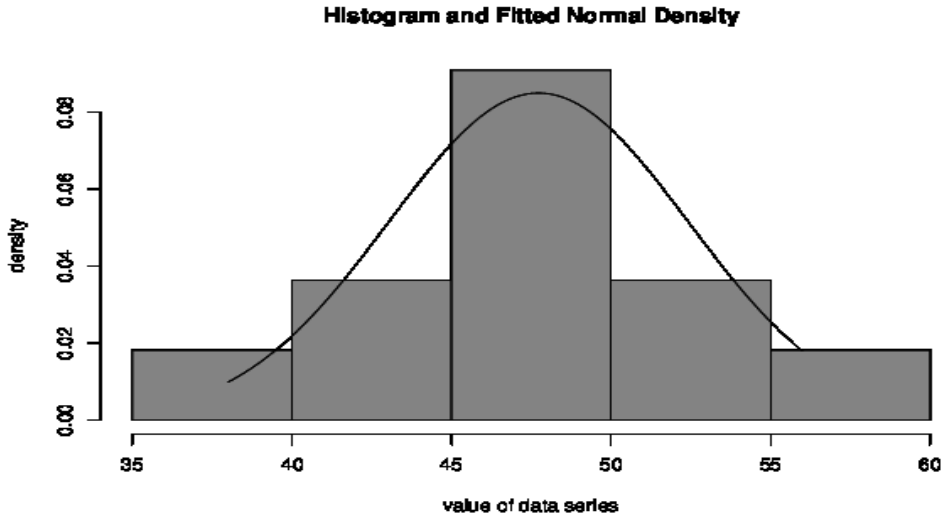

Figure 3. Histogram of preworkshop computer anxiety scores.

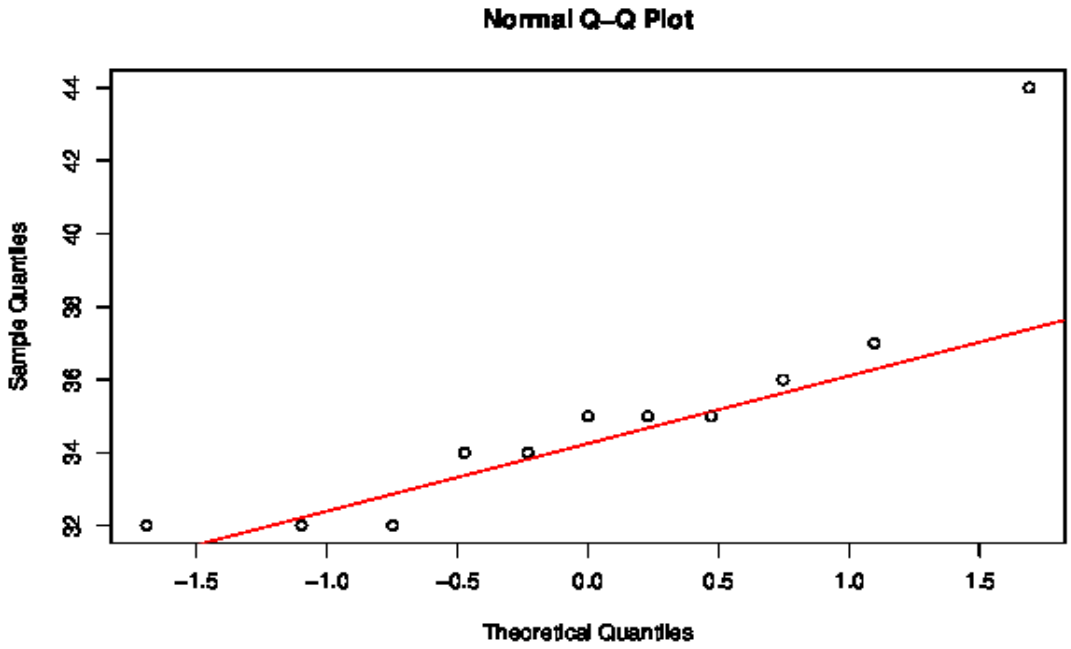

Figure 4. Normal quantile plot for postworkshop computer anxiety scores.

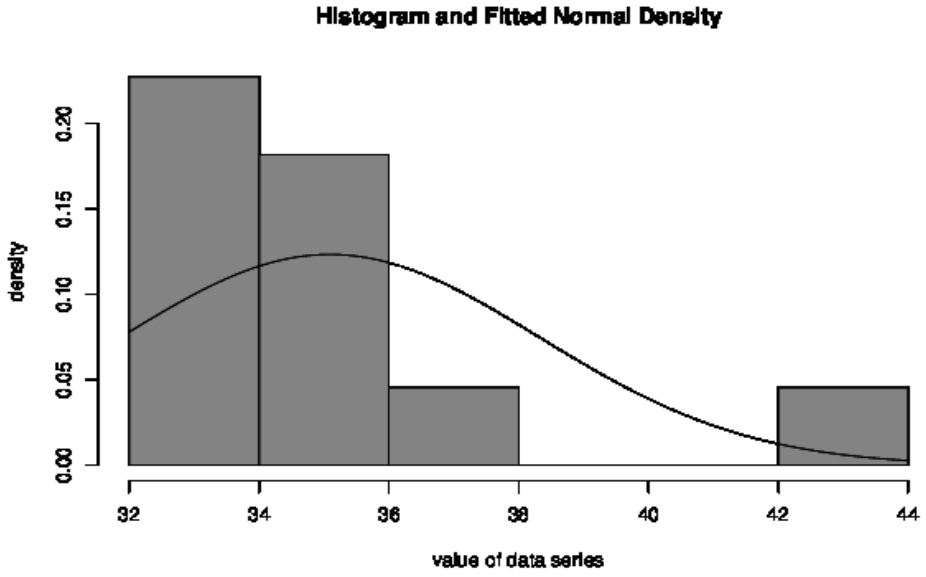

Figure 5. Histogram of postworkshop computer anxiety scores.

To further examine RQ1 on computer anxiety, seven subquestions were addressed during the data analysis process.

Subquestion 1. *What is the relationship between older persons' ages and their computer anxiety?*

Table 5 presents the results for participants' computer-anxiety mean scores and their corresponding age groups. The postworkshop computer-anxiety mean scores were comparable for participants in each age group. This result seems to indicate that persons in each age group could achieve lowered computer anxiety levels after completing a computer workshop. Decreases in computer anxiety scores based on age groups averaged approximately 24% for persons aged 64 and under (n = 3) and 27% for persons aged 65 and over (n = 8).

Table 5

Computer anxiety and age

Age group	*N*	Preworkshop CARS scores		Postworkshop CARS scores	
		Mean	*SD*	Mean	*SD*
Under 55	2	41.5	4.95	33	1.41
55 – 64	1	49	NA	34	NA
65 – 74	5	47.4	3.21	37	3.94
75 and over	3	52	4.58	34	2.89
65 and over	8	49.13	4.19	36	3.77
Overall	11	47.73	4.92	35	3.39

Subquestion 2. *What is the relationship between older persons' educational levels and their computer anxiety?*

Table 6 presents the results for participants' computer-anxiety mean scores and their corresponding educational level. The postworkshop computer-anxiety mean scores were comparable for participants regardless of educational level (i.e., for participants with self-reported education levels ranging from not graduating from high school (n = 5) to some college or a 2-year degree (n = 5)). This result seems to indicate that persons at each self-reported educational level could achieve lowered computer anxiety levels after completing a computer workshop. Decreases in computer anxiety scores based on educational levels averaged approximately 29% for persons with high school equivalency or less (n = 6) and 24% for persons with some college or a 2-year degree (n = 5).

Table 6

Computer anxiety and education level

Education level	*N*	Preworkshop CARS scores		Postworkshop CARS scores	
		Mean	*SD*	Mean	*SD*
Less than high school	5	47	5.5	33	1.41
GED or HS diploma	1	48	NA	35	NA
Some college	4	50	5.69	38	4.08
2-year college	1	45	NA	34	NA
Overall	11	47.73	4.92	35	3.39

Subquestion 3. *What is the relationship between older persons' genders and their computer anxiety?*

Table 7 presents the results for participants' computer-anxiety mean scores based on gender. The research sample consisted of one man and ten women. The postworkshop computer-anxiety mean scores were comparable for both genders. This result seems to indicate that regardless of gender individuals could achieve lowered computer anxiety levels after completing a computer workshop. Decreases in computer anxiety scores based on gender were approximately 15.8% for the male and 28.6% for the women (n = 10).

Table 7

Computer anxiety and gender

Gender	*N*	Preworkshop CARS scores		Postworkshop CARS scores	
		Mean	*SD*	Mean	*SD*
Female	10	49	3.92	35	3.41
Male	1	38	NA	32	NA
Overall	11	47.73	4.92	35	3.39

Subquestion 4. *What is the relationship between older persons' weekly usages of computers and their computer anxiety?*

Table 8 presents the results for participants' computer-anxiety mean scores and their weekly computer usage. The postworkshop computer-anxiety mean scores were comparable for participants with no weekly usage before the workshop as compared with participants with some weekly computer usage. This result seems to indicate that persons with limited weekly computer usage could achieve lowered computer anxiety levels after

completing a computer workshop that would be comparable to levels achieved by individuals with moderate or higher weekly usage. The decrease in computer anxiety scores based on participants (n = 9) who had less than one hour of weekly computer usage was approximately 28%.

Table 8

Computer anxiety and weekly computer usage

Weekly computer usage	*N*	Preworkshop CARS scores		Postworkshop CARS scores	
		Mean	*SD*	Mean	*SD*
Less than 1 hour	9	48.89	4.11	35	3.61
1 to 4 hours	1	38	NA	32	NA
5 hours or more	1	47	NA	35	NA
Overall	11	47.73	4.92	35	3.39

Sub-Question 5. *What is the relationship between older persons' experiences with computers and their computer anxiety?*

Table 9 presents the results for participants' computer-anxiety mean scores and their self-reported levels of computer experience. The postworkshop computer-anxiety mean scores were comparable for each self-reported level of computer experience. This result seems to indicate that regardless of an individual's level of computer experience he or she could achieve lowered computer anxiety levels after completing a computer workshop.

Table 9

Computer anxiety and computer experience

Computer experience	*N*	Preworkshop CARS Scores		Postworkshop CARS Scores	
		Mean	SD	Mean	SD
Less than 1 year	8	49	4.1	36	3.81
1 to 2 years	2	46	1.41	35	0.71
2 to 4 years	1	38	NA	32	NA
Overall	11	47.73	4.92	35	3.39

Table 10 presents the results for participants' computer-anxiety mean scores and whether they owned a computer or related technology (e.g.; a tablet, an Ipod or a Kindle). The postworkshop computer-anxiety mean scores were comparable whether a participant owned a computer or not. This result seems to indicate that regardless of an individual's computer ownership lowered computer anxiety levels could be achieved by completing a computer workshop. Decreases in computer anxiety scores based on computer ownership were approximately 20% for individuals who owned a computer ($n = 4$) and 30% for individuals who did not own computers ($n = 7$).

Table 10

Computer anxiety and computer ownership

Computer ownership	*N*	Preworkshop CARS Scores		Postworkshop CARS Scores	
		Mean	*SD*	Mean	*SD*
Yes, own	4	44	4.55	35	1.73
No, do not own	7	50	3.93	35	4.16
Overall	11	47.73	4.92	35	3.39

Sub-Question 6. *What factors contributed to older persons' coping with computer anxiety?*

The audio taped interviews were transcribed and reviewed by the researcher and a peer reviewer. Appendix G provides the peer reviewer's signed confidentiality agreement. Following the transcription and review process, transcribed interview notes were tabulated which classified the interview responses according to the guiding interview questions. Research participants' thick descriptions of their computer experiences responses were utilized to develop themes to address specific research sub-questions. Table 11 provides the questions used in the semi-structured interviews of the participants after the workshop was completed.

Table 11

List of interview questions

	Semi-structured interview questions
IQ-1	Before you completed the computer workshop, what were your feelings toward using computers and the Internet?
IQ-2	How often and for what actions did you use computers before the workshop?
IQ-3	Before the workshop, how would you rate your computer and the Internet experience?
IQ-4	What motivated you to participate in the computer workshop? How so?
IQ-5	Would you recommend this type of training to others? Why or why not?
IQ-6	What challenges or barriers did you encounter during the workshop? How did you overcome those challenges?
IQ-7	Do you plan to continue using computers and the Internet? How so?
IQ-8	After completing the workshop, how has it changed your view of the value of using computers and the Internet?
IQ-9	Is there anything you would like to share about your workshop experience or would like to ask me?

The interview questions in Table 11 were mapped to use participants' responses to the postworkshop interview questions to answer this sub-question of Research Question 1. Of the nine interview questions, all except IQ-7 and IQ-9 were represented in participant responses to support this sub-question. Factors that contributed to older persons' coping with computer anxiety were derived by using qualitative thematic analysis of the transcribed interview notes that are presented in Appendix I, Transcripts

of Participants' interviews, and guided by the research sub-question. These factors included:

- Learning opportunities (for example, being able to take part in a computer workshop for older adults, enrolling in a refresher course, having had prior computer training and experience, and getting hands-on training)
- Positive attitudes (for example, having expectations of successful learning, being motivated and eager to learn, being comfortable with teachers, wanting to learn and continue learning, being motivated to acquire new skills, and not feeling any barriers to learning)
- Tools and learning environment (for example, having overwhelmingly positive experiences with the teachers and the training program, being able to use easy-to-follow lessons and exercises, using computer features to accommodate barriers such as manipulating touchscreens to increase and decrease screen views, and learning to use a stylus to assist with typing and activation of links and software applications)

Sub-Question 7. *What factors exacerbated older persons' computer anxiety?*

The interview questions in Table 11 were mapped to use participants' responses to the postworkshop interview questions to answer this sub-question of Research Question 1. Of the nine interview questions, interview questions IQ-1 through IQ-5 were represented in participant responses to support this sub-question. Factors that contributed to worsening or possibly increasing computer anxiety in older persons were derived by

using qualitative thematic analysis of the transcribed interview notes that are presented in Appendix I, Transcripts of Participants' Interviews. These factors included:

- Barriers (for example, lack of access to computers and the Internet, lack of access to training programs, and lack of access to computer services)
- Disruptive Attitudes (for example, being nervous about using computers, being apprehensive about acquiring computer knowledge and skills, being scared of computers, being discouraged as a learner, having a fear of making mistakes, and being skeptical about one's ability to learn)

Research Question 2. What is the effect of a computer knowledge and skills workshop on computer self-efficacy in older adults?

Table 12 presents participants' CSE scores obtained from the preworkshop and postworkshop administration of the survey questionnaire. Using a convention similar to one adopted by Simsek (2011): scores in the interval 29–67 represent low CSE, scores in the interval 68–106 represent medium CSE, and scores in the interval 107–145 represent high CSE, then the postworkshop results indicated that 10 of 11 (90%) research participants scored in the high CSE range, and the preworkshop results showed that one member scored as high CSE, five scored as medium CSE, and five scored as low CSE. The data shows that the percentage increases in score changes ranged from 13.4% to 162.7%, where the largest change occurred for one of the oldest participants (aged 75 and older) and the smallest change occurred for one of the youngest members (age 54 and younger) who self-reported as having some computer experience with moderate computer knowledge and skills.

Table 12

Participants' scores using the Computer Self-Efficacy Scale (CSE)

Participant	Preworkshop CSE score	Postworkshop CSE score	Percent change (%)
1	65	116	78.5
2	51	134	162.7
3	71	124	74.6
4	63	118	87.3
5	63	134	112.7
6	112	127	13.4
7	99	138	39.4
8	88	129	46.6
9	81	117	44.4
10	60	115	91.7
11	85	106	24.7

Figures 6 and 8 provide normal q-q plots to aid in visually examining the normality of the CSE scores collected before and after the computer workshop. Figures 7 and 9 provide histograms fitted with normal density lines, which provide opportunities to visually examine whether the CSE-score populations were normally distributed. For the preworkshop computer anxiety scores, Figures 6 and 8 show that the populations of before and after CSE scores are not normally distributed due to skewness and presence of outliers. Figures 7 and 9 show that the before and after CSE scores changed from being skewed to the left to being skewed to the right (indicating improved CSE scores after completing the workshop); both distributions deviate from normality and show outliers.

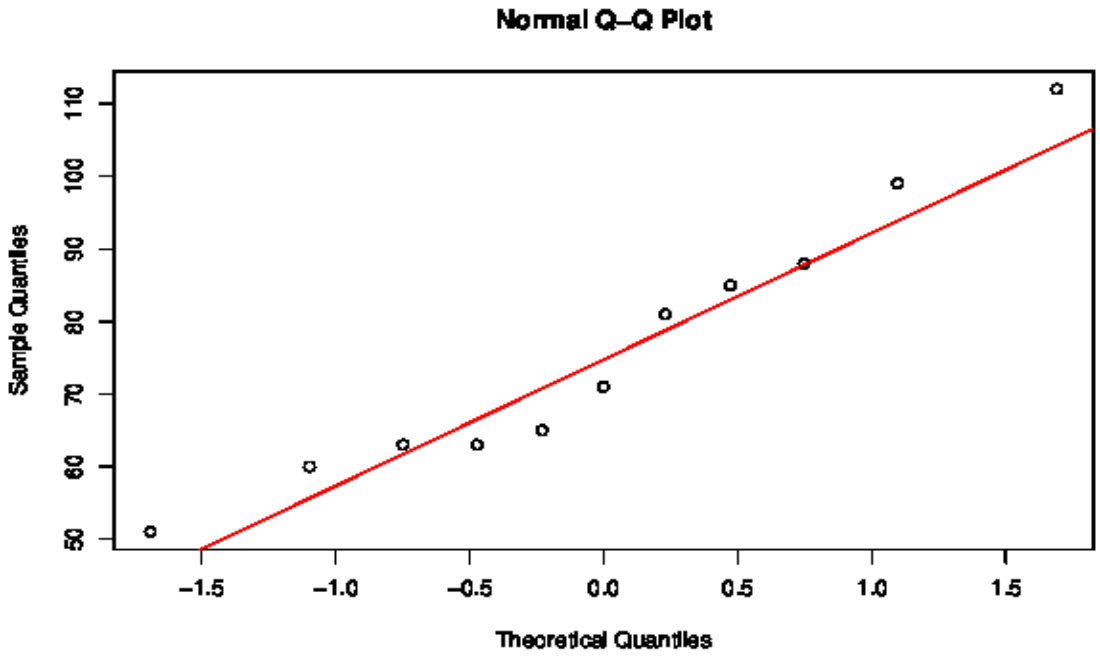

Figure 6. Normal quantile plot for preworkshop CSE scores.

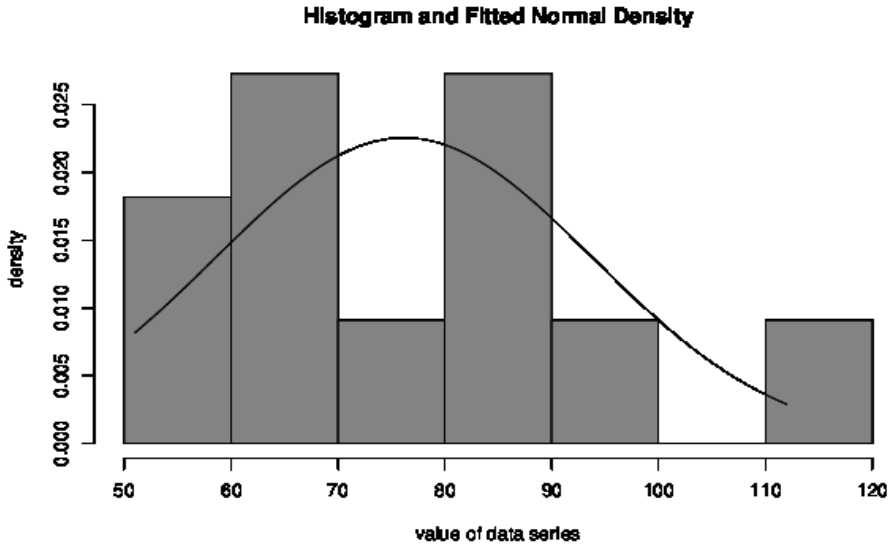

Figure 7. Histogram of preworkshop CSE scores.

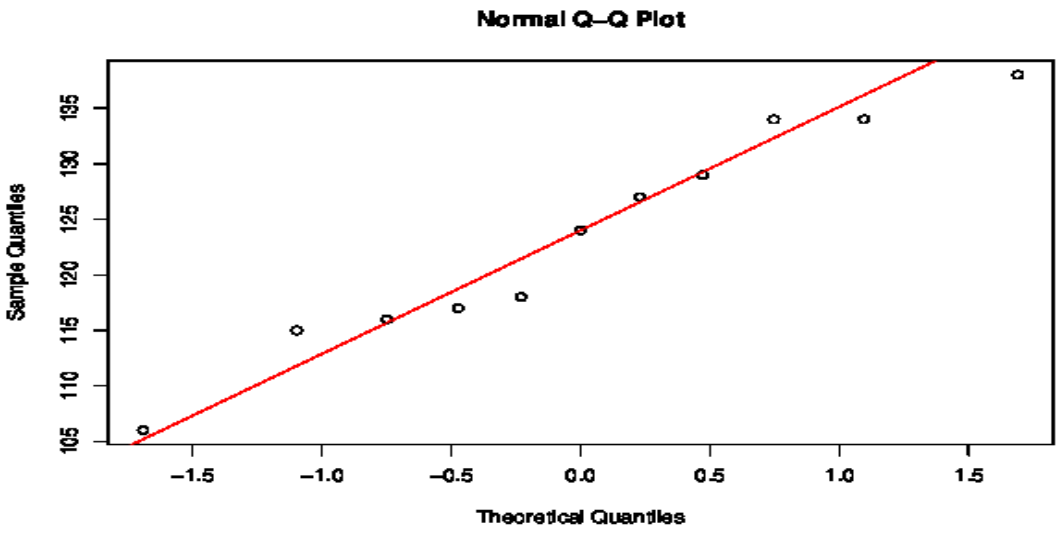

Figure 8. Normal quantile plot for preworkshop CSE scores.

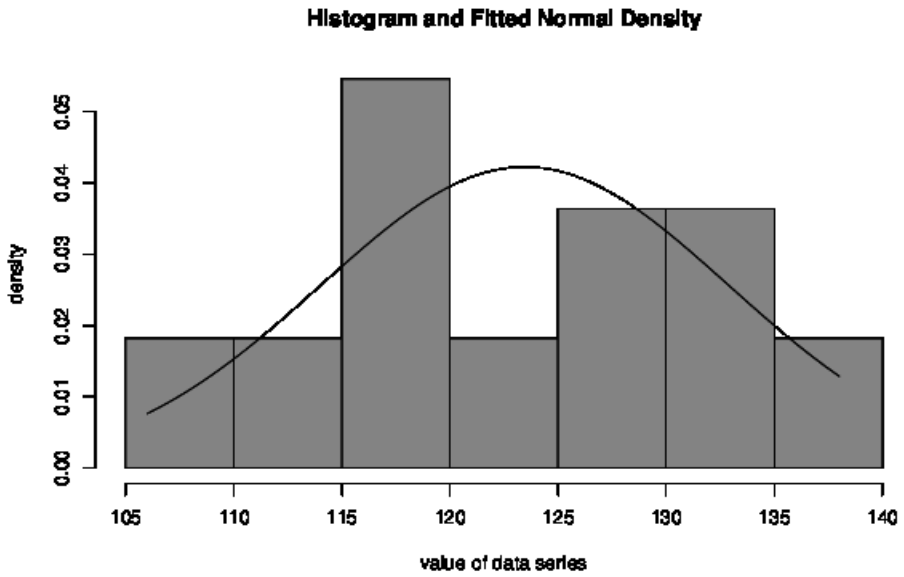

Figure 9. Histogram of preworkshop CSE scores.

To further investigate RQ2 on computer self-efficacy, six subquestions were addressed during the data analysis process.

Sub-Question 1. *What is the relationship between older persons' ages and their computer self-efficacy?*

Table 13 presents the results for participants' CSE mean scores and their corresponding age groups. The postworkshop CSE mean scores were highest for the youngest age group (under 55 years); this was possibly due to their computer ownership, increased computer skill and experience, and increased weekly computer usage. Surprisingly, the postworkshop CSE mean scores were higher for the oldest age groups (aged 65–74 and aged 75 and older) than for the participant aged 55–64. This result seems to indicate that persons in each age group could achieve elevated CSE levels after completing a computer workshop. Increases in CSE scores based on age groups averaged approximately 40.6% for persons aged 64 and under (n = 3) and 72.1% for persons aged 65 and over (n = 8).

Table 13

Computer self-efficacy and participant's age

Age Group	*N*	Preworkshop CSE scores		Postworkshop CSE scores	
		Mean	*SD*	Mean	*SD*
Under 55	2	105.5	9.19	133	7.78
55–64	1	60	NA	115	NA
65–74	5	73.6	10.67	121	5.54
75 and over	3	66.33	17.24	125	16.17
65 and over	8	70.88	12.81	122	9.81
Overall	11	76.18	18.55	123	9.9

Sub-Question 2. *What is the relationship between older persons' genders and their computer self-efficacy?*

Table 14 presents the results for participants' CSE mean scores based on gender. The research sample consisted of one man and ten women. The postworkshop CSE mean scores were comparable for both genders. This result seems to indicate that regardless of gender individuals could achieve improved CSE levels after completing a computer workshop. Increases in CSE scores based on gender were approximately 13.4% for the male and 64.5% for the women (n = 10). The male participant self-reported as having moderate computer knowledge and skills, owned a computer, and used his computer almost daily.

Table 14

Computer self-efficacy and gender

Gender	*N*	Preworkshop CSE scores		Postworkshop CSE scores	
		Mean	*SD*	Mean	*SD*
Female	10	73	15.01	123	10.37
Male	1	112	NA	127	NA
Overall	11	76.18	18.55	123	9.9

Sub-Question 3. *What is the relationship between older persons' educational levels and their computer self-efficacy?*

Table 15 presents the results for participants' CSE mean scores and their levels of education. As expected, the one member with the education level, a two-year college degree, had the highest postworkshop CSE score at 138, which represented a 39% increase in the initial score of 99. Interestingly, four persons who self-reported as having completed some college had lower preworkshop CSE mean scores than those with high school or lower education levels. Participants with high school or lower education levels had comparable postworkshop CSE mean scores that were more than 40% higher than their preworkshop CSE mean scores. Increases in CSE scores based on educational levels averaged approximately 48% for persons with high school equivalency or less (n = 6) and 79.5% for persons with some college or a 2-year degree (n = 5).

Table 15

Computer self-efficacy and education level

Education level	*N*	Preworkshop CSE scores		Postworkshop CSE scores	
		Mean	*SD*	Mean	*SD*
Less than high school	5	82	21.15	122	11.43
GED or HS diploma	1	81	NA	117	NA
Some college	4	63	8.39	123	8.08
2-year college	1	99	NA	138	NA
Overall	11	76.18	18.55	123	9.9

Sub-Question 4. *What is the relationship between older persons' weekly usages of computers and their computer self-efficacy?*

Table 16 presents the results for participants' CSE mean scores and their weekly computer usage. The postworkshop CSE mean scores were higher for each of the 11 participants, with mean scores ranging from a 13.4% increase ($n = 1$) for the 1 to 4 hour weekly computer usage to a 46.6% increase ($n = 1$) for the 5 hours or more weekly usage to a 72.1% increase ($N = 9$) for the lowest weekly computer usage. This result seems to indicate that persons with limited weekly computer usage could achieve comparably higher levels of CSE after completing a computer workshop as compared with individuals with moderate or greater weekly usage. The increase in CSE scores based on participants ($n = 9$) who had less than one hour of weekly computer usage was approximately 72%.

Table 16

Computer self-efficacy and weekly computer usage

Weekly computer usage	*N*	Preworkshop CSE scores		Postworkshop CSE scores	
		Mean	*SD*	Mean	*SD*
Less than 1 hour	9	70.89	14.85	122	10.77
1 to 4 hours	1	112	NA	127	NA
5 hours or more	1	88	NA	129	NA
Overall	11	76.18	18.55	123	9.9

Sub-Question 5. *What is the relationship between older persons' experiences with computers and their computer self-efficacy?*

Table 17 presents the results for participants' CSE mean scores and their self-reported levels of computer experience. The postworkshop CSE mean scores for the participants represented an average of 61.5% increase in the preworkshop CSE mean scores, with the participants with the lowest experience level (i.e., less than one year) (n = 8) averaging an increase of 80.6% over their preworkshop CSE mean scores.

Participants with one to two years of experience (n = 2) achieved the highest averaged CSE score of 138, representing a 42.6% increase as compared with their preworkshop CSE mean scores. This result seems to indicate that regardless of an individual's level of computer experience increased CSE level could be achieved by completing a computer workshop.

Table 17

Computer self-efficacy and computer experience

Computer experience	*N*	Preworkshop CSE scores		Postworkshop CSE scores		Percent change (%)
		Mean	*SD*	Mean	*SD*	
Less than 1 year	8	67	11.19	121	9.68	+80.6
1 to 2 years	2	94	7.78	134	6.36	+42.6
2 to 4 years	1	112	NA	127	NA	+13.4
Overall	11	76.18	18.55	123	9.9	+61.5

Table 18 presents the results for participants' CSE mean scores and whether they owned a computer or related technology (e.g.; a tablet, an Ipod or a Kindle). The postworkshop CSE mean scores were comparable for participants whether a member owned a computer or not. This result seems to indicate that regardless of an individual's status of computer ownership heightened CSE levels could be achieved by completing a computer workshop.

Table 18

Computer self-efficacy and computer ownership

Computer ownership	*N*	Preworkshop CSE scores		Postworkshop CSE scores	
		Mean	*SD*	Mean	*SD*
Yes, own	4	82	21.47	122	4.8
No, do not own	7	73	17.62	125	12.16
Overall	11	76.18	18.55	123	9.9

Sub-Question 6. *What factors contributed to improving older person's computer self-efficacy?*

The interview questions in Table 11 were mapped to use participants' responses to the postworkshop interview questions to answer this sub-question of RQ2. All nine of the interview questions were represented in participant responses to support this sub-question. The audio taped interviews were transcribed and reviewed by the researcher and a peer reviewer. Appendix G provides the peer reviewer's signed confidentiality agreement. Following the transcription and review process, transcribed interview notes were tabulated which classified the interview responses according to the guiding interview questions. Research participants' rich, thick descriptions of their computer experiences responses were utilized to develop themes to address specific research sub-questions. Factors that contributed to improving older persons' computer self-efficacy were derived by using qualitative thematic analysis of the transcribed interview notes that are presented in Appendix I, Transcripts of Participants' Interviews, and guided by the context of the sub-question. These factors included:

- Constructive attitudinal changes (for example, feeling confident about using computers, being motivated to continue using computers and the Internet, being motivated to continue learning, and looking forward to and being excited about learning)
    - Conducive learning environment (for example, having patient, thoughtful teachers, learning by using real-life examples and practice sessions,

experiencing the ease of using mobile technology and learning by mastering simple lessons)

Evidence of Quality

Measures were implemented to ensure that the study's data and findings were valid, reliable, and trustworthy. Those measures included utilizing an interview protocol, using appropriate data analysis techniques, and utilizing pre-established instruments. The validity of a study must be addressed throughout the phases of the research effort, where validity refers to the trustworthiness of the data and results, denoting the extent to which the research findings are accurate and not subject to the researcher's subjective biases (Runeson & Host, 2009). Techniques that were employed to improve the reliability, validity, and trustworthiness of this study included applying data triangulation, using reliable pre-established instruments, developing and maintaining a systematic and detailed data collection and analysis process, incorporating feedback obtained from study participants, and following approved procedures and protocols for conducting the research.

When using Likert-type scales in a research effort, research literature emphasizes the importance of calculating and reporting Cronbach's alpha coefficients (for internal consistency reliability) for any scales or subscales that may be used (Field, 2005; Gliem & Gliem, 2003; Yu, 2001). Providing alpha values in research studies makes possible subsequent meta-analysis of mean difference and alpha (Yu, 2001). In addition, the researchers' efforts aid in checking the reliability and validity of their own data and making modifications if necessary (Yu, 2001).

Spearman's correlation coefficient (Rho or *r*) is a non-parametric test that is used to measure the strength of association between two continuous variables; the coefficient can range from +1 for a perfect positive correlation to zero for no correlation to -1 for a perfect negative correlation (Mukaka, 2012). Figure 10 illustrates a strong negative association of preworkshop computer anxiety scores versus CSE scores, where high CSE scores corresponded with low computer anxiety scores. Similarly, Figure 11 illustrates a weak negative association of postworkshop computer anxiety scores versus CSE scores, which indicated low association between the computer anxiety and CSE scores.

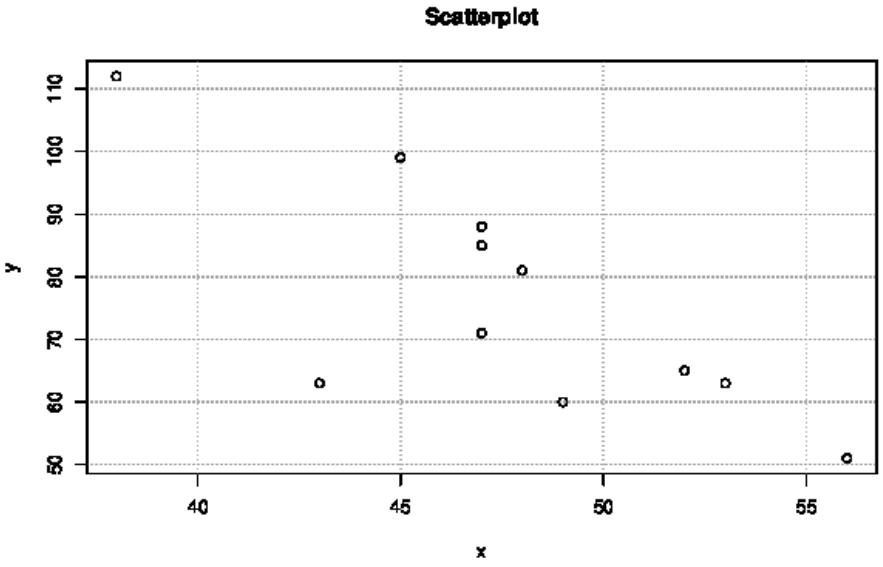

Figure 10. Scatter plot of preworkshop computer anxiety versus CSE scores.

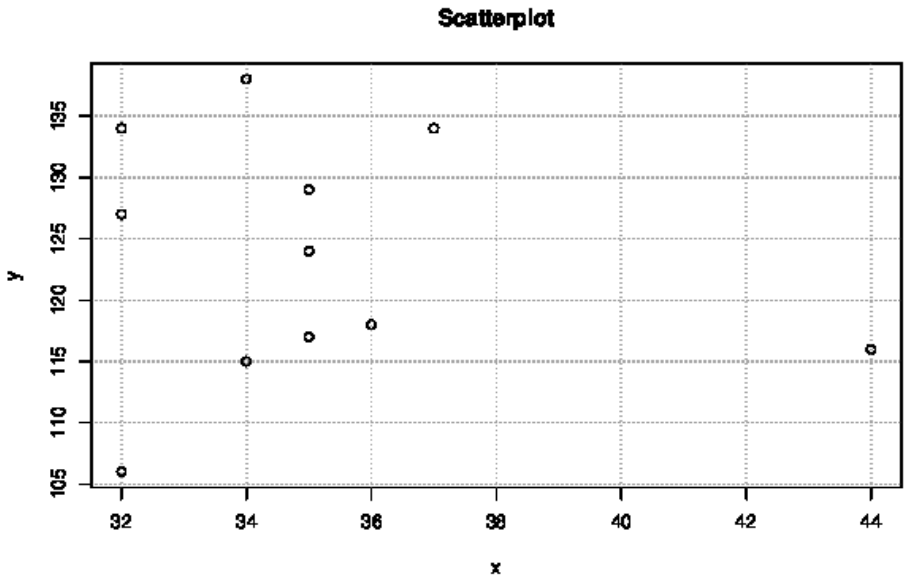

Figure 11. Scatter plot of postworkshop computer anxiety versus CSE scores.

Cronbach coefficient alpha values have been calculated using the preworkshop and postworkshop scores for computer anxiety and for computer efficacy. Yu (2001) expressed that the reliability attaches to the scores rather than to the test. Therefore, it is important to provide the reliability coefficients (i.e., alpha values) to examine the applicability of the test for the research participants and so that subsequent meta-analyses can be performed by other researchers.

Table 19 provides the mean scores, standard deviations, and alpha values for the preworkshop and postworkshop computer-anxiety scores. Using the rating scale criteria presented in Gliem and Gliem (2003, p. 87), the preworkshop alpha values for the computer anxiety scale was questionable at a value of 0.61, and the postworkshop alpha value was poor at 0.52. Yu provided insights into possible reasons for obtaining low

reliability (i.e., low alpha values). Yu offered that low reliability may be indicative of high measurement error, which may reflect a gap between participants' familiarity with the subject matter and too much random guessing when scoring survey questionnaires. A possible solution offered by Yu (2001, p. 5) was providing an "I don't know" option for multiple choice answers or Likert scale responses. However, Yu warned that being proactive and providing other response options may result in too many "I don't know" or neutral answers, which could lead to low Cronbach alpha values due to a lack of variance.

Table 19

Means, standard deviations, and alpha for computer-anxiety scores

	Preworkshop computer-anxiety scores			Postworkshop computer-anxiety scores		
	Mean	*SD*	Alpha	Mean	*SD*	Alpha
Overall ($N = 11$)	47.73	4.92	0.61	35	3.39	0.52

Table 20 provides the mean scores, standard deviations, and alpha values for the preworkshop and postworkshop computer self-efficacy scores. Using the rating scale criteria presented in Gliem and Gliem (2003, p. 87), the preworkshop alpha values for the preworkshop and postworkshop computer self-efficacy scale were excellent at 0.96 and 0.95, respectively.

Table 20

Means, standard deviations, and alpha for computer self-efficacy scores

	Preworkshop computer self-efficacy scores			Postworkshop computer self-efficacy scores		
	Mean	*SD*	Alpha	Mean	*SD*	Alpha
Overall (*N* = 11)	76.18	18.55	0.96	123	9.9	0.95

Summary

This methodology section presented steps for conducting this study using a concurrent triangulation mixed-methods approach for addressing the research questions. After a sample from the population was identified, the following key steps were completed: (a) obtained the necessary permissions for accessing study participants and prior to utilizing pre-established surveys, (b) selected the needed instruments, assessments, and tools, (c) developed procedures and instructions for data collection efforts, (d) before and after the computer workshop, administered the survey questionnaire that contains two pre-established instruments, (e) collected data using ethical and standardized practices, (f) separately analyzed the quantitative and qualitative data, (g) interpreted the results, and (h) diligently and thoroughly reported the findings and implications. After ensuring receipt of the necessary permissions for accessing the participants and the research site, the mixed-methods research efforts proceeded with the data collection, data analysis, interpretation of results, and report preparations.

Finally, ethical considerations included the researcher's actions that placed the welfare of the study's participants, administrators, and other key persons in the forefront before any decisions were made in utilizing and reporting the collected data and findings.

This section also presented the results of the data analysis for the mixed-methods investigation of changes in computer anxiety and computer self-efficacy of older adults after they participated in a computer knowledge and skills workshop. Eleven workshop attendees volunteered to take part in the research project. Study participants' ages ranged from under 54 years (n = 2) to over 65 years (n = 8), with the eldest participants in the age group 75 and older (n = 3). Quantitative survey data collected before and after the workshop, and qualitative interview data collected after the workshop were analyzed to address the two research questions and their sub-questions.

Analysis of the collected data indicated statistically significant differences between the preworkshop and postworkshop mean scores for both computer anxiety and computer self-efficacy. Cronbach alpha values were calculated for the preworkshop and postworkshop computer anxiety data, yielding low reliability determinations and possibly indicating the need to revise the wording of items in the construct for measuring computer anxiety in older adults. Cronbach alpha values for the preworkshop and postworkshop computer self-efficacy data yielded high reliability determinations, which indicated the constructs suitability for assessing computer self-efficacy in older adults.

An introduction is offered for the final two sections of this dissertation. Section 3 provides details about the project. Included in this section are description and goals, rationale, review of the literature, implementation, project evaluation, and implications

for social change. Lastly, in Section 4, I provide my reflections as a scholar, practitioner, and project developer. In addition, I share my reflections on the project's strengths, recommendations for remediation of its limitations, and implications, applications, and directions for future research.

Section 3: The Project

Introduction

This section presents the proposed project for implementing improvements to a learning intervention presented in this research study that utilized a concurrent triangulation mixed-methods approach. The study involved a computer workshop that was specially designed and implemented for older adults who had little or no prior computer training or experience. This section includes the project's goals, rationale, literature review, implementation, project evaluation, and implications for social change.

Description and Goals

The goal of the project was to improve the processes and tools for examining the efficacy of using mobile technology to provide a computer knowledge and skills workshop to older adults in both community and metropolitan locations. This project recommended the use of tablet personal computers (tablet PCs) and mobile hotspots as components of a mobile computer laboratory that could be easily set up and dismantled using a classroom at the selected location. Using mobile technology can enable the workshop to be conducted in areas of facilities that might not have Internet access. Another goal of this project was to suggest techniques for collecting quantitative and qualitative data from workshop participants for examining the psychological constructs of computer anxiety and computer self-efficacy. This study, using a mixed-methods approach, demonstrated the efficacy of using pre-established instruments to examine the attitudes and experiences of older adults in conjunction with completing a computer workshop. See Appendix B for the survey questionnaire used in this research study.

Rationale

This study added to the literature on the *digital divide* that exists within some communities. The term refers to the fact that some people do not know how to use computers or the Internet (Chang, Shieh, Liu, & Yu, 2012). In particular, to inform the project, this study examined the efficacy of using mobile technology to bring computer training and Internet access to older adults who were interested in attending a workshop for developing computer knowledge and skills. The completed mixed-methods study collected the following data: (a) demographic and computer experience, (b) quantitative and qualitative data from before and after the workshop, and (c) semi-structured interviews. The results of the study demonstrated the importance of capturing the rich, thick descriptions of workshop participants' attitudes and experiences of the educational intervention. Data triangulation techniques could be used to help obtain insights into factors that lessen computer anxiety and improve the computer self-efficacy of older adults after completing the workshop.

According to a 2010 Pew Report (Mayberry, Kripalani, Rothman, & Osborn, 2011), there continues to be a digital divide in computer and Internet use for accessing helpful information based on age, race/ethnicity, and income. Chang et al. (2012) reported that adult women are usually found in a group experiencing the digital divide. There is a real need to provide adult women, especially older women, opportunities to join the digital age and to empower them to use computers, the Internet, and information technology.

Review of the Literature

Similar to the approach previously in this report, a review of the literature to inform the project also identified and retrieved scholarly peer-reviewed articles from the Internet and from online databases (e.g., ERIC, SAGE Premier, ProQuest, and Educational Research Complete). In addition, queries for pertinent articles were based on the title of the article, title of a journal, or DOI number. Other informing research publications were located by reviewing references cited by peer-reviewed articles that had been collected. Keywords and phrases used in conducting the searches included computer literacy, computer anxiety, computer self-efficacy, barriers and challenges of older adults using ICT, adult learning theories, and older adults using computers and technology for accessing the Internet.

The theoretical framework that was employed to guide the research study and the proposed project was based on Bandura's self-efficacy theory, which is now known as the social cognitive theory. This approach emphasizes the importance of adult learners taking charge of their learning by performing the necessary actions to achieve their learning goals and objectives ; for example, signing up for training, showing up for the lessons, and confidently participating in the learning activities (Grant et al., 2009; Guy & Lownes-Jackson, 2010). Further, according to Bandura's self-efficacy theory, learners would be engaged to be self-regulated and demonstrate self-beliefs in their abilities to be motivated and take the necessary actions for achieving their learning goals and objectives (Grant et al., 2009; Guy & Lownes-Jackson, 2010). Social-cognitive theory-based approaches are appropriate and efficient methods for influencing older adults' positive

behaviors when interventions are offered for their self-enrichment and well-being (Pajares, 2002; Wagner et al., 2010; White et al., 2012; Winett et al., 2009).

The literature contains a myriad of studies that examined and provided insights on how increased confidence and self-efficacy have mediating effects of reducing the impact of anxiety as older adults enhance their knowledge and use of computers, the Internet, and (ICT) (Barbeite & Weiss, 2004; Bunz, 2009; Campbell & Wabby, 2003; Chu, 2010; Chu & Mastel-Smith, 2010; Chu et al., 2009; Durndell & Haag, 2002; Harris et al., 2011; Hauser et al., 2012; Karavidas et al., 2004; Khorrami-Arani, 2001; Lagana, 2008; Nahm & Resnick, 2008; Saade & Kira, 2009; Simsek, 2011; Vandenbroeck et al., 2008; Willis, 2006; Xie, 2011). For example, Chu et al. after conducting a study with a 5-week intervention (to learn the retrieval of health information from the Internet) found that the older adult participants' confidence and self-efficacy increased while their anxiety levels decreased.

In addition, there is a significant amount of research on older adults' use of computers and technology, for example, studies (a) reporting decreased anxiety, increased confidence, improved coping strategies, and improved self-efficacy after completing interventions (Chu, 2010; Chu et al., 2009; Lagana, 2008; Wood, Lanuza, Baciu, MacKenzie, & Nosko, 2010; Xie, 2011; Xie, 2012; Xie & Bugg, 2009); (b) providing multi-disciplinary reviews of previous studies (Wagner et al., 2010); (c) designing training and instructional programs (Czaja & Sharit, 2012); (d) providing strategies to enhance computer use (Saunders, 2004; Werner et al., 2011); (e) showing no significant differences between gender and anxiety (Bunz, 2009); and (f) reporting

motivations, opportunities, and barriers to computer and technology use (Dickinson et al., 2011; Gatto & Tak, 2008; Githens, 2007; Jung et al., 2010; Kim, 2008; Rosenthal, 2008). Even with the myriad of research available on the relevant topic of technology use by older persons, numerous opportunities persist for additional relevant studies (Wagner et al., 2010). For example, Choi & DiNitto (2013) suggested that future studies should examine the extent to which technology equipment is provided, methods for connecting to the Internet, how to use software applications, and provision of training to accomplish those items to increase their interest, improve access to health information, and improve their well-being. This research study supplemented previous research on older adults' use of computers and technology and served to inform development of the proposed project aimed at helping to bridge the gap between research and application of training techniques in the learning environment (Mayhorn et al., 2004).

Computer anxiety and computer self-efficacy have been shown to impact persons' successful use of computers or performance of tasks using computer-based systems (Brown, 2008; Khorrami-Arani, 2001; Saade & Kira, 2009). Computer anxiety has been posited as being influenced by self-efficacy and attitudes toward using computers, and the impact of computer anxiety upon learning is of primary importance in educational systems (Saade & Kira, 2009). Self-efficacy is deemed as an individual's assessment and belief in one's ability to plan and perform the necessary actions in a prospective task (Chu et al., 2009). Computer self-efficacy was reported as an effective mediator of the impact of anxiety by reducing its effect on perceived use of technology and successful computer experiences (Saade & Kira, 2009).

In addition to designing and utilizing a suitable project for improving the computer knowledge and literacy of adults, other actions were found to be important. These included: (a) providing clear explanations to learners of the personal benefits of technology and computer literacy, (b) allowing ample time for older persons to master new skills, (c) treating learners in positive manners to make them feel valued and that program success is the expected outcome, and (d) using role models for encouraging similar behavior among women and older persons, particularly using women teachers and older teachers acting as role models for students with similar demographic characteristics (Broady et al., 2010). In addition, Park, Sim, & Roh (2008) emphasized another venue for aiding persons in achieving their computer literacy goals – using peer tutoring or partnering to reinforce skills, build team spirit, and establish accountability of team members in group work.

Implementation

The project's workshop was designed to provide a convenient and valuable opportunity for older adults to receive computer training to enhance their day-to-day livelihoods. Another benefit of the project was demonstrating the use of mobile technology and thereby allowing participants to better understand the use of their computers, cellular phones, tablet PCs, and other devices that allow Internet access. Demonstrating the use of mobile technology in the workshops could serve to inspire managers at the community centers, libraries, and other facilities to consider setting up computer stations with Internet connectivity for patrons' use.

One important goal for the workshop coordinator (i.e., facilitator or instructor) would be to identify program characteristics that when implemented would facilitate delivery of adaptive programs to support the range of cognitive abilities found in older adults. It is highly recommended that the workshop coordinator adopt the practice utilized in the current research study. The research study took advantage of the myriad of free, online and relevant training materials that were specially prepared for older adults and adults with minimal or no computer knowledge and skills. Using the outline of workshop lessons provided in Appendix A as a guide, the workshop coordinator could identify computer workshop lessons, training materials, and practical exercises based on the type of technology (e.g., desktop computers, laptops, tablet PCs, or other mobile device) that will be used in the project. The workshop coordinator must be knowledgeable about the subject matter and become familiar with the training materials and selected technology prior to conducting the computer workshop.

Design Elements and Potential Barriers

Design elements of the project shall include (a) selecting a suitable location and obtaining the necessary permissions for conducting the computer workshop, (b) obtaining assistance from the community partner in hosting a sign-up sheet for older persons interested in participating in the workshop, (c) identifying and obtaining the components for the mobile computer laboratory, (d) assembling the curriculum and training materials that would be used by the training facilitator during the workshop, and (e) preparing a three-ring notebook binder (containing the workshop agenda, basic lessons, and other training materials) for each workshop participant. Appendix A provides information

about the project, which includes the workshop agenda, curriculum, and computer practical exercises. In addition to the design elements noted above, a flyer could be used by the community partner to advertise the free computer workshop to interested older persons. Appendix A also lists materials and equipment that are needed to establish the workshop's mobile computer laboratory and tools and materials used by the instructors. The workshop's curriculum could be enhanced by including the use of free, online training materials that are appropriate for the workshop's older adult learners. The agenda for the computer workshop may cover topics such as computer basics, tablet PC basics, Internet basics, e-mail basics, and computer and Internet security. Potential barriers may include persons not signing up for the scheduled computer workshop, unavailability of adequate funding and facilities for the computer workshop, and scheduling conflicts for the workshop facilitators and instructors. Funding may be needed to compensate facilitators and instructors, lease appropriate training equipment and facilities, and purchase incidentals such as notebooks and other training requirements.

Resources and Timeline

The project's computer workshop would include the use of lesson plans, tablet personal computers (i.e., tablet PCs), mobile hotspots, and facilitator-led lessons and exercises. This computer workshop could be offered at community centers, libraries, and other facilities for accommodating adult learners aged 55 and older. The workshop should consist of 6–10 3-hour sessions conducted over a 3- to 5-week period, which would convene 1–2 times per week and could be coordinated in a fashion similar to lunch-time seminars. Each session would commence after setting up the mobile computer

laboratory, distributing lesson notebooks and tablet PCs, and utilizing a seating arrangement for accommodating the workshop participants and instructors. At the conclusion of each session, the computer laboratory should be disassembled and removed from the classroom at the facility. Prior to the onset of subsequent workshop sessions, all electronic equipment should be properly recharged and checked for proper operability. At the conclusion of the workshop, each participant would be provided a completion certificate, instruction booklet, and training materials.

Stakeholders, Roles, and Responsibilities

Stakeholders for implementing the project would include the workshop organizer, instructors or facilitators, sponsors for obtaining resources and funding, and community, corporate or private partners for hosting the workshop at their facility. The workshop organizer would coordinate the activities of all stakeholders to implement the computer workshop as planned. Roles and responsibilities for workshop participants would include attending each session, participating in individual and group activities, being engaged as learners, and providing feedback to instructors to facilitate improvements to training techniques and materials. Responsibilities of the teachers and facilitators would include preparing lessons, exercises, and other training materials, engage with the participants and share the expectation of a successful intervention, maintain order in the classroom for the sessions, treat the participants with respect and patience, and assume responsibility for maintaining the necessary materials and equipment for the duration of the workshop. Sponsors and community partners would be engaged to provide timely funding,

materials, equipment, and access to suitable facilities for conducting the 6–10-session computer knowledge and skills workshop.

Project Evaluation

The project's computer knowledge and skills workshop would be conducted at a community center or another facility. Both formative and summative evaluations would be carried out in conjunction with the project, where the formative assessments would enable immediate adjustment of teaching styles and learning modalities during the course of the workshop, and summative assessments would provide a critique of the completed training and its effectiveness and would identify improvements for future workshop offerings. Formative assessment measures, such as observations, exercises, quizzes, and student feedback, should be integrated as part of the computer training and activities rather than as a separate phase following each workshop session (Looney, 2011). On the other hand, summative assessments could be in the form of student evaluations of teaching effectiveness, examinations, instructor self-evaluations, and individual projects (Looney, 2011). Trainers and facilitators would be responsible for conducting formative assessments during each of the workshop sessions and making adjustments to deliver lessons and training to older adults with emphasis placed on providing ample time for absorbing the information about computers and receiving individualized instructions during the hands-on exercises using the tablet PCs and the Internet. After the conclusion of the workshop, the instructors could perform summative assessments to determine whether learning objectives were achieved, whether participants were accommodated in a safe learning environment, and whether feedback was appropriately documented for

addressing lessons learned. In addition, instructors can assess the efficacy of using mobile technology in a portable computer laboratory for provision of computer training. Moreover, instructors could utilize interview results and feedback from the participants and community partners to confirm whether the offering of the free computer training was well received and deemed of value.

Implications Including Social Change

Local Community

Offering this computer workshop at a local community center or another facility could provide an opportunity for several older adults to achieve their goal of obtaining computer knowledge and skills training. For the research study, several persons expressed interest in attending computer training but had elected not to sign up for the free workshop. Many of the research participants expressed a desire for the training to be extended over a longer period; therefore, it is recommended that the computer workshop be extended beyond a 3-week period. Providing this proposed project for older adults in community or metropolitan facilities would be viewed as a blessing by the workshop attendees. It would be highly worthwhile to provide similar computer workshops throughout the local community for the older population and any other disadvantaged groups.

Far-Reaching

Using mobile technology (e.g., tablet PCs and hotspots) in the project would demonstrate the efficacy of providing meaningful computer knowledge and skills training to persons at a facility in any locality whether or not Internet connections were available.

Implementing this project could also demonstrate that using mobile technology to offer computer knowledge and skills training to older adults, adult women, and other disadvantaged groups can be a viable option for lessening the digital divide (i.e., helping persons learn how to use computers and the Internet; Chang et al., 2012).

Conclusion

This section introduced the proposed project that developed from the mixed methods study conducted to explore computer anxiety and computer self-efficacy of older adults in conjunction with their participation in a computer knowledge and skills workshop. In addition, mobile technology is proposed for use in a project, thereby enabling the assembly and disassembly of a portable computer laboratory at locations within facilities with or without hard-wired Internet connectivity. The use of a mobile computer laboratory – using tablet PCs and mobile hotspots – would be employed to access online educational lessons and perform practical exercises. During the project's workshop, feedback from participants and workshop staff could be recorded and assessed to determine whether immediate adjustments to training techniques or materials should be considered. Offering the computer knowledge and skills workshop could provide opportunities to collect both qualitative and quantitative data from workshop participants. Those formative assessments could aid in timely implementation of lessons learned and measures to improve the effectiveness of the educational intervention. After the completion of the workshop, summative assessments could be conducted to incorporate feedback received from participants and instructors to improve the efficiency and effectiveness of future workshop offerings.

The next section presents the researcher's reflections as a scholar, practitioner, and project developer; implications for further studies; and, implications for social change.

Section 4: Reflections and Conclusions

Introduction

I chose to conduct a research study with the idea of making a difference in the lives of a small group of older adults who hungered for an opportunity to improve their computer and Internet skills. I found that the digital divide among older adults, especially older women, needs to be addressed. I believe that there are numerous ways of lessening the digital divide and that any effort taken to address this issue is worthwhile. The project builds upon a concurrent triangulation mixed-methods study that I completed for studying computer anxiety and the computer self-efficacy of older adults in conjunction with their completing a computer knowledge and skills workshop. In addition, the study used a novel approach for introducing the older adults to computers and the Internet—mobile technology—which made it possible to rapidly set up and disassemble a mobile computer laboratory using tablet PCs and portable hotspots for Internet connectivity. This section discusses the project's strengths, recommendations for the remediation of limitations, scholarship, project development and evaluation, leadership and change, analysis of self, implications for social change, and future research.

Project Strengths

Several project strengths were identified for addressing the problem of improving the prospects for older adults to learn about computers, mobile and information technology, and the Internet. Those strengths included the following:

- The instructor can select readily-available, free, online training materials and instructor guides for use in a computer workshop.

- The instructor could easily tailor the lesson content and pace and the practical exercises to suit the abilities of the learners.
- Mobile technology – using tablet PCs and mobile hotspots – was demonstrated to be an effective method of establishing a computer laboratory within facilities, with or without Internet connectivity.
- The computer workshop format provided instant opportunities for older persons to improve their computer and Internet skills.
- Using tablet PCs and their features can enhance learners' understanding and use of their cell phones, smart phones, and other information-technology devices.

Recommendations for Remediation of Limitations

Every project has inherent limitations. Recommendations for remediating the limitations of this project include the following items:

- Minimizing or eliminating the cost of signing up for the computer workshop by obtaining sponsors and volunteers who are willing to donate their time and resources and by maximizing the use of any other available public and private resources
- Revising the course content and pace of the workshop to match the learning styles of participants, with a focus on using relevant, free, online training materials that are appropriate for the workshop's adult learners
- Using workshop sign-up sheets that encourage older adults with limited education or limited computer knowledge and skills

- Revising and pilot testing preestablished instruments for measuring constructs, such as computer anxiety and computer self-efficacy, where revisions would focus on the type of mobile technology and practical exercises used in the workshop
- Incorporating preworkshop and postworkshop tests or other assessments for assessing the effectiveness of the workshop for improving older adults' computer knowledge and skills

Scholarship

During this doctoral journal, starting from course work to the final dissertation report, I have learned the importance of maintaining an open, questioning attitude toward learning. I learned the value of being flexible and willing to adapt my way of thinking, continually reading and remaining ready to keep on digging for better understanding of concepts and the literature. Hopefully, in the presentation of my research study and the proposed project, I have promoted scholarship in others, for learning is indeed a journey that must be shared, explored, and endured. My choice of research study design – concurrent triangulation mixed methods – required that I plunge into the literature to improve my understanding of how to apply the necessary quantitative and qualitative methodologies for data analysis and reporting of findings. I have faithfully followed the advice provided by several administrators at a recent Walden Seminar, "Read, read, read."

Project Development and Evaluation

I completed a doctoral course that covered key aspects of project development and evaluation. In addition, the entire effort of selecting, designing and conducting a research study based on an approved research proposal was indeed a tremendous example of project development and evaluation. I learned that project management entails perceiving a goal then embarking on the journey to accomplishment by integrating all the key elements and factors, constraints and resources, meeting deadlines and ethical standards, rising to challenges, weathering and adjusting to setbacks, and ultimately meeting the pre-defined objectives. Project evaluations are essential tasks for determining the project's effectiveness and efficiency; for example, formative assessments were utilized in each phase of the research study to ensure that critical milestones and objectives were being met for steps such as the literature review, proposal preparation, data collections, and data analysis. On the other hand, summative assessments were also completed; for example, at the conclusion of the respective phases to ensure that appropriate techniques were utilized and that the study remained on course for successful completion.

Leadership and Change

I learned that leadership involves not only the visible aspects designated for action by the leader, but also the thoughtful pre-planning, negotiating for approvals and resources, and answering the call when things go well and vice versa. I learned that leadership also means standing for a cause and supporting the efforts to bring about needed change. I learned that leadership means having the courage to recognize ones

strengths and weaknesses and to take the time to learn from others and understanding that there are many other points of view. I learned that change is about the only constant in this world. I learned that change also means standing up and making a difference. I learned that as a leader I must embrace change when change is needed. I also learned that often change is very slow and arduous and that patience and dedication are essential tools when I am confronting change.

Analysis of Self as Scholar

As a scholar, I learned that I do not have unlimited energy and attention. I learned that I must pace myself and develop a plan for investigating a topic or concept. I learned that I could derive understanding of concepts and methodologies only by immersing myself in the literature and finding materials to shed light on the issues at hand. I learned how to select a research project and how to implement that project. I also have learned that I will continue to be a life-long learner, and I am thankful that this is my last journey in pursuit of a formal academic degree.

Analysis of Self as Practitioner

Along this doctoral journey, one of the requirements was to identify a research project that involved conducting a project, where the project would require data collections and analysis. For my research project, I chose to design and implement a computer knowledge and skills workshop for older adults. The implementation required (a) selecting the lesson objectives and suitable training materials to achieve project objectives, (b) selecting and purchasing equipment for establishing a mobile computer laboratory, (c) coordinating the content and pace of a workshop that was completed with

sessions being conducted twice weekly for three consecutive weeks, and (d) performing data collections from participants using preworkshop and postworkshop surveys and postworkshop interviews. As a practitioner, I learned the importance of detailed pre-planning of every aspect of the workshop. Most importantly, I learned the importance of adding a personal, caring touch in addition to delivering the computer workshop. Connecting with the older adults within the first and second sessions was a critical factor in assuring the success of the workshop, both from the perspectives of the instructors and the students. Once that non-threatening relationship was established, remarkably, the students (aged 50 to over 75 years) were fully engaged and committed to their learning and learning activities.

Analysis of Self as Project Developer

As a project developer, I learned the importance of developing a realistic plan with a realistic timeline, which allows opportunities to make any needed adjustments. I also learned the importance of conducting research to inform the development of each critical milestone. I also learned the importance of gaining the buy-ins from all stakeholders and maintaining open lines of communication. I also learned the importance of seeking help and assistance when needed and gaining the trust and cooperation of community partners.

The Project's Potential Impact on Social Change

I was amazed at the overwhelmingly positive feedback received from my community partner and the computer workshop participants. The provision of the workshop at the local community center was viewed as a blessing for many of the

workshop participants. Further, the workshop participants wanted to know when the workshops would be offered again and also asked whether the current workshop could be extended for a few more weeks. The proposed project could serve as a model for presenting low-cost computer knowledge and skills workshops at facilities and in locations that may or not have Internet connectivity. The use of tablet PCs and portable hotspots in the research study demonstrated the successful use of mobile information and communication technology for providing computer training for older adults and other underprivileged individuals. The simplicity of the project's implementation makes it a feasible alternative method for aiding in the lessening of the digital divide within communities, rural areas, and metropolitan areas.

Implications, Applications, and Directions for Future Research

The research study adds to the literature on the provision of computer training for older adults and underprivileged persons in society. In addition, the study added to the literature on the rapidly advancing use of mobile technology, which enhances the accessibility and use of information technology and the Internet. The mobile computer laboratory can also be utilized in traditional classrooms and other training environments. Future studies could advance efforts to create reliable and valid instruments for assessing psychological constructs such as computer anxiety and self-efficacy of older adults and other underprivileged persons, where the items in the instruments would be adapted to reflect the types, features, and capabilities of the mobile technology being used in the training workshop. In addition, the computer workshop should also investigate the

utilization of final assessments to gain insights into the educational intervention's efficiency and effectiveness.

Conclusion

This section presented a discussion of the project's strengths, recommendations for remediating some limitations, provided insights into scholarship, project development and evaluation, self-analysis as a scholar, practitioner and project developer, impact on social change, and implication for application and future research. The research project and development of the proposed project have had profound, positive effects on me as a scholar, practitioner, and project developer. The research study supporting the proposed project revealed that there is a real need for additional provision of computer knowledge and skills training for older adults and other underprivileged persons. This provision of training can serve to lessen the digital divide that negatively impact persons' communications with others, access to health information, and other factors affecting their quality of life.

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Appendix A: Project Summary

The proposed project will involve the implementation of a computer workshop, specially designed for older adults who had limited or no prior computer training or experience. The project will include five components: Lesson 1, Lesson 2, Lesson 3, Lesson 4, and Lesson 5. The five lessons will be utilized to guide the classroom and practical exercise elements of the computer knowledge and skills workshop. The timeline for implementing the workshop is presented in outline format, in which the first lesson will consist of introductory material, subject-matter descriptions and action items, practical exercises, and a review of the lesson's learning objectives; and subsequent lessons will begin with a review of previous learning goals and practical exercises followed by introductory material, subject-matter descriptions and action items, practical exercises, and a discussion of the day's learning objectives. The five lessons are described as follows:

Lesson 1 – Computer basics

Lesson 2 – Tablet PC basics

Lesson 3 – Internet basics

Lesson 4 – E-mail basics and setting up an e-mail account

Lesson 5 – Accessing online health information

Ten sessions are proposed for the project, with students meeting two days per week for five weeks, for example, with classes meeting on Tuesdays and Thursdays during 11:00 am to 1:00 pm. Implementing the project would consist of the following actions:

- Selecting a local community center or other facility and obtaining the necessary permissions for conducting the computer workshop and research effort.
- Receiving assistance from the community partner in hosting a sign-up sheet for older persons interested in participating in the workshop.
- Identifying and purchasing the components for the mobile computer laboratory – for example to accommodate up to 20 students: 20 units of the Chromo Tablet PC (4 GB 7" Android 4.1, WiFi, Camera) with carrying case and external keyboard; 20 tablet stylus pens; two heavy-duty, multiple-outlet electrical power strips; mobile hotspots with a capacity of 20 Internet connections; 20 notebook binders for containing the agenda, lessons, and other training materials; and two heavy-duty carrying cases for transporting the components of the mobile computer laboratory to and from the training site in conjunction with each of the workshop's ten 3-hour sessions.
- Researcher's Materials – the researcher collected data before and after the computer workshop. Materials and equipment used by the researcher included an audio recorder, an interview checklist, survey questionnaire forms, and consent forms.
- Assembling the curriculum and training materials that would be used by the training facilitator during the workshop – materials for the curriculum, lessons, and practical exercises are summarized below in this appendix. The instructor would determine the need for additional equipment and training

materials that may be required; for example, PowerPoint presentations, projector system, white boards, flip charts, and computer- or technology-related props or components.

- A classroom with a blackboard or erasable board
- Preparing 20 notebooks (containing the workshop agenda, basic lessons, and other training materials) for each workshop participant – each workshop participant was provided a notebook containing the schedule and computer workshop lessons and practical exercises.

Curriculum for Computer Knowledge and Skills Workshop

Note: The instructor would identify relevant, free, online training materials and exercises that would be needed to meet the learning objectives for computer workshop lessons.

Week 1

Introduction

Lesson 1 - Computer Basics

- Learn basic computer terms and features (for example, computer or central processing unit, monitor, keyboard, mouse, mouse pad, speakers, hardware, software, applications, desktop, icon, folders, cursor, browser, clicking, arrow, hour glass, and pointing hand)
- Learn about folders, menus, and windows
- Practice using the mouse

Lesson 2 - Tablet or Laptop PC Basics

- Learn basic tablet and laptop terms and features (for example, connecting to WiFi, getting to the Internet, doing searches on the Internet, putting favorites or most-used items on the tablet's desktop (homepage), turning the camera on and off)
- Learn about menus, windows, and applications
- Practice using the stylus

Practice & Exercises

Review

Week 2

Review for Lessons 1 and 2

Lesson 3 - Internet Basics

- Learn Internet terms (for example, World Wide Web, website, homepage, hyperlink, back arrow, web address or URL, search box, address box, browsers, search engines, site map, scroll, scrollbar, and browser icons)
- Learn about Internet security
- Learn about Internet Service Providers

Practice & Exercises

Week 3

Review of Lesson 3

Lesson 4 - E-mail basics and setting up an e-mail account

- Learn about the e-mail address (describe the three parts: contact or username, the "@" character, and the domain or Internet Service Provider)

- Learn e-mail terms (compose, subject, reply or forward, inbox, sent mail, contacts, calendars, spam, attachments)
- Learn about e-mail etiquette and e-mail security
- Creating an e-mail account using Gmail or other (for example, http://www.eurofiling.info/documents/Instructions_on_how_to_create_a_free_Gmail_account.pdf)

Practice & Exercises

Skills Assessment

Week 4

Review of Lesson 4

Lesson 5 - Accessing online health information

- Learn about available websites for obtaining health information (for example, www.nihseniorhealth.gov/toolkit, NIHSeniorHealth.gov, MedlinePlus.gov)
- Learn how to navigate websites for obtaining health information
- Learn how to save files and bookmark websites

Practice & Exercises

Week 5

Review of Lesson 5

Practice & Exercises

Skills Assessment

Workshop Completion Certificate

Appendix B: Questionnaire Survey Instrument

I have read and signed the consent letter for this research study. Yes ( ) No ( )

Part 1 – Demographic and Computer Usage Information				
Number	Item			Scoring Key
Q-1	Age	Check one (√)	Age 54 or younger	1
			Age 55 to 64	2
			Age 65 to 74	3
			Age 75 or older	4
Q-2	Gender	Check one	Male	1
			Female	2
Q-3	Hispanic or Latino Origin	Check one	Hispanic or Latino	1
			Not Hispanic or Latino	2
Q-4	Race	Check one	White	1
			Black or African American	2
			American Indian and Alaska Native	3
			Asian	4
			Native Hawaiian or Other Pacific Islander	5
			Some Other Race	6
			Two or More Races	7
Q-5	Level of Education	Check one	Less than high school	1
			GED or High school diploma	2
			Some college	3
			2-year degree	4
			4-year degree	5
			Graduate degree	6
			Post graduate education	7
Q-6	Own a Computer?	Check one	Yes	1
			No	2
Q-7	Computer Knowledge and Skills	Check one	No knowledge or skills	1
			Little knowledge and skills	2
			Knowledgeable with skills	3
			Very knowledgeable and skilled	4
Q-8	Computer Experience	Check one	Less than 1 year	1
			1 to 2 years	2
			2 to 4 years	3
			5 years or more	4
Q-9	Weekly Computer Usage	Check one	Less than 1 hour	1
			1 to 4 hours	2
			More than 5 hours	3

Part 2 - Computer Self-Efficacy Scale (CSE)

Instructions

For each statement, decide whether you agree or disagree with the statement using the following 5-point scale ranging from strongly disagree to strongly agree. In the box to the right of each statement, feel in the number on the 5 point scale that best describes your level of agreement or disagreement.

Strongly Disagree 1	2	3	4	Strongly Agree 5

I feel confident:

Number	Item	
Q-10	working on a personal computer	☐
Q-11	getting software up and running	☐
Q-12	using the users guide when help is needed	☐
Q-13	entering and saving data (numbers and words) into a file	☐
Q-14	escaping (exiting) from the program (software)	☐
Q-15	calling up a data file to view on the monitor screen	☐
Q-16	understanding terms/ words relating to computer hardware	☐
Q-17	understanding terms/words relating to computer software	☐
Q-18	handling a compact disc or CD correctly	☐
Q-19	learning to use a variety of programs (software)	☐
Q-20	learning advanced skills within a specific program (software)	☐
Q-21	making selections from an onscreen menu	☐
Q-22	using the computer to analyze number data	☐
Q-23	using a printer to make “hardcopy” of my work	☐

Part 2 - Computer Self-Efficacy Scale (CSE) (continued)

Instructions

For each statement, decide whether you agree or disagree with the statement using the following 5-point scale ranging from strongly disagree to strongly agree. In the box to the right of each statement, feel in the number on the 5 point scale that best describes your level of agreement or disagreement.

Strongly Disagree 1	2	3	4	Strongly Agree 5

	I feel confident:	
Number	Item	
Q-24	copying a disk or compact disk	☐
Q-25	copying an individual file	☐
Q-26	adding and deleting information from a data file	☐
Q-27	moving the cursor around the monitor screen	☐
Q-28	writing simple programs for the computer	☐
Q-29	using the computer to write a letter or essay	☐
Q-30	describing the function of computer hardware (e.g. keyboard, monitor, disc drives, computer processing unit	☐
Q-31	understanding the 3 stages of data processing: input, processing, output	☐
Q-32	getting help for problems in the computer system	☐
Q-33	storing software correctly	☐
Q-34	explaining why a program (software) will or will not run on a given computer	☐
Q-35	using the computer to organize files and information	☐
Q-36	deleting files when they are no longer needed	☐
Q-37	organizing and managing files	☐
Q-38	seeking answers to computer problems	☐

Part 3 - Computer Anxiety Scale (CARS)

Instructions

For each statement, decide whether you agree or disagree with the statement using the following 5-point scale ranging from strongly disagree to strongly agree. In the box to the right of each statement, feel in the number on the 5 point scale that best describes your level of agreement or disagreement.

(Heinssen, Glass, & Knight, 1987)

Strongly Disagree 1	**2**	**3**	**4**	**Strongly Agree 5**

Number	Item	
Q-39	I feel insecure about my ability to print documents using a computer	☐
Q-40 **	I look forward to using a computer on my job	☐
Q-41	I would be able to use computer software applications	☐
Q-42 **	The challenge of learning about computers is exciting	☐
Q-43 **	I am confident that I can learn computer skills	☐
Q-44 **	Anyone can learn to use a computer is they are patient and motivated	☐
Q-45 **	Learning to operate computers is like learning any new skill, the more you practice, the better you become	☐
Q-46	I am afraid that if I begin to use computer more, I will become more dependent upon them and lose some of my reasoning skills	☐
Q-47 **	I am sure that with time and practice I will be as comfortable working with computers as I am in working by hand	☐
Q-48 **	I feel that I will be able to keep up with the advances happening in the computer field	☐
Q-49	I would dislike working with machines that are smarter than I am	☐
Q-50	I feel apprehensive about using computers	☐
Q-51	I have difficulty in understanding the technical aspects of computers	☐
Q-52	It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key	☐
Q-53	I hesitate to use a computer for fear of making mistakes that I cannot correct	☐

Part 3 - Computer Anxiety Scale (CARS) (continued)

Instructions

For each statement, decide whether you agree or disagree with the statement using the following 5-point scale ranging from strongly disagree to strongly agree. In the box to the right of each statement, feel in the number on the 5 point scale that best describes your level of agreement or disagreement.

(Heinssen, Glass, & Knight, 1987)

Strongly Disagree 1	**2**	**3**	**4**	**Strongly Agree 5**	
Q-54	You have to be a genius to understand all the special keys contained on most computer terminals				☐
Q-55 **	If given the opportunity, I would like to learn more about and use computers more				☐
Q-56	I have avoided computers because they are unfamiliar and somewhat intimidating to me				☐
Q-57 **	I feel computers are necessary tools in both educational and work settings				☐

Note: ** indicates the survey questions that must be reverse scored. Higher scores indicate higher levels of computer anxiety. (Heinssen, Glass, & Knight, 1987)

Appendix C: Letter of Cooperation

Mount Hermon Village
2400 Cutherell Street
Portsmouth, VA 23707
June 10, 2014

Dear Elizabeth Cooper-Gaiter,

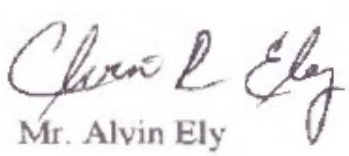
Based on my review of your research proposal, I give permission for you to conduct the study entitled Computer Anxiety and Computer Self-Efficacy of Older Adults within the Mount Herman Village. As part of this study, I authorize you to seek volunteers from workshop participants. Data collections will consist of administering a questionnaire survey instrument and conducting postworkshop interviews. A one- to two-page summary of the study's research findings will be provided to Mount Hermon Village. Individuals' participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include: granting access to potential participants in the research study and providing a room for conducting private interviews of volunteer participants after workshop sessions are completed during the first week and final week of the computer knowledge and skills workshop. We reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this setting.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the research team without permission from the Walden University IRB.

Sincerely,



Mr. Alvin Ely
Chairman

Appendix D: Interview Protocol

Interview Protocol Form

Project: Exploring Computer Anxiety and Computer Self-Efficacy in Older Adults

Date _____

Time _____

Location: Mount Hermon Village Community Center

Interviewer: Elizabeth Cooper-Gaiter

Interviewee's Initials: _____

Consent form signed? _____

Notes to interviewee:

Thank you for your participation. I believe your input will be valuable to this research and in helping grow all of our professional practice.

Confidentiality of responses is guaranteed

Approximate length of interview: 20 minutes, five major questions

Purpose of research:

Methods of disseminating results: Final report issued as a doctoral dissertation.

Interview Questions

1. Before you completed the computer workshop, what were your feelings toward using computers and the Internet?
2. How often did you use computers before the workshop?
3. How much time per week?
4. What type of actions?
5. Before the workshop, how would you rate your skills using the computer and the Internet?
6. What motivated you to participate in the computer workshop? How so? Would recommend this type of training to others? Why or why not?
7. What challenges or barriers did you encounter during the workshop? How did you overcome those challenges?
8. Do you plan to continue using computers and the Internet? How so?
9. After completing the workshop, how has it changed your view of the value of using computers and the Internet?

(1) Is there anything else you would like to share about your experience?

(2) Is there anything you would like to ask me?

Reflection by Interviewer

- Closure
  - Thank you to interviewee
  - Reassure confidentiality

Appendix E: Permission to Use Instrument – Computer Self-efficacy Scale (CSE)

Welcome, Elizabeth

Educational and psychological measurement
ISSN: 0013-1644
Publication year(s): 1941 - present
Author/Editor: AMERICAN COLLEGE PERSONNEL ASSOCIATION ; SCIENCE RESEARCH ASSOCIATES
Publication type: Journal
Publisher: SAGE PUBLICATIONS, INC.
Language: English
Country of publication: United States of America
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Author(s): Murphy, C. A. ; Coover, D. ; Owen, S. V.
DOI: 10.1177/001316448904900412
Date: Dec 1, 1989
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Appendix F: Permission to Use Instrument – Computer Anxiety Scale (CARS)

Confirmation Number: 11064013

Order Date: 01/23/2013
Customer Information

Customer: Elizabeth Cooper-Gaiter
Account Number: 3000615147
Organization: Elizabeth Cooper-Gaiter
E-mail: vandigaiter@peoplepc.com
Phone: +1 (757)4854309
Payment Method: Invoice

Order Details

Computers in human behavior

Billing Status: **N/A**

Order detail ID: 63374780
Article Title: Assessing computer anxiety: Development and validation of the Computer Anxiety Rating Scale
Author(s): Heinssen, Robert K. ; Glass, Carol R. ; Knight, Luanne A.
DOI: 10.1016/0747-5632(87)90010-0
ISSN: 0747-5632
Publication Type: Journal
Volume: 3
Issue: 1
Start page: 49
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Appendix G: Confidentiality Agreement for Peer Reviewer

By affixing my signature and date to this agreement, I agree to keep all information and data associated with the research project and its participants strictly confidential. All research documents and data will be returned to the researcher.

Date: June 10, 2014

Name: Schleurious L. Gaiter

Signature: 

Appendix H: Survey Questionnaire Data

Preworkshop Survey Data

Note: Items indicated by "**" following the question number were reverse-scored.

P1 – P11 represent 11 participants

Q1 – Q9 represent the demographic and computer-use data for research participants

Q10 – Q38 represent the 29 items on the computer self-efficacy scale (CSE)

Q39 – Q57 represent the 19 items on the computer anxiety scale (CARS)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7
P1	3	1	2	2	3	2	1
P2	4	1	2	2	3	2	1
P3	3	1	2	2	3	1	1
P4	3	1	2	2	3	1	1
P5	4	1	2	2	1	2	1
P6	1	2	2	2	1	1	3
P7	1	1	2	2	4	2	3
P8	3	1	2	2	1	2	2
P9	3	1	2	2	2	1	2
P10	2	1	2	2	1	2	1
P11	4	1	2	3	1	2	1

	Q8	Q9	Q10	Q11	Q12	Q13	Q14
P1	1	1	2	4	3	2	2
P2	1	1	1	1	1	2	1
P3	1	1	4	5	5	2	2
P4	1	1	2	2	3	2	1
P5	1	1	1	1	2	2	3
P6	3	2	4	4	4	4	4
P7	2	1	4	4	4	4	4
P8	2	3	3	3	3	3	3
P9	1	1	4	4	3	2	2
P10	1	1	2	2	2	2	2
P11	1	1	4	4	3	3	4

	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22
P1	2	4	2	2	2	2	2	2
P2	1	2	2	2	2	2	2	2
P3	2	2	4	2	2	2	2	2
P4	3	3	3	2	2	2	2	2
P5	4	3	2	2	3	2	2	2
P6	5	4	4	3	3	3	5	5
P7	4	4	4	4	4	2	4	2
P8	3	3	3	3	3	3	2	3
P9	4	4	2	3	3	2	4	2
P10	3	2	3	2	2	2	2	2
P11	4	4	4	2	3	2	4	2

	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
P1	4	2	2	2	2	2	2	2
P2	2	2	2	2	2	2	1	1
P3	2	2	2	2	3	2	2	2
P4	2	2	2	2	4	2	2	2
P5	2	2	2	2	2	2	2	2
P6	4	2	4	4	4	4	4	4
P7	4	2	2	4	4	2	4	3
P8	2	3	2	4	4	2	4	4
P9	2	2	2	2	4	2	4	4
P10	2	2	2	2	2	2	2	2
P11	2	2	2	2	4	2	4	4

	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38
P1	2	2	2	2	2	2	2	2
P2	2	2	1	1	2	2	2	4
P3	2	2	2	2	2	2	2	4
P4	2	2	2	2	2	2	2	2
P5	2	2	2	2	2	2	2	4
P6	4	4	2	3	4	5	5	3
P7	3	4	3	2	3	4	4	3
P8	3	3	3	2	3	4	3	4
P9	2	4	2	2	2	2	2	4
P10	2	2	2	2	2	2	2	2
P11	2	3	2	2	2	3	2	4

	Q39	Q40 **	Q41	Q42 **	Q43 **	Q44 **	Q45 **	Q46
P1	4	2	2	2	2	2	2	2
P2	4	4	2	2	2	2	2	2
P3	2	2	2	2	2	2	1	2
P4	1	2	3	2	2	2	2	1
P5	4	2	3	2	2	2	2	2
P6	4	1	4	1	2	1	1	3
P7	2	2	4	2	2	2	2	2
P8	2	2	3	2	2	2	2	2
P9	4	2	4	2	2	2	2	1
P10	2	3	2	2	2	2	2	2
P11	3	2	4	1	2	2	1	1

	Q47 **	Q48 **	Q49	Q50	Q51	Q52	Q53	Q54
P1	5	2	2	4	2	4	4	4
P2	2	2	4	4	4	4	4	4
P3	2	3	3	4	3	4	4	2
P4	2	2	4	2	4	4	4	2
P5	2	2	2	4	4	4	4	2
P6	2	2	2	2	2	3	2	2
P7	2	3	2	2	4	3	3	2
P8	2	3	2	3	4	3	3	3
P9	2	2	2	4	4	4	4	2
P10	2	2	3	4	4	4	4	2
P11	2	2	2	4	4	4	4	2

	Q55 **	Q56	Q57 **
P1	4	2	1
P2	2	4	2
P3	2	3	2
P4	1	2	1
P5	2	4	4
P6	1	2	1
P7	2	2	2
P8	2	3	2
P9	2	2	1
P10	2	4	1
P11	2	3	2

End of Pre-computer-workshop survey data

Postworkshop Survey Data

Note: Items indicated by "**" following the question number were reverse-scored.

P1 – P11 represent 11 participants

Q1 – Q9 represent the demographic and computer use data

Q10 – Q38 represent the 29 items on the computer self-efficacy scale (CSE)

Q39 – Q57 represent the 19 items on the computer anxiety scale (CARS)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7
P1	3	1	2	2	3	2	1
P2	4	1	2	2	3	2	1
P3	3	1	2	2	3	1	1
P4	3	1	2	2	3	1	1
P5	4	1	2	2	1	2	1
P6	1	2	2	2	1	1	3
P7	1	1	2	2	4	2	3
P8	3	1	2	2	1	2	2
P9	3	1	2	2	2	1	2
P10	2	1	2	2	1	2	1
P11	4	1	2	3	1	2	1

	Q8	Q9	Q10	Q11	Q12	Q13	Q14
P1	1	1	4	4	4	4	4
P2	1	1	5	5	5	5	5
P3	1	1	4	4	5	4	5
P4	1	1	4	4	4	4	5
P5	1	1	5	5	5	5	5
P6	3	2	5	5	5	5	5
P7	2	1	5	5	5	5	5
P8	2	3	4	4	4	4	5
P9	1	1	4	4	4	4	5
P10	1	1	4	4	5	4	5
P11	1	1	4	4	4	3	4

	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22
P1	4	4	4	4	5	5	5	5
P2	5	4	5	5	5	5	5	4
P3	4	4	4	4	5	4	5	4
P4	4	4	4	4	4	4	4	4
P5	5	5	5	4	4	5	5	4
P6	4	5	4	4	5	4	5	5
P7	5	5	5	4	5	5	5	5
P8	4	5	5	4	5	5	5	5
P9	4	5	5	3	4	4	4	4
P10	4	4	4	4	4	4	4	4
P11	4	4	4	3	4	3	4	3

	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
P1	3	3	4	4	4	3	4	4
P2	4	4	5	5	5	3	4	5
P3	3	3	4	4	5	3	4	5
P4	3	4	4	4	4	3	4	4
P5	4	4	5	4	5	3	5	5
P6	4	4	4	4	5	4	4	4
P7	4	4	5	5	5	3	5	5
P8	5	5	5	5	5	4	4	4
P9	4	3	4	4	5	3	4	5
P10	4	3	4	4	4	3	4	4
P11	3	3	4	4	4	3	4	4

	Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38
P1	4	4	4	3	4	4	4	4
P2	4	5	5	3	4	5	5	5
P3	4	5	4	4	5	5	5	5
P4	4	5	5	3	4	5	4	5
P5	4	5	5	3	5	5	5	5
P6	4	4	4	4	3	5	5	4
P7	5	5	5	3	5	5	5	5
P8	4	4	4	4	4	5	4	4
P9	4	5	3	3	4	4	4	4
P10	4	4	4	3	4	4	4	4
P11	4	3	4	3	3	4	4	4

	Q39	Q40 **	Q41	Q42 **	Q43 **	Q44 **	Q45 **	Q46
P1	1	2	4	5	1	1	1	2
P2	4	1	5	1	1	1	1	2
P3	2	1	5	1	1	1	1	2
P4	4	1	5	1	1	1	1	2
P5	1	1	5	1	1	1	1	2
P6	2	1	5	1	1	1	1	2
P7	2	1	5	1	1	1	1	2
P8	3	1	5	1	1	1	1	2
P9	4	1	5	1	1	1	1	1
P10	2	2	4	1	1	1	1	2
P11	3	1	5	1	1	1	1	2

	Q47 **	Q48 **	Q49	Q50	Q51	Q52	Q53
P1	1	2	5	2	4	2	2
P2	1	2	4	2	2	2	2
P3	2	2	3	2	2	2	2
P4	1	2	3	2	2	2	2
P5	1	2	2	2	2	2	2
P6	1	2	2	2	2	2	2
P7	1	2	3	2	2	2	2
P8	1	2	3	2	2	2	2
P9	1	2	3	2	2	2	2
P10	1	2	3	2	2	2	2
P11	1	1	4	1	3	1	1

	Q54	Q55 **	Q56	Q57 **
P1	2	1	5	1
P2	2	1	2	1
P3	2	1	2	1
P4	2	1	2	1
P5	2	1	2	1
P6	2	1	1	1
P7	2	1	2	1
P8	2	1	2	1
P9	2	1	2	1
P10	2	1	2	1
P11	2	1	1	1

End of Post-computer-workshop survey data

Appendix I: Transcripts of Participant Interviews

Interview Question 1. Before you completed the computer workshop, what were your feelings toward using computers and the Internet?

Participant	Response
P1	I was a little bit nervous and I didn't think that I would be confident. But I have learned and gained a lot.
P12	Before I completed the workshop, I was really scared to use a computer. I didn't know how to turn it on and I didn't know how to turn it off.
P3	I wanted to learn computers and when I saw the letter with our rent statement I called to sign up even before I finished reading the letter. I asked for management to please put my name down because I want to learn. It is something that I wanted to do for a long time. But I did buy a laptop but my granddaughter has it for her college school work.
P4	I was very nervous and illiterate with regards to computer use.
P5	I was afraid of them because I didn't know what to do
P6	Neutral. I do have a computer but didn't use it often.
P7	Well my feelings toward the computer and Internet were kind of scary. Just the computer itself and the Internet.
P8	I was neutral but now I am more comfortable with them.
P9	I have a computer at home and I know how to go on it and play my solitaire but I took a course about 7 years ago but I lost all that because I didn't continue practicing and they have upgraded computer equipment. So when I got the brochure to attend the workshop that was the light bulb and I said that I could get a refresher course.
P10	Very nervous about it because I was skeptical that I would not be able to grasp because most of the time that I went on a computer it seemed like I couldn't comprehend it to a certain extent. Because I could hit a button but if I needed to go back I didn't know how to do it again I didn't get the needed help to stimulate my interest in improving my computer skills I had a computer class where I worked at school. I'm very hands on and if could take time and continue practicing like in the workshop then I could learn better than someone just teaching or saying what to do. I have to feel it and work with it.
P11	Before I completed the workshop, I was really scared to use a computer. I didn't know how to turn it on and I didn't know how to turn it off.
P12	Before I completed the workshop, I was really scared to use a computer. I didn't know how to turn it on and I didn't know how to turn it off.

Interview Question 2. How often and for what actions did you use computers before the workshop?

Participant	Response
P1	None. No one would teach me to use the computer, not even my grandson
P2	(laughing) I didn't use the computer so much and I only learned what I needed to learn and not knowing enough about navigating around on the computer because at that time I wasn't interested. But I found myself wishing and hoping that this class was longer. I learned quite a bit in this course. It's hard to say what I have learned. When I get back home I recall what I have learned in the workshop
P3	I never did get a chance to use the computer. My granddaughter goes everywhere with the laptop, including the library.
P4	No I had no computer and internet experience before the workshop. This workshop was my first computer course
P5	I never did.
P6	Used a computer once or twice per week to look up certain things like dictionary and basic offline actions
P7	I used it mostly on my phone every day_ mostly to play games and would sometimes go on the Internet.
P8	I used the computer a little at work but now I am a little more advanced so I know how to do certain things. I know how to go back to previous step and home. I can move around and get things on my own now.
P9	None except for my solitaire games
P10	None
P11	I hadn't used a computer before the workshop that much. My granddaughter has a computer.

Interview Question 3. Before the workshop, how would you rate your computer and the Internet experience?

Participant	Response
P1	Minimal skills
P2	Little or minimal
P3	Very little computer skills. My grandchildren aided in my being motivated to participate in the computer workshop. I want to be able to send text messages and e-mails. I am so slow with that. I wanted to be able to bring up apps and navigate better. I'm always being asked for my e-mail address. It's like everything is going to be electronic.
P5	Zero to minimum skills.
P6	Average skills that increased a bit after the computer workshop
P7	Average skill level for my activities on the computer and Internet.
P8	Before the workshop I will say 65% and now I am at 90 to 95%.
P9	Nothing but turning it on and going to an app. I wanted to learn more about computers because both of my daughters told me that I need to learn to use the computer
P10	Zero
P11	I had minimal skills before the workshop

Interview Question 4. What motivated you to participate in the computer workshop? How so?

Participant	Response
P1	I am motivated to learn because I am getting older and not getting any younger. I am willing to learn in my 70's.
P2	I did and I am. Because my teachers… I liked the togetherness and that they took with us to teach us and worked with each of us. It's a joy being excited in the class.
P4	Everything nowadays are somewhat related to computers and if you don't know about computers then you are left out. When your great grandchildren know more about computers than you do then that's kind of sad. The teachers made it so easy to learn and were so patient.
P5	Motivated because all my children have computers and I don't know what to do with computers. I felt that I might as well learn. I've got to know something about computers and the internet. I'm enjoying learning about computers and the Internet.
P6	I felt that this as an opportunity to learn skills that I could use to advance and help me figure certain things about the computer that I didn't know. You have to change with the times.
P7	I used to work with computers as a Teacher Assistant but when I had to stop work for health reasons I didn't have the time anymore. I thought that this workshop would be a good refresher course. I used to work with computers as a Teacher Assistant but when I had to stop work for health reasons I didn't have the time anymore. I thought that this workshop would be a good refresher course.
P8	Yes because I wanted to learn more about computers and I need the computer to do my job and GED test.
P9	Because it really motivated me and I look forward to coming the workshop Tuesday and Thursday. Like I said I'm really going to miss it. The teachers have spoiled us. But I learned a lot. I really did and will be able to show my daughters what I learned.
P10	Cause I wanted to keep up with my grandchildren. Cause they have computers and they know how to use them…they have cell phones, computers, laptops. I do plan to continue using computers after the workshop. I feel that I can approach the computer more now that I have more experience and I am not afraid anymore. I feel more comfortable with it now.
P11	Because I wanted to buy me a computer and I couldn't buy one if I didn't know how to use it.

Interview Question 5. Would you recommend this type of training to others? Why or why not?

Participant	Response
P1	Yes I would recommend this for those who are willing to be educated and not waste my time. I would recommend this workshop because they need this in the near future for the next generation. I'd like to motivate people in the next generation to go forward.
P3	Yes I would recommend this type of training to others. I love it. I would recommend it because the first time I tried to learn to use computers I was in my 30's and attended a course at Howard University in Washington, DC and a young instructor wanted to do everything by the book and not take the time to ensure our learning. He would say "my son can do this, you all are so stupid." That was the end of the training for me.
P4	The teachers did a great job of keeping us engaged. I would recommend this type of training to others
P5	Yes I would recommend this type of training to others. I wish you would stay another 3 weeks. I could learn more. I've learned a lot. And I could learn even more.
P6	A lot of people come asking me questions and I tell them the same thing… I don't know. After completing the computer workshop, I learned some things that I didn't know so no I would recommend the training.
P7	Yes I would recommend this training to others because you have the opportunity to learn a lot of things you didn't know - as far as the Internet use, putting icons on the desktop, computer terminology, links, lists, browsers and searches on sites. I would recommend that everyone should take a computer course, especially introductory courses.
P8	Yes
P11	Yes I would. To anybody not even the elderly but anybody. Because you taught us very well. I just hope I can apply it to the computer. I recommend this class to anybody and I thank the instructors for bringing it to Mount Hermon Village.

Interview Question 6. What challenges or barriers did you encounter during the workshop? How did you overcome those challenges?

Participant	Response
P1	I didn't experience any barriers or challenges. The teaching was successful in helping me to navigate the lessons.
P2	It was like I knew how to turn the computer off and on but how to get to the different pages and the searches I learned in this workshop. It will take some more practice on my part but I am confident that I can continue to use the computer and internet when there is an opportunity and that's on the weekend when my daughter comes over with her tablet. When she comes over after church. I can't wait until I can turn it on and search and watch the surprise on her face. She'll say "mom you've been holding out on me"
P3	The workshop instructors were fantastic because they had patience with seniors. It made me feel so comfortable in learning. I feel so much better now. For young teachers to have patience with seniors in teaching computers is fantastic.
P5	Well I didn't know anything about barriers so I didn't have to overcome anything.
P7	I feel great about using the computer and the Internet. I'm not as nervous anymore because I was taught so much in the computer workshop that I didn't know features on my phone that is similar to the tablet PC. Now I know how to better use my phone as well as the tablet PC. I now know how to get out of trouble or reverse my clicks on the computer when needed.
P8	I am more comfortable, and not as nervous as I was when I first came in because I was nervous about the training and using computers. The experience with the teachers was great. I was apprehensive about what would take place in the workshop. I overcame my feelings of anxiety and nervousness
P9	I didn't have any barriers and felt comfortable from the first time the teachers introduced themselves. And started talking to me and I do plan to continue to use the computer so that I won't lose my new skills and knowledge.
P10	I feel that I can approach the computer more now that I have more experience and I am not afraid anymore. I feel more comfortable with it now.

Interview Question 7. Do you plan to continue using computers and the Internet? How so?

Participant	Response
P1	Yes I do plan to continue to use the computer and Internet and have a desire to go back and work at Portsmouth Naval Medical Center and be a 911 Assistant.
P3	Now that I have completed the workshop, it is going to be much easier to go on the computer and find things of interest. It seems every time I go someplace someone asks "do you have an e-mail account?"
P4	I plan on continuing to use computers. I am going to pay bills online and do some shopping and when the children start using their computers then I can show them that I am not computer illiterate anymore and I can send e-mails.
P5	I definitely do plan to continue to use the computer. I'll get my children to help.
P6	I do plan to continue to use the computer and the Internet. After the workshop, I intend to spend more time using the computer. I thought that the computer was good for games and things like that. But now I see how helpful and useful computers are. You can extend the use of the computer and Internet for other reasons, such as entertainment, medical, business and home. I didn't think Wi-Fi was that important, but now see it is important for the computer to help persons, especially useful in finding things. Finding Wi-Fi hook-ups was problem I as having with my phone and now I know how to use the tablet pc.
P7	Yes, I will continue to use the computer – e-mail, Internet, and e-mailing the instructors.
P8	I plan on continuing to use the computer and internet
P9	I will use the computer to communicate with my daughters and do some browsing and learn how to use the camera to take pictures.

Interview Question 8. After completing the workshop, how has it changed your view of the value of using computers and the Internet?

Participant	Response
P1	Completing the workshop has given me a better outlook and motivated me to go forward at my old age and develop and motivate the next generation that's coming up now. I want to keep on learning.
P3	I wish that there could be other classes like the workshop. And having good, patient teachers is a plus because we are like children with a new toy.
P5	My point of view has changed after completing the workshop. That's the way to go. I'm not scared of the computer now. Not afraid of it any more. I really enjoyed the workshop and I wish you all could stay longer because this is something I really wanted to learn. When are the workshop instructors coming back?
P7	I feel great about using the computer and the Internet. I'm not as nervous anymore because I was taught so much in the computer workshop that I didn't know features on my phone that is similar to the tablet PC. Now I know how to better use my phone as well as the tablet PC. I now know how to get out of trouble or reverse my clicks on the computer when needed.
P8	It makes me want to use computers more now and I can see the value of using the internet for shopping and health information. I had great instructors and really enjoyed the interactions but the course was not long enough. Completing the computer workshop has inspired me to pick up the computer and start using it. I have enjoyed this computer class and it has been delightful having teachers that cared.
P11	I recommend this class to anybody and I thank the instructors for bringing it to Mount Hermon Village.

Interview Question 9. Is there anything you would like to share about your workshop experience or would like to ask me?

Participant	Response
P1	The lead instructor was a modest beautiful teacher. The other facilitator was a wonderful teacher and instructor and I thank God for sending them here. Thank you for the beautiful lunch and thank you for the education of elder citizens at Mount Hermon Village. Thank you very much.
P2	How did the teachers come up with teaching us elders? The teachers were very good and patient.
P3	No, I have no more questions. Would you respond to e-mails from me?
P4	The teachers of the workshop have been the best teachers even when I was young and in school the teachers have been better than they were. This is the honest truth. Before the workshop, I was illiterate with computers and while I like playing games on the computers this was not the same as using the internet and doing searches. I have enjoyed the computer workshop. If you ever have another class, please let me know
P6	No, you answered all the questions I had especially about Wi-Fi connections. I learned about mobile hotspots as well as home-wired connections.
P8	Yes, when is the next time that a computer workshop will be offered? I really enjoyed the workshop and I wish you all could stay longer because this is something I really wanted to learn.
P10	I wish the teachers could have stayed longer and gave us more training. I will miss the workshop. I am motivated at this time and I appreciate the teachers taking the time to teach us. And when teachers have patience with us I can grasp it better. The teachers took the time to show us and offered one-on-one assistance when we needed it.
P11	Not that I know of.

Curriculum Vitae

Higher Education

Doctorate of Education (Ed.D), Higher Education and Adult Learning, Walden University, April 2015

M.S., Software Engineering, University of Maryland University College, 2004

Certificate, Software Engineering, University of Maryland University College, Fall 2002

B.S., Computer Management and Information Systems, University of Maryland University College, 1995

Employment and Professional History

2009 – 2010: Associate Professor, Undergraduate Computer Programming Courses, University of Phoenix

2003 – 2004: Senior Software Engineer, Praxis Engineering Technologies

2002 – 2003: Senior Software Engineer, Scientific & Engineering Solutions

1999 – 2002: Software Engineer/Lead Engineer, ProObject Incorporated

1998 – 1999: Software Developer, Sequoia Software Corporation

1995 – 1998: Software Developer, FGM Incorporated

Active Military Service

U. S. Navy, February 1988 – May 1991